Programs, Policies & Courses

This online academic catalog provides the latest information on all undergraduate areas of study and degree programs at the University of Massachusetts Lowell and supersedes all print versions of the catalog.

Admissions

The information within this online catalog describes in detail University requirements and processes concerning the admission of high school graduates, non-traditional students, and transfer students; the admission of international students and candidates for second degrees; the admission of non-matriculating students; and the readmission of previously enrolled University students. It also provides the basic information concerning degree programs, applicant inquiries, application deadlines, Advanced Placement, health certification requirements, and Joint Admission.

For further information, visit the Admissions web site.

Applicants for Additional Bachelor’s Degree

A student who has earned a bachelor's degree at the University of Massachusetts Lowell or at another accredited bachelor's institution may be admitted to the University to pursue an additional bachelor's degree subject to the following requirements:

1. the major field of the previous degree must be clearly distinct from that of the additional degree (as determined by the department awarding the second degree);
2. the work for the additional degree must consist of not less than two semesters (or the equivalent) of full-time study;
3. the final 30 credits presented for the additional degree must be in addition to and independent of any previously awarded bachelor's; and
4. a minimum of 15 credits must be taken at the University in the major field which is presented for the additional degree.

Candidates for the additional bachelor's degree must earn a minimum of 30 credits and must comply with any special college regulations concerning completion at the University of major field and professional program requirements (including collateral and prerequisite course requirements for the major/professional program). Second-degree candidates may be eligible for major field honors but are not eligible for University honors unless they have completed 60 credits at the University for the additional bachelor's degree.

Application for admission to the University as a candidate for an additional bachelor's degree is made through the Office of Undergraduate Admissions. Prior to admission to the University as candidates for additional bachelor's degrees, applicants must be approved by the college in which they plan to matriculate and the department in which they intend to major. Retention standards for candidates for additional bachelor's degrees are based upon the grade point averages for achieving satisfactory standing which are specified for the several levels of course credits completed. Grade point averages are computed solely on the basis of qualitatively graded courses which have been completed at the University for the additional bachelor's degree. The number of course credits completed include those which have been applied from previous bachelor's programs.

Admissions General Policies

Admission to all Baccalaureate day programs is made through the Office of Undergraduate Admissions according to established undergraduate policies. Admission to programs of continuing education or to summer school, which is made through the Division of Continuing Studies & Corporate Education, does not constitute admission to baccalaureate day programs and implies no commitment, per se, for subsequent application of continuing education or summer school courses to baccalaureate day programs. It is the policy of the University of Massachusetts Lowell that students seeking admission to either regular or continuing education programs will be evaluated on their merits and (as prescribed in applicable federal and state laws) without respect to their race, color, creed, national origin, age, gender, handicap, sexual orientation, veteran status or marital status.

The admission policies of the University of Massachusetts Lowell, which are in keeping with its mission and the guidelines of the Massachusetts Department of Higher Education, specify procedures for admitting three types of applicants for undergraduate degrees:

1. high school seniors and individuals who have graduated from high schools within the past three years;
2. non-traditional students (students who have graduated from high school more than three years at time of application to the University of Massachusetts Lowell); and
3. transfer students.

Accordingly, these policies not only protect the intellectual integrity and strength of the University by requiring standards of preparation and objective evidence of the student’s potential for success, but also provide access for a diverse student population, including traditional and non-traditional students and students with special needs and talents. Individuals who are admitted by the Office of Undergraduate Admissions must be accepted under one of the following categories:

1. as undeclared students (entering as freshmen or transfer students with less than 45 semester credits) who wish to establish initial
matriculation in an undeclared status offered by one of the colleges of the University of Massachusetts Lowell;

2. as declared students (entering as freshmen or transfer students) who wish to establish initial matriculation for a UMass Lowell degree and who have a commitment to an academic major or professional program which is offered by one of the colleges of the University;

3. as declared students with advanced standing who wish to pursue a second baccalaureate degree at Lowell after having completed an initial baccalaureate degree at the University or another accredited institution; or as non-matriculating students admitted on a semester-by-semester basis.

To be admitted for undergraduate study, applicants must present records of academic performance that indicate a reasonable probability of success in their chosen programs or colleges. For regular freshman admission to an undergraduate college or degree program, probability of success is measured by an individual’s high school record, class and standardized test results and/or by his or her academic record at the University of Massachusetts Lowell for prescribed provisional courses of study. For regular transfer admission to an undergraduate college or degree program, probability of success is measured by an individual’s previous academic record at some other accredited institution of higher education. Within the space available in particular programs, admission is offered first to those whose performance record indicates the highest probability of success in the chosen college and/or program. Specific academic standards and requirements are described below under headings for admission categories.

The University welcomes correspondence from prospective students who may need assistance in adapting their high school programs to satisfy specific program requirements. Such correspondence should be addressed to the Office of Undergraduate Admissions, University of Massachusetts Lowell, 883 Broadway Street, Suite 110, Lowell, Massachusetts 01854-5104.

Students may apply online through the Common Application (https://www.commonapp.org/CommonApp/default.aspx) or at www.uml.edu/apply. Students may also download an application at www.uml.edu/admissions.

### Applicant Decisions Concerning Program Selection

Entering freshmen who prefer to test their abilities and interests or who wish to explore several areas of study before identifying themselves with one of the baccalaureate day programs can request admission as undeclared students. Students transferring 60 or more credits may not request status as undeclared students and must enter the University with a commitment to an academic major or professional program. Undeclared students are advised that openings in a desired professional program may be inadequate to accommodate all qualified undeclared student applicants at the time when program declarations must be made (upon completion of 45 credits). When resources of a college or program render it necessary to establish admission quotas, different admission criteria, above and beyond specified admission requirements, will be applied in the selection of applicants as matriculating students.

The University of Massachusetts Lowell has an Early Action Deadline of Nov. 15 for freshmen applicants for the fall semester. The regular decision deadline for freshmen applicants for the fall semester is Feb. 15. The deadline for transfer applicants for the fall semester is Aug. 15 for the Fall semester.

Baccalaureate degree programs are offered by the Colleges of Fine Arts and Humanities, College of Sciences, Francis College of Engineering, the Manning School of Business and the College of Health Sciences. Continuing education degree programs, including certificate, associates, and baccalaureate degree programs are offered in the evening and online. Applicants who wish to apply for continuing education programs should address their inquiries to Continuing Studies & Corporate Education, 883 Broadway St., Suite 110, Lowell, MA. 01854.

### Admission Policies for Non-Traditional Students

Students applying for admission more than three years after high school graduation, or who have completed the GED and would have graduated from high school three or more years prior to applying to college, must show their ability to succeed in college based upon their high school record and other application materials.

Students who drop out of high school, earn a GED, and apply to college within three years of when they would have graduated with their high school class are subject to the same admission standards as students applying within three years of graduation from high school.

### English as a Second Language (ESL) Applicants

If you have submitted an application to an undergraduate program at UMass Lowell and need to demonstrate English Language Proficiency to complete your application process, you will be contacted by an Admissions counselor who will let you know if the University sponsored diagnostic test is an option for you. If it is an option but you cannot make it to campus you can take the Test of English as a Foreign Language. Students must have a minimum score of 79-80 on the internet based test.

### Fresh Start Program

Students who have been absent from the University for two years or longer may be readmitted under the terms of the Fresh Start program. Under this program, a returning student will be treated as if he or she were a transfer student. Courses completed during earlier periods of enrollment with grades of C or above will be accepted toward graduation but will not be included in the cumulative average. Courses completed during earlier periods of enrollment with grades below C will not be counted toward graduation or included in the cumulative average.

A maximum of 75 earlier University of Massachusetts Lowell “transfer” credits will be accepted toward graduation, and after readmission under Fresh Start the student must earn a minimum of 45 credits in residence at UMass Lowell in a matriculated program of study.
Courses taken in the academic major during earlier periods of enrollment must be approved by the major department before those courses can be counted toward the requirements of the major. (This provision is especially important in majors that undergo regular curriculum revision.)

Admissions Policies for Traditional Students

Graduating High School Seniors and High School Graduates

Graduating high school seniors and high school graduates who wish to be admitted to the University as matriculating students must complete the following steps:

1. file an official application form with the University of Massachusetts Lowell prior to July 1;
2. request high school principals or guidance directors to forward to the Office of Undergraduate Admissions transcripts of secondary school grades, including grade reports for at least the first quarter of the senior year;
3. arrange to take either the College Entrance Examination Board Scholastic Aptitude Test (SAT) or ACT exam.

Detailed information concerning the College Entrance Examination Board tests and the dates throughout the year on which they are administered may be secured from the Office of Undergraduate Admissions of the University of Massachusetts Lowell, guidance counselors, or the Educational Testing Service, Princeton, New Jersey 08540. Special information is provided in the following sections concerning required aptitude examinations for applicants to music programs and for satisfaction of department language requirements through the Foreign Language Achievement Tests of the College Entrance Examination Board.

The responsibility for having all credentials forwarded to the University of Massachusetts Lowell rests solely with the applicant.

Admission Requirements for Graduating High School Seniors and High School Graduates

The general expectation is that applicants will present course work, which has been taken within college preparatory curricula. However, the Office of Undergraduate Admissions will evaluate the academic units of vocational technical school (Chapter 74) graduates to determine their relevance for University curricula. The ultimate judgment concerning such equivalency rests solely with the University of Massachusetts Lowell. The following pages specify prescribed high school unit requirements and other qualitative requirements for the admission of freshmen students. Applicants must satisfactorily complete prescribed units prior to enrollment. Table 1 specifies the high school unit distribution which is required for general University admission consideration.

Prescribed High School Unit Requirements

Table 1: General University Admission

<table>
<thead>
<tr>
<th>Subject Required Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 4 courses</td>
</tr>
<tr>
<td>Mathematics 3 courses (Algebra I &amp; II and Geometry or Trigonometry, or comparable coursework)</td>
</tr>
<tr>
<td>Sciences 3 courses (including 2 courses with laboratory work)</td>
</tr>
<tr>
<td>Social Sciences 2 courses (including 1 course in U.S. History)</td>
</tr>
<tr>
<td>Foreign Languages 2 courses (in a single language)</td>
</tr>
<tr>
<td>Electives 2 courses (from the above subjects or from the Arts and Humanities or Computer Sciences)</td>
</tr>
<tr>
<td>Minimum Prescribed Units 16</td>
</tr>
</tbody>
</table>

Qualitative Requirements for the Admission of Freshman Students

All freshman applicants are evaluated using standards determined by both the Massachusetts Department of Higher Education and the University. Emphasis is placed upon the rigor of the high school course selection as well as scores on standardized tests (if applicable); letters of recommendation, essays and extracurricular activities are also considered during the evaluation of applications.

Entering freshmen in Fall 2011 had an average GPA 3.25 and an average combined Critical Reading and Math SAT score of 1113.

*SAT Requirements

*Criminal Justice & Sound Recording: 1000 SAT or equivalent ACT score

Music Aptitude and Proficiency Examinations, College of Arts & Sciences Music Programs

Students who wish to apply for music programs are required to demonstrate vocal or instrumental ability in a performance audition with a member of the faculty of the College of Fine Arts and Humanities. The student is also required to achieve satisfactory scores on both a written test of music fundamentals and a brief examination in aural comprehension. Performance auditions and theory testing are scheduled throughout the spring semester. Applicants will be invited to take these special music tests at the University when all
Advanced Placement Policies for Baccalaureate Applicants

Students entering the university as freshmen or as transfer students may elect to challenge required courses through established procedures cited below. University departments reserve the right to refuse the granting of credit for those examinations which are presented by a student for his or her major(s). Equivalency credit is granted for laboratory components of science courses only through examinations of university departments. Accordingly, science credits which are granted through the College Level Examination Program and Advanced Placement Examinations of the College Entrance Examination Board do not waive any specified laboratory requirement, including those of the university core curriculum.

- **College Level Examination Program (CLEP)**
- **International Baccalaureate (IB) Program**
- **Advanced Placement Examinations of the College Entrance Examination Board**
- **Foreign Language Achievement Tests of the College Entrance Examination Board**
- **Course Credit Limits Through Advanced Placement with Credit**

### College Level Examination Program (CLEP)

Entering freshmen and transfer students may be granted university credit for subject examinations of the College Level Examination Program when they have achieved scores which are on or above the 'C' grade level. A complete listing of subject examinations of CLEP for which the University grants credits is noted below:

<table>
<thead>
<tr>
<th>COMPOSITION AND LITERATURE</th>
<th>Credits</th>
<th>Score</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Literature</td>
<td>3</td>
<td>50</td>
<td>42.281</td>
</tr>
<tr>
<td>Analyzing and Interpreting Literature</td>
<td>6</td>
<td>52</td>
<td>42.199 &amp; 42.299</td>
</tr>
<tr>
<td>College Composition</td>
<td>6</td>
<td>53</td>
<td>42.101 &amp; 42.102</td>
</tr>
<tr>
<td>College Composition Modular</td>
<td>3</td>
<td>50</td>
<td>42.101</td>
</tr>
<tr>
<td>English Literature</td>
<td>3</td>
<td>50</td>
<td>42.282</td>
</tr>
<tr>
<td>Humanities</td>
<td>6</td>
<td>50</td>
<td>58.105 &amp; 42.202</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FOREIGN LANGUAGES</th>
<th>Credits</th>
<th>Score</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>French Language, Level 1</td>
<td>6</td>
<td>53</td>
<td>50.101 &amp; 50.102</td>
</tr>
<tr>
<td>French Language, Level 2</td>
<td>12</td>
<td>70</td>
<td>50.101,102,211,212</td>
</tr>
<tr>
<td>German Language, Level 1</td>
<td>6</td>
<td>53</td>
<td>51.101 &amp; 51.102</td>
</tr>
<tr>
<td>German Language, Level 2</td>
<td>12</td>
<td>70</td>
<td>51.101,102,211,212</td>
</tr>
<tr>
<td>Spanish Language, Level 1</td>
<td>6</td>
<td>53</td>
<td>54.101 &amp; 54.102</td>
</tr>
<tr>
<td>Spanish Language, Level 2</td>
<td>12</td>
<td>70</td>
<td>54.101,102,211,212</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIAL SCIENCES AND HISTORY</th>
<th>Credits</th>
<th>Score</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Government</td>
<td>3</td>
<td>50</td>
<td>46.101</td>
</tr>
<tr>
<td>History of US I: Early Colonization's to 1877</td>
<td>3</td>
<td>50</td>
<td>43.111</td>
</tr>
<tr>
<td>History of US II: 1865 to the Present</td>
<td>3</td>
<td>50</td>
<td>43.112</td>
</tr>
<tr>
<td>Human Growth and Development</td>
<td>3</td>
<td>50</td>
<td>47.260</td>
</tr>
<tr>
<td>Macroeconomics, Principles of</td>
<td>3</td>
<td>54</td>
<td>49.202</td>
</tr>
<tr>
<td>Microeconomics, Principles of</td>
<td>3</td>
<td>56</td>
<td>49.201</td>
</tr>
<tr>
<td>Psychology, Introductory</td>
<td>3</td>
<td>50</td>
<td>47.101</td>
</tr>
<tr>
<td>Introductory Sociology</td>
<td>3</td>
<td>51</td>
<td>48.101</td>
</tr>
<tr>
<td>Western Civilization I: Ancient Near East to 1648</td>
<td>3</td>
<td>53</td>
<td>43.105</td>
</tr>
<tr>
<td>Western Civilization II: 1648 to the Present</td>
<td>3</td>
<td>53</td>
<td>43.106</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCIENCES AND MATHEMATICS</th>
<th>Credits</th>
<th>Score</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>6</td>
<td>50</td>
<td>81.111 &amp; 81.112</td>
</tr>
<tr>
<td>Calculus</td>
<td>3</td>
<td>50</td>
<td>92.131</td>
</tr>
<tr>
<td>Mathematics, College</td>
<td>3</td>
<td>50</td>
<td>92.151</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>6</td>
<td>50</td>
<td>83.101 &amp; 83.102</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Credits</th>
<th>Score</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Accounting</td>
<td>6</td>
<td>53</td>
<td>60.201 &amp; 60.202</td>
</tr>
<tr>
<td>Business Law, Introductory</td>
<td>3</td>
<td>50</td>
<td>41.262</td>
</tr>
</tbody>
</table>
International Baccalaureate (IB) Program

<table>
<thead>
<tr>
<th>Higher Level (HL) exam ONLY</th>
<th>Transfer Credit awarded with scores of 4-7 (unless otherwise noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting/Finance</td>
<td>3 credits: 60.199</td>
</tr>
<tr>
<td>Chemistry</td>
<td>6 credits: 84.121 &amp; 84.122</td>
</tr>
<tr>
<td>(scores of 5-7 only)</td>
<td></td>
</tr>
<tr>
<td>Economics</td>
<td>6 credits: 49.201 &amp; 49.202</td>
</tr>
<tr>
<td>(scores of 5-7 only)</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>6 credits: 42.101 &amp; 42.199</td>
</tr>
<tr>
<td>(scores of 5-7 only)</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td>6 credits: 43.299 &amp; 43.399</td>
</tr>
<tr>
<td>(scores of 5-7 only)</td>
<td></td>
</tr>
<tr>
<td>Language B</td>
<td>6 credits: Intermediate I &amp; II</td>
</tr>
<tr>
<td>(# depends on language)</td>
<td></td>
</tr>
<tr>
<td>ex. French 50.211/50.212</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>7 credits: 92.131 &amp; 92.283</td>
</tr>
<tr>
<td>Psychology</td>
<td>6 credits: 47.101 &amp; 47.269</td>
</tr>
<tr>
<td>Sociology</td>
<td>3 credits: 48.199 (score of 4)</td>
</tr>
<tr>
<td></td>
<td>6 credits: 48.199 &amp; 48.299 (score of 5-7 only)</td>
</tr>
</tbody>
</table>

Advanced Placement Examinations of the College Entrance Examination Board

Entering freshmen who have demonstrated college level proficiency through Advanced Placement examinations of the College Entrance Examination Board may be granted university credit for scores of 5, 4, and 3. Credit will not be given for scores of 2 or 1.

The following is a listing of Advanced Placement Examinations for which the university grants course credit:

<table>
<thead>
<tr>
<th>AP Test Name</th>
<th>Score</th>
<th>Equivalent</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMERICAN HISTORY</td>
<td>3, 4 or 5</td>
<td>43.111 &amp; 43.112</td>
<td>6 Credits</td>
</tr>
<tr>
<td>EUROPEAN HISTORY</td>
<td>3, 4 or 5</td>
<td>43.105 &amp; 43.106</td>
<td>6 Credits</td>
</tr>
<tr>
<td>WORLD HISTORY</td>
<td>4 or 5</td>
<td>43.107 &amp; 43.108</td>
<td>6 Credits</td>
</tr>
<tr>
<td>BIOLOGY</td>
<td>3, 4 or 5</td>
<td>81.111, 81.112, 81.113, 81.114</td>
<td>8 Credits</td>
</tr>
<tr>
<td>CHEMISTRY</td>
<td>4 or 5</td>
<td>84.121, 84.122, 84.123, 84.124</td>
<td>8 Credits</td>
</tr>
<tr>
<td>CLASSICS-VIRGIL</td>
<td>3, 4 or 5</td>
<td>56.303</td>
<td>3 Credits</td>
</tr>
<tr>
<td>CLASSICS-LATIN LYRIC</td>
<td>3, 4 or 5</td>
<td>56.303</td>
<td>3 Credits</td>
</tr>
<tr>
<td>MACROECONOMICS</td>
<td>4 or 5</td>
<td>49.202</td>
<td>3 Credits</td>
</tr>
<tr>
<td>MICROECONOMICS</td>
<td>4 or 5</td>
<td>49.201</td>
<td>3 Credits</td>
</tr>
<tr>
<td>FRENCH LANGUAGE</td>
<td>3 or 4</td>
<td>50.261 &amp; 50.262</td>
<td>6 Credits</td>
</tr>
<tr>
<td>FRENCH LITERATURE</td>
<td>3, 4 or 5</td>
<td>50.261 &amp; 50.262</td>
<td>6 Credits</td>
</tr>
<tr>
<td>GERMAN LANGUAGE</td>
<td>3 or 4</td>
<td>51.101, 51.102, 51.101, 102, 211, 212</td>
<td>6 Credits</td>
</tr>
<tr>
<td>US GOVERNMENT &amp; POLITICS</td>
<td>3, 4 or 5</td>
<td>46.101</td>
<td>3 Credits</td>
</tr>
<tr>
<td>PHYSICS B</td>
<td>3, 4 or 5</td>
<td>95.103, 104 &amp; 96.103, 104</td>
<td>8 Credits</td>
</tr>
<tr>
<td>PHYSICS C-MECHANICS</td>
<td>3, 4 or 5</td>
<td>95.141 &amp; 96.141</td>
<td>4 Credits</td>
</tr>
<tr>
<td>PHYSICS C-ELECTRICITY &amp; MAGNETISM</td>
<td>3, 4 or 5</td>
<td>95.141 &amp; 96.141</td>
<td>4 Credits</td>
</tr>
<tr>
<td>MATHEMATICS: CALCULUS AB</td>
<td>3, 4 or 5</td>
<td>92.131</td>
<td>4 Credits</td>
</tr>
<tr>
<td>MATHEMATICS: CALCULUS BC</td>
<td>3, 4 or 5</td>
<td>92.131 &amp; 92.132</td>
<td>8 Credits</td>
</tr>
<tr>
<td>MUSIC</td>
<td>3, 4 or 5</td>
<td>71.101</td>
<td>3 Credits</td>
</tr>
<tr>
<td>PSYCHOLOGY</td>
<td>3, 4 or 5</td>
<td>47.101</td>
<td>3 Credits</td>
</tr>
<tr>
<td>Course</td>
<td>Code(s)</td>
<td>Credits</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Spanish Language 3 or 4</td>
<td>54.101, 102, 211, 212</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>54.101 &amp; 54.102</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>English Language &amp; Composition 3 or 4</td>
<td>42.101 &amp; 42.102</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>42.101</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Environmental Science 3, 4 or 5</td>
<td>87.111</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Comparative Government &amp; Politics 3, 4 or 5</td>
<td>46.112</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Statistics 3, 4 or 5</td>
<td>92.283</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Art History 3, 4 or 5</td>
<td>58.101</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Computer Science A 4 or 5</td>
<td>91.101</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>91.101</td>
<td></td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Foreign Language Achievement Tests of the College Entrance Examination Board

University credit is granted on the recommendation of the Department of Languages to entering freshmen who have demonstrated satisfactory language competency through the Language Achievement tests of the College Entrance Examination Board. University credit on the intermediate course level will be given to students achieving scores of 550 or better. Such credit will satisfy any language proficiency requirement specified for students by their major departments.

Course Credit Limits Through Advanced Placement with Credit

The maximum number of credits that may be granted to any student through advanced placement procedures, including departmental equivalency examinations, is 30 semester credits. Under no circumstances will duplicate examination credit be granted to students who present formal course work for transfer. Nor will examination credit be granted to transferring students for the purposes of reducing either the major field residency requirement of 15 credits or the general residency requirement of 30 credits in university courses.

Application Procedures and Requirements for Non-Graduates of High Schools

Individuals who have not graduated from high school may be admitted to the University upon satisfactory completion of the General Educational Development (GED) tests and receipt of a certificate of high school equivalency. Such students are required to take either the Scholastic Aptitude Tests of the College Entrance Examination Board (SAT) or ACT exam prior to their application and to present scores that are acceptable to the University. Admission procedures for students possessing certificates of high school equivalency are the same as those that are prescribed for graduating seniors and high school graduates.

Application Procedure for Non-Matriculating Students

Admission as a non-matriculating student is granted only under provisions which govern the non-degree programs cited below. Applicants for admission as non-matriculating students are required to file admission applications and to submit such credentials as are specified for their proposed non-degree programs. A non-matriculated student may be readmitted subject to the following conditions:

1. the student has satisfactorily completed his or her previously attempted courses,
2. the original condition under which the student initiated non-matriculating studies permits continued enrollment, and
3. commitments of the University to matriculating students permit enrollment of non-matriculating students.

Non-Matriculating Programs for Students Holding Baccalaureate Degrees

An individual who holds a baccalaureate degree and who wishes to pursue a limited non-degree program (up to a maximum of 15 credits) may be admitted full- or part-time to the University as a non-matriculating student. Such admission requires the approval of each of the departments in which courses are contemplated. University of Massachusetts Lowell graduates should indicate their date of graduation on their application forms. Other applicants must request the registrars of the institutions by which their degrees were conferred to mail transcripts of their baccalaureate records directly to the Office of Undergraduate Admissions and are warned that permission to enroll in courses will be denied if transcripts have not been received prior to course registration. A student who holds a baccalaureate degree and who wishes to pursue a second baccalaureate should investigate the appropriateness of both degree and non-degree programs of the Graduate School before applying for such status.

Change of Baccalaureate Program Declaration After Application

Individuals who are admitted to specific programs and who wish to change their major may do so by notifying the Office of Undergraduate Admissions. Changes will be approved only if space in the desired program is available and the applicant has satisfied all admission requirements for the new college or program.

For Students Transferring from Massachusetts Community Colleges to Public Colleges and Universities Offering the Baccalaureate Degree

Office of the Registrar 83 Broadway Street, Dugan 101, Lowell, MA 01854-5129
Section I: Requirement for Transfer Compact Status

A student shall be eligible for Transfer Compact status if he or she has met the following requirements:

a. completed an associate’s degree with a minimum of 60 credit hours exclusive of developmental course work;

b. achieved a cumulative grade-point average of not less than 2.000 (in a 4.000 system) at the community college awarding the degree; and

c. completed the following minimum general education core, exclusive of developmental course work:

   - English Composition/Writing 6 credits
   - Behavioral and Social Science 9 credits
   - Humanities and Fine Arts 9 credits
   - Natural or Physical Science 8 credits
   - Mathematics 3 credits

The sending institution is responsible for identifying the transcript of each student who is a candidate for transfer under this compact.

Section II: Credits to be Transferred

The 35 credits in general education specified in Section I will be applied toward the fulfillment of the receiving institution’s general education requirements. A minimum of 25 additional credits will be accepted as transfer credits by the receiving institution. These credits may be transferred as:

a. free electives,

b. toward the receiving institution’s additional general education requirements,

c. toward the student’s major, or
d. any combination, as the receiving institution deems appropriate.

Only college-level course credits consistent with the standards set forth in the Undergraduate Catalog are included under this Compact. Credits awarded by the sending institution through CLEP and challenge examinations may be included when the community college certifies that a student qualifies under this Compact. Student must forward official CLEP scores.

Section III: Credits Beyond the Associate Degree

To complete the baccalaureate degree, a student who transfers under this compact may be required to take no more than 68 additional credits unless:

a. the student changes his or her program upon entering the receiving institution; or

b. the combination of additional general education requirements, if any, and the requirements of the student’s major at the receiving institution total more than 68 credits.

Under these circumstances, transfer students will be subject to the same requirements as native students. (The term "native student" refers to students who began their undergraduate education at the baccalaureate institution.)

Section IV: Admission to Competitive Majors or Programs

If, because of space or fiscal limitations, the receiving institution does not admit all qualified applicants to a given major or program, the receiving institution will use the same criteria for applicants who are transfer students under this Compact as it does for its native students.

Day Programs for Students Matriculating for Online & Continuing Education

Students who have established matriculation for University of Massachusetts Lowell continuing education degrees at either the associate or baccalaureate levels may be permitted to pursue specifically authorized day courses. Such students must secure the written approval of their program coordinators for all projected courses prior to receiving permission from the course instructor. Full notation of approved courses (including those failed) is made upon the permanent record of Online & Continuing Education students.

Dual Enrollment Program for High School Students

The Massachusetts Dual Enrollment Program was established by the Education Reform Act of 1993. The program provides qualified high school juniors and seniors the opportunity to take courses at public colleges and universities and thus earn both high school and college credit. Participants in this program are required to have a high school GPA of 3.0 or better and be recommended by their high school principal or guidance counselor. Dual Enrollment students must file an application with the Office of Undergraduate Admissions and submit high school transcripts, along with a parental signature and a guidance counselor signature allowing them to take classes on campus. Dual enrollment students are limited to enrolling in 100 and 200 level courses. The University reserves the right to decline admittance to students on the basis of academic ability. Students are financially responsible for all Dual Enrollment Courses.

Equal Opportunity and Outreach

Equal and Fair Treatment

Under federal and state laws, all students are protected from discrimination based on race, color, religion, national origin, disability, gender, (including sexual harassment), age, sexual orientation, marital or veteran status. If you feel that you have been discriminated against based upon any one of these areas, you must contact Equal Opportunity and Outreach (EOO)(http://www.uml.edu/equal/), Wannalancit Business Center, 600 Suffolk Street, Suite 301. These protections also include retaliation for filing complaints of discrimination. Concerns regarding course offerings, instructor and student attitudes should also be directed to EOO staff.

Students are responsible for adhering to the polices of the University regarding equal and fair treatment.

Health Certification Requirements for Admission

All students, as part of the condition of admission, are required to have on file a Health Examination Report and physical exam form, evidence of a recent Mantoux TB test, and proof of completed up-to-date immunizations as mandated by law.

The Massachusetts College Immunization Law requires all full-time students, and all full or part time students in the health sciences, regardless of age, to provide a medical certificate of immunization against measles, mumps, rubella, tetanus and diphtheria. The month and year must be given.

The measles vaccine must have been administered after 1968 and after the age of one, and there must have been two doses at least one month apart.

In the absence of proof of the measles, mumps, or rubella vaccine, a positive titer is sufficient. History of a disease is not acceptable.

The Tetanus-Diphtheria injection must be within the past ten years.

All freshmen entering college after September 2001, as well as any student in the health sciences, regardless of class must have
completed the hepatitis B vaccine series.

As of August 2007, the Massachusetts Department of Public Health has mandated that all new college students, who live in campus housing receive one of the Meningococcal vaccines or sign the Department of Public Health’s waiver form.

Effective September 1, 2011, the Massachusetts Department of Public Health has added new immunization requirements for all newly enrolled students as well as all students enrolled in the College of Health Sciences. These immunizations include Tdap and Varicella.

**Joint Admissions**

Joint Admissions is a state-wide program which guarantees qualified students admission to the University of Massachusetts Lowell upon completion of an Associate Degree in an approved Joint Admissions program. A minimum cumulative grade point average of 2.5 is required. Students may enroll in the Joint Admissions program at any time prior to graduation from their community college by signing the Joint Admissions agreement (available in the transfer office of their community college).

- When ready to transfer, students are required to submit the Intent to Enroll Form as application to the University. There is no application fee.
- Students must provide the University with their final transcript showing graduation date and their cumulative grade point average.

**Programs for University Employees**

University employees who are high school graduates or who possess certificates of high school equivalency may apply for admission as non-matriculating students. Admission is extended to employees as non-matriculating students on a semester-by-semester basis and solely for courses designated at the time of application. Employees who wish to matriculate for a baccalaureate degree should apply for admission. Participation in this program is subject to employee obligations and special policies of the Board of Trustees.

**Readmission Procedures for Previously Enrolled Students of the University of Massachusetts Lowell**

The University does not grant leaves of absence to students who wish to interrupt their baccalaureate studies. For more information about withdrawal options, please contact the Office of the Registrar. Accordingly, students who have withdrawn from the University and who seek readmission must file an application for readmission with the Registrar’s Office. Your options for readmissions, including qualified, unqualified, and probationary readmissions are explained below. When resources of a college or program render it necessary to limit enrollments, the Registrar’s Office will establish a waiting list of applicants for transfer and reinstatement. Different admission and/or enrollment criteria, above and beyond minimum program requirements, may be applied to these individuals to ensure the admission and readmission of the most qualified applicants for the limited openings.

Upper division students in the College of Health Sciences who have withdrawn must make individual arrangements with appropriate chairpersons to reserve their spaces in courses for the semester of the anticipated return to the University. Unless such special arrangements have been made, reinstatement by the Office of the Registrar cannot ensure full resumption of a student’s course of study. Please note that other departments may also have additional requirements for reinstatement.

In the event that readmission applicants wish to change their programs and/or to seek readmission to the University in a college other than that which they previously attended, their reinstatement must be approved by the chairperson of the program to which they seek admission and the appropriate college dean or his/her designee. If program enrollments permit, approval for such readmission will be granted to students who satisfy all program admission requirements. Individuals who seek re-admission to the University in a college other than that which they previously attended will be subject to re-evaluation procedures that are specified for enrolled students who seek an intercollegiate transfer (cf. policies governing intercollegiate transfers which appear elsewhere in this publication under the heading “Academic Policies: Change of Major with Intercollegiate Transfer”). Individuals who apply for intercollegiate transfers must submit their applications no later than November 1 for Spring semester reinstatement and April 1 for Fall semester reinstatement.

**Unqualified Reinstatement**

Individuals who were students in satisfactory academic standing prior to their withdrawal and who have not been absent from the University for more than one semester are automatically reinstated to the programs in which they were previously enrolled and are subject to curriculum requirements that are in effect for the classes to which they previously belonged. Application for readmission must be filed with the Office of the Registrar.

**Qualified Reinstatement**

Students who have been absent from the University for two or more continuous semesters are subject to the rules and regulations of the University which are in effect at the time of their readmission rather than at the time of their original admission. If program enrollments permit, individuals who were students in satisfactory academic standing prior to their withdrawal ordinarily are reinstated to the programs in which they were previously enrolled. However, during an individual’s absence some programs may have established higher entrance and retention requirements and he or she may be denied reinstatement for failure to satisfy these requirements.

Individuals are not automatically reinstated to the programs in which they were previously enrolled when they have been absent from the University for periods exceeding ten years. Course work that has been completed prior to ten years of the date of readmission is generally recognized only through those examination procedures described in the policy statements for course equivalency. Such course work may also be evaluated on an individual basis by the academic standards committee of the college in which an applicant desires to
re-establish his or her matriculation. Students who wish to have such course work evaluated by the committee must present their cases in writing to the committee.

Individuals who have been suspended from the University for unsatisfactory academic standing may apply for readmission only within policies that govern probationary readmission.

**Probationary Readmission**

A student who has been suspended from the University is entitled to apply for readmission as a full-time probationary student but may not initiate his or her probationary studies before an absence from the University for one semester. Application for readmission to all programs is made through the Office of the Registrar and must be received by April 1 for a readmission decision during the Spring semester and by November 1 for a readmission decision during the Fall semester.

Petitions that have been received by the filing deadline of November 1 will be reviewed by the appropriate academic standards committee during the Fall semester, and readmitted students will be permitted to initiate their probationary studies at the beginning of the Spring semester. Similarly, petitions which have been received by the filing deadline of April 1 will be reviewed by the appropriate academic standards committee during the spring semester, and readmitted students will be permitted to initiate their probationary studies at the beginning of the Fall semester. Probationary studies may be authorized during the Fall and Spring semesters in day classes only.

Upon the receipt of an application, the Office of the Registrar will forward all readmission papers to the academic standards committee of the college to which the student applies. Except as prohibited by the academic policies of professional colleges, suspended students may petition for readmission to the University with probationary status as follows: 1) all suspended students may petition for readmission to the college in which they were previously enrolled and may request re-enrollment in the former major or readmission with a change of major; 2) freshmen students and sophomore students who have not attempted more than 45 credits or have not completed more than three full-time semesters also may petition for simultaneous intercollegiate transfer and probationary admission to a new program. Students who have attempted 45 credits or three full-time semesters are not eligible for intercollegiate transfer at the time of probationary readmission.

Students who are readmitted to colleges from which they were previously suspended must achieve satisfactory academic standing for all course hours completed by the end of their probationary semester. Students who are permitted to make an intercollegiate transfer will be required to attain a probation average of 2.000 in order to achieve satisfactory academic standing.

After securing recommendations from appropriate departments and studying the previous academic record of the student, the academic standards committee will lay down the requirements which the student must satisfy as a condition for his or her probation (specific courses to be taken, conference schedules with faculty advisors, and any other special or general academic condition which may be construed as necessary for the student’s successful completion of his or her probationary studies). In determining such requirements for probation, the academic standards committees shall prescribe a sufficient number of courses for a student who has been readmitted to the college from which he or she has been suspended, which shall make the achievement of satisfactory academic standing reasonably possible during a full-time semester of probation.

A student who has been dismissed from the University needs to review the Academic Standing policy for **Academic Dismissal**

**Accommodations for Students with Disabilities**

The University and its programs and activities are accessible to academically qualified students who have physical, learning, or psychiatric disabilities as required under the Americans With Disabilities Act (ADA). Although some architectural barriers still remain, physically disabled persons can traverse the campus with a minimum of difficulty. University libraries, the student unions, several residence halls, and more recently constructed classroom buildings are accessible to students who use wheelchairs or have other mobility impairments. Early registration, preferential scheduling, housing assistance, readers, note-takers, interpreters, alternative testing procedures, reduced course load, and special parking arrangements are some of the accommodations available to students with disabilities. Documentation from an appropriate professional is required for all accommodations. For further information contact the Office of Disability Services (http://www.uml.edu/student-services/disability/default.aspx) or by calling 978-934-4574.

Since admission to the University is based entirely on the academic qualifications of the applicant, admission procedures remain the same for all applicants, regardless of disability.

**Admissions Policies for Transfer Students**

- Application Procedures and Requirements
- Required Credentials for Transfer Applicants
- Evaluation of Transfer Credits
- University Restrictions Concerning Transfer Credit Recognition
- College and Program Restrictions Concerning Transfer Credit
- Initial Review of Transfer Students for Compliance with University Retention Standards

**Application Procedures and Requirements**

In general, the University of Massachusetts Lowell will accept on an hour-for-hour basis semester credits with grades of C- (1.70 on a 4.00 scale) or better as shown on official transcripts of record which are received directly from other regionally accredited collegiate institutions and which are applied to an initial baccalaureate degree. No credit will be recognized for the grade of P unless the catalog of
the transferring institution specifically states that P is equivalent to a final course grade of C-. Quarter credits are recognized on a
prorated basis of three quarter credits to two semester credits. (Students who are interested in transferring credits for an additional
baccalaureate degree should consult the appropriate section below concerning such admission.) Preference for admission to the
University is based upon the record of each individual transfer applicant at the end of the semester preceding admission. All credits to
be transferred must be identified at the time of application for transfer. The University reserves the right to deny credit for course work
taken by the student prior to admission if it is identified and presented after transfer.

In general, the University of Massachusetts Lowell will accept departmental test credits with grades of C- or better as shown on official
transcripts of record which are received directly from other accredited institutions. No credit will be recognized for the grade of P or S
unless the catalog of the transferring institution specifically states that P or S is equivalent to a final minimum course grade of C-.

Students who transfer from four-year institutions must complete a minimum of 30 semester credits at the University of Massachusetts
Lowell to be eligible for a Lowell baccalaureate degree. The University will not reduce the minimum residency requirement of 60
semester credits for students who present 60 or more semester credits from a two-year college. The records of applicants 1) who have
completed associate degree programs or who have established matriculation at other accredited institutions of higher education and 2)
who are eligible to return to such institutions for the semester in which they seek admission to the University are routinely processed by
the Office of Undergraduate Admissions for regular transfer admission.

Required Credentials for Transfer Applicants

It is the responsibility of students seeking transfer to arrange for all official transcripts and notations on courses in progress to be
forwarded to the Office of Undergraduate Admissions directly from the previous institution(s).

Additionally, final transcripts of all completed courses must be forwarded to the Office of Undergraduate Admissions following the
completion of previously designated courses in progress. Transfer students whose records are incomplete on the first day of semester
classes may be prohibited from attending courses and may be required to withdraw from the University.

An applicant who has attended one or more institutions must request each registrar to mail directly to the Office of Undergraduate
Admissions a transcript of his or her record, even if credits were not earned or credits are not presented for transfer.

Transfer students must meet one of the following criteria:

1. 12 or more transferable college credits and a minimum of 2.5 college GPA;
2. Up to 23 transferable college credits, a minimum 2.0 college GPA, and a high school transcript that meets the admission
   standards for freshmen applicants; or
3. 24 or more transferable credits and a minimum 2.0 college GPA.

Transfer students who have fewer than 12 transferable college credits must meet the admission standards for freshmen applicants.

Evaluation of Transfer Credentials

A preliminary evaluation of course credits to be transferred to the University is made by the Office of Undergraduate Admissions at the
time of application. Students seeking transfer should be aware that this evaluation by the Office of Undergraduate Admissions is
preliminary in nature and that acceptance of transfer credit and assignment of a year of graduation or other status is subject to final
review by the student’s major department when the student is formally accepted for matriculation by one of the colleges of the University.
Credit which is acceptable according to general University standards is not necessarily acceptable for specific programs. This is
especially true when program transfer quotas have been imposed. The Office of Undergraduate Admissions will advise applicants when
their admission to the University does not guarantee acceptance into their preferred professional programs. The applicability of grades
received in transferred courses for the determination of the grade-point average of the student’s major at the University of
Massachusetts Lowell is determined by policies of each of the colleges.

Massachusetts public community colleges may award other associate degrees and certificates with a primary objective other than
student transfer to a four-year institution. Course credits from such programs presented for transfer will be evaluated by the four-year
institution for applicability to general education requirements, to unrestricted elective courses, and to requirements in the student’s major
field.

To view the list of courses approved by departments for transfer into the University of Massachusetts Lowell, visit
www.uml.edu/registrar/transfer/

University Restrictions Concerning Transfer Credit Recognition

Courses completed at non-public institutions which are not accredited by the major regional accrediting associations will not be credited
to degree programs of the University. Nor will credit be granted for courses which are unacceptable to the transfer institution for its own
associate or baccalaureate programs or which are completed within post-secondary school diploma programs. Non-credit CEU
courses, adult-enrichment or refresher courses, and secondary school correspondence and home study courses also are not recognized
for transfer credit. The University reserves the right to refuse recognition for courses which were taken more than ten years prior to the
date when a student applies for transfer when, in the opinion of department chairpersons and program directors, the knowledge attained
in such courses is deemed to be out of date and/or in need of verification. Competencies which a student has achieved through such
courses, or by any other means, may be recognized for credit if verified by the College Level Examination Program (CLEP) or
departmental examinations.

College and Program Restrictions Concerning Transfer Credit
Many colleges and programs impose additional restrictions on the acceptability of transfer credit. The College of Health Sciences and the Manning School of Business have special regulations governing the acceptance of transfer credits for professional courses. Transfer applicants to these colleges should consult the dean of the college or the appropriate department chairperson concerning transfer credit for these courses.

As a general rule, courses of a professional nature from any curriculum are not accepted in transfer when a student seeks admission to a different curriculum or program at the University of Massachusetts Lowell. Transfer applicants should consult the appropriate dean or departments for current regulations.

Initial Review of Transfer Students for Compliance with University Retention Standards

For the purpose of determining academic standing, student records are reviewed each semester. Transfer students are initially evaluated for retention purposes at the end of the semester in which they have attempted their first 18 credits at the University.

Tuition Assistance Program

MASSACHUSETTS ADVANTAGE PLUS PROGRAM (MAPP)

The University of Massachusetts Lowell proudly offers MA community college students who have earned an associate’s degree in an approved program with a 3.0 or better grade point average a full in-state tuition discount when they transfer to the University of Massachusetts Lowell.

Award: In-State day school tuition, currently $1,454 for full time students/pro-rated for part time students.

- In-state, Out of State, International, Proximity, or New England Regional residencies
- Minimum GPA of 3.0
- Associates Degree from MA State community college
- Mass Transfer eligible major
- Enroll at the University of Massachusetts Lowell within one year of graduating from MA community college
- Does not cover online or continuing education courses

Renewal criteria: 3.0 GPA; maximum four semesters.

Programs for Students Matriculated at other Colleges and Universities

VISITING STUDENTS

Students who are matriculated for degrees at associate or baccalaureate institutions may be admitted to the University to pursue specifically authorized courses. Such students are admitted to the University on a semester-by-semester basis and must secure prior approval for University courses from appropriate authorities at institutions where their degrees will be granted. Permission to enroll in courses of the University will not be granted to students without a letter from an appropriate officer of the institution in which they are matriculating which certifies that they are candidates for a degree and are in good academic standing. Courses of a professional nature may not be elected by non-matriculating students of the University unless specifically authorized by the appropriate college dean.

Joint Military Studies Minor

Minor in Joint Military Studies

The minor in Joint Military Studies is offered to any student completing the courses of study listed below. The minor not only prepares cadets for active duty service but provides any student the opportunity to study one of our country’s major instruments of power, the United States Military. There is no military commitment required for a student to enroll in and complete the Joint Military Studies minor and may provide a critical resume discriminator for employment within the Department of Defense, State Department, or government services. In addition to studying military organizations, missions, and operations, the student will gain a broad perspective of the military in general by studying the history of all Department of Defense Services and completing at least two sister-service ROTC course; thus emphasizing our countries focus on “Joint” military operations.

Air Force and Army ROTC

The preparation of future Air Force and Army officers is provided through the Air Force ROTC program. Enrollment is open to any student attending the university on a full-time basis. The curriculum provides the individual with a firm understanding of the concepts of aerospace power, Army doctrine, military tactics and the Joint mission, organization, and operations.

Enrollment in the ROTC is voluntary and accomplished through the fall and spring registration periods. Scholarships are available in many academic disciplines on a competitive basis. Approximately one-third of the students hold scholarships. Depending on the semester, approximately one-third of the cadet corps consists of women. Almost all Army and Air Force career fields are open to women, including pilot positions.

General Program
Both the two and four-year ROTC programs are offered. The program consists of the General Military Course (GMC) during the freshman and sophomore years and the Professional Officer Course (POC) for the remaining two years of college for Air Force ROTC. The Army program is divided into the Basic Course for freshman, sophomores and the Advanced Course for Juniors and Seniors. All cadets participate in a four-week training period during the summer between their sophomore and junior years.

Those students that do not desire to pursue a commission into either military service are welcome to enroll in the Joint Military Studies Program. Requirements for completion of the Joint Military Studies Minor include 6 credit hours from each ROTC curriculums below for a total of 12 credit hours and 6 credit hours from the acceptable electives listed below. All total 18-21 credit hours in respective course of study.

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<thead>
<tr>
<th>AEROSPACE STUDIES</th>
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<tbody>
<tr>
<td>AS101</td>
<td>Foundations of U.S. Air Force I</td>
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<td>AS102</td>
<td>Foundations of U.S. Air Force II</td>
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<td>AS201</td>
<td>The Evolution of USAF Air &amp; Space Power I</td>
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<td>AS202</td>
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<td>AS301</td>
<td>Air Force Management &amp; Leadership I</td>
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<td>Air Force Management &amp; Leadership II</td>
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<tr>
<td>MS101</td>
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<td>MS401</td>
<td>Advanced Military Management &amp; Leadership I</td>
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<td>MS402</td>
<td>Advanced Military Management &amp; Leadership II</td>
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<tr>
<th>ACCEPTABLE ELECTIVE COURSES</th>
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<td>44.212</td>
<td>WMD</td>
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<td>42.251</td>
<td>War in Literature</td>
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<td>43.204</td>
<td>China and the Modern World</td>
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<td>43.242</td>
<td>World War II</td>
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<td>43.322</td>
<td>Chinese Foreign Policy</td>
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<td>43.356</td>
<td>The Civil War and Reconstruction</td>
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<tr>
<td>43.393</td>
<td>History of the Middle East and Islamic World</td>
</tr>
<tr>
<td>46.101</td>
<td>Introduction to American Politics</td>
</tr>
<tr>
<td>46.112</td>
<td>Introduction to Comparative Political Systems</td>
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<tr>
<td>46.121</td>
<td>Introduction to International Relations</td>
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**Active Duty Obligation**

There is no active duty obligation for enrolling in the ROTC courses as a student in the JMS minor program unless you are a cadet pursuing a commission. Students who complete the Air Force or Army ROTC program and receive a commission, incur a four-year active duty commitment. Flying officers (pilot, navigator, combat systems operator) serve additional commitments from the time they complete their training. Students who do not desire to pursue a commission are welcome to enroll into any ROTC academic course and will be administratively tracked separately from those that desire to pursue a commission. These administrative requirements are transparent to the student.

**Aerospace Studies**

The program is designed to qualify for commissions those men and women who desire to serve in the United States Air Force and to provide an education which will develop skills and attitudes of vital importance to professional Air Force officers.

**Contact**

Chairperson: Lt. Col. Matthew McSwain

- Joint Military Studies Minor

Office of the Registrar  83 Broadway Street, Dugan 101, Lowell, MA 01854-5129
Army ROTC

Army ROTC is an elective curriculum you take along with your required college classes. It prepares you with the tools, training and experiences that will help you succeed in any competitive environment. Along with great leadership training, Army ROTC can pay for your college tuition, too. You will have a normal college student experience like everyone else on campus, but when you graduate, you will be an Officer in the Army.

Courses

Basic Leadership 28.170.201
Leadership And Teamwork 28.240.201
Leadership & Management I 28.440.201
Leadership & Management II 28.450.201

Chemical and Nuclear Engineering Industrial Advisory Board

Richard J. Cacciapouti, Marketing Manager [retired], ANP DE & S
Anne Marie Chesno, Technical Maintenance Manager, Florida Power and Light, Seabrook Nuclear Power Station
Rick Couto, Vice President and General Manager, Brooks Automation, Inc.
Peter Cowley, President, Process Development Services, Inc.
Al Hambelton, Director of Manufacturing, DSM Thermoplastic Elastomers, Inc.
Robert Konopacz, Senior Director, Manufacturing Drug Substance, Wyeth BioPharma
Joseph Musiak, (Co-Chairperson of DIAB), Associate Director, Process Engineering, Biogen. Inc.
J. Michael O'Connell, Project Manager, Shaw Stone & Webster
David Peters, Plant Manager, Saint-Gobain Performance Plastics
Rick Pierro, (Chairperson of DIAB), President, Superior Controls, Inc.
Steven Potter, Air Pollution Control Engineer, Bureau of Air Management, State of Connecticut Department of Environmental Protection
David J. Schultz, General Manager/Owner, Union Street Brand Packaging, LLC
Steven A. Schultz, Vice President, Program Management, Boston Scientific Corporation
Patrick Slattery, President, Innovative Fabrication, Inc.

Educational Objectives and Student Outcomes

Strong Foundation

The Chemical Engineering program builds a strong foundation for the professional development of its students. With a bachelor’s degree, graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and science. To achieve these broad objectives, the program provides the knowledge, skills and resources for lifelong learning and professional development.

Educational Objectives

To achieve its mission, the chemical engineering program provides the knowledge, skills and resources for continued learning and professional development over a lifetime. The program emphasizes its historic, nationally-recognized strength in processing and manufacturing and draws on the scholarly accomplishments of its faculty to integrate traditional chemical engineering topics with specialized studies in the contemporary fields of biological engineering, nanomaterials engineering, nuclear engineering and paper engineering. The goals of the program are to produce graduates that will:

- pursue rewarding professional careers by skillfully leveraging chemical engineering principles
- effectively bridge engineering and non-engineering fields through a commitment to lifelong professional development
- engage in service activities highlighting the societal benefits of engineering principles
Student Outcomes

The faculty members of the department are committed to providing a stimulating learning environment that encourages active learning and high quality student performance. A set of Program Outcomes have been developed based on the Educational Objectives to achieve this result. The chemical engineering program including the options in Biological, Nanomaterials, Nuclear, and Paper Engineering integrates the knowledge and skills acquired in a rigorous set of courses, the extracurricular experiences, and the faculty scholarship needed to enable the graduates of the program to achieve the following outcomes:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

An Undergraduate Focus with a Complementary Graduate Program

An important focus of the department is undergraduate education. The majority of our graduates stay in the New England area. The graduate program builds upon the strengths of the department faculty and complements the undergraduate program. The faculty have close ties primarily with local and regional industry through consulting, research, advising graduate students from regional companies, and participation in local, as well as national professional society meetings. The department obtains input from its advisory board to continually assess the relevancy of the curriculum to the needs of industry.

The quality of the program is of constant importance and interaction with industry helps to maintain and improve it. More importantly, department courses are taught only by faculty. Graduate students are used only as laboratory and grading assistants.

Five-Year Bachelor of Science/Master of Science in Engineering Program

The Department offers a special five-year program that makes it possible for qualified students to complete the requirements for the BS degree and the MS degree in five years.

Chemical Engineering Major

General Requirements For Chemical Engineering Curriculum

1. The student is required to take six (6) three credit general education courses as follows:
   - Three three-credit courses in the Arts and Humanities. Either Introduction to Ethics (45.203) or Engineering and Ethics (45.334) must be used to satisfy one of the Arts and Humanities course requirements.
   - Three three-credit courses in the Social Sciences. Either Economics I (49.201) or Economics II (49.202) must be used to satisfy one of the Social Science course requirements.
   - A General Education course that fulfills the Diversity requirement must be taken.
   - No more than two General Education courses can be taken from the same department.

2. The student in the General Chemical Engineering curriculum must take three chemical engineering technical electives, one other approved technical elective and an approved advanced chemistry elective or equivalent.

3. The student in the Biological Engineering option must take one Chemical Engineering technical elective and one technical elective from the recommended list of courses.

4. The student in the Nanomaterials option must take two chemical engineering technical electives from a recommended list of courses, one other approved technical elective and an approved advanced chemistry elective or equivalent.

5. The student in the Nuclear Engineering option must take one Nuclear Engineering technical elective from a recommended list of courses.

6. The student in the Paper Engineering option must take three chemical engineering technical electives from the recommended list of courses, another approved technical elective and an approved advanced chemistry elective or equivalent.

7. The following 12 “core” courses have been identified for special tracking:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.201</td>
<td>Material Balances</td>
</tr>
<tr>
<td>10.202</td>
<td>Energy Balances and Intro to Thermo</td>
</tr>
</tbody>
</table>
A student must obtain a grade of C– or higher in the 12 "core" courses and an overall GPA of 2.000 or higher in those courses. Also, the student must have an overall GPA of 2.000 or higher in "core" courses listed as prerequisites in order to enroll in the senior capstone design course sequence: 10.409 Engineering Economics and Process Analysis and 10.410 Plant Design. In addition, a student is permitted only 3 attempts including withdrawals (except for medical reasons), to obtain a C– or higher grade in the “core” courses. If a student fails to earn a minimum grade after 3 attempts, the student will be “dismissed” from the program for one semester in which the student will not be allowed to enroll in any courses offered by the department. The student may apply for reinstatement into the program for the semester following the “dismissal” at which time the student will be allowed to enroll only in the department “core” course that caused the “dismissal” from the program as well as any other non-departmental courses to achieve full-time student status. The student must earn a grade of C– or better on the fourth attempt in order to continue in the program; otherwise the student will be permanently dismissed from the program. The student must also satisfy the University requirement of an overall GPA of 2.000 or higher to graduate.

**Course of Study**

View the complete courses of study for students entering the Chemical Engineering program before Fall 2011:

- Chemical Engineering - General
- Chemical Engineering - Biological Engineering Option
- Chemical Engineering - Nuclear Option
- Chemical Engineering - Paper Option
- Chemical Engineering - Nanomaterials Track

View the complete courses of study for students entering the Chemical Engineering program for Fall 2011 and beyond:

- Chemical Engineering - General
- Chemical Engineering - Biological Engineering Option
- Chemical Engineering - Nuclear Option
- Chemical Engineering - Paper Option
- Chemical Engineering - Nanomaterials Track

**Mission Statement**

The mission of the Department of Chemical Engineering is to produce competent graduates. The program builds a strong foundation for the professional development of its students, and graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and science. Through specialization in the option areas of biological engineering, nanomaterials engineering, nuclear engineering and paper engineering, graduates obtain special skills, so that they are actively pursued by local and regional industries and government because of their ability to immediately contribute to solving today’s engineering problems. Department faculty members develop and maintain strong associations with alumni, local and regional industries and professional societies to continually assess, modify, improve and support the program.

**Specialization**

Through specialization in the option areas of biological engineering, nanomaterials engineering, nuclear engineering and paper engineering, graduates obtain special skills, so that they are actively pursued by local and regional industries and government because of their ability to immediately contribute to solving today’s engineering problems.

**Relationship with Alumni and Industry**

Department faculty members develop and maintain strong associations with alumni as well as with local and regional industries to continually assess, modify, improve and support the program.
Biological Engineering Option

The Biological Engineering Option is designed to prepare the student for work in the biopharmaceutical or biotechnology industry. One technical elective is required and must be selected from the following list of courses.

**Elective Courses** (Select one of the following)

- 10.538 Advanced Separations in Biotechnology
- 10.555 Biopharmaceutical Regulatory Compliance
- 10.586 Bioprocessing Projects Laboratory
- 81.252 Physiology
- 81.476 Cell Culture
- 92.593 Experimental Design

Chemical Engineering, Concentration in Computer-Aided Process Design and Controls

The Computer Aided Process Design and Controls concentration, which consists of four courses, provides the student with a specialization in the design, analysis and computer control of chemical processes. Courses are taught on the hardware and software aspects of computer control and advanced methods of chemical process analysis, design and control. The four courses for the concentration satisfy the technical and Chemical Engineering elective requirements in the curriculum.

**Required Courses**

- 10.518 Microprocessor Control with Lab
- 10.522 Computer Aided Chemical Process Design
- 10.530 Advanced Control Strategies
- 10/24.509 System Dynamics

Chemical Engineering, Concentration in Engineered Materials

The Engineered Materials Concentration allows the student to develop a specialization in a particular area. The concentration begins with the survey course 10.308 Introduction to Materials Science and Engineering, which is required for all Chemical Engineering juniors, and is followed by four additional courses. Courses must be selected to cover at least three areas of specialization. The four courses for the concentration satisfy the technical and Chemical Engineering elective requirements in the curriculum.

**Required Courses**

- 10.405 Design of Paper
- 10.506 Interfacial Science and Engineering and Colloids OR
- 10.527 Nanomaterials Science and Engineering

**Elective Courses** (Select two of the following)

- 10.501 Paper Ind. and Proc. Analysis
- 10.523 Nanodevices and Electronic Materials
- 10.525 Construction and Use of Packaging Materials
- 10.533 Macromolecular Science and Engineering
- 10.541 Nanocharacterization by SEM, TEM and AFM
- 16.470 VLSI Fabricating with Lab
- 26.543 Survey of Plastic Materials
- 26.544 Survey of Plastics Materials II

Policy

- Mission Statement
- Educational Objectives and Standards
- Financial Support
- Interacting with Industry
- Professional Activities

Visit the UMass Lowell Chemical Engineering site for more information.

Financial Support in Chemical Engineering

There are different sources of support for students in the Department of Chemical Engineering enhance their professional development. A number of scholarships are available to qualified students in chemical engineering, in the paper engineering option, and in the nuclear
A number of scholarships are available to qualified students in chemical engineering, in the paper engineering option, and in the nuclear engineering option.

Undergraduates are encouraged to gain practical experience and are directed to employment in industry. Through a Cooperative Education Program or the Scholar/Intern Program, it is possible for an undergraduate student to integrate productive work experience with academic studies. Part-time or summer work experience opportunities are available as well.

Five Year Bachelor of Science/Master of Science in Engineering Program

The Department of Chemical Engineering offers a special five-year program that makes it possible for qualified students to complete the requirements for the BS degree and the MS degree in five years. During the first three years, the course work under this program is the same as that specified for students in the four-year bachelor program. In the junior year, students with at least a 3.00 cumulative grade point average may be admitted into the BS/MS program. Those students can take three or four graduate-level courses in their senior year, which may be counted for both the undergraduate and the graduate degrees. This gives them a nine to twelve credit head start on their MS program in Chemical or Energy Engineering, which normally can be completed in the fifth year.

Interaction with Industry

The Chemical and Nuclear Engineering Programs work closely with an Industrial Advisory Board, which meets regularly to advise on matters relating to program modifications and assessment and external relations and development.

Chemical Engineering Major

General Requirements For Chemical Engineering Curriculum

1. The student is required to take six (6) three credit general education courses as follows:
   - Three three-credit courses in the Arts and Humanities. Either Introduction to Ethics (45.203) or Engineering and Ethics (45.344334) must be used to satisfy one of the Arts and Humanities course requirements.
   - Three three-credit courses in the Social Sciences. Either Economics I (49.201) or Economics II (49.202) must be used to satisfy one of the Social Science course requirements.
   - A General Education course that fulfills the Diversity requirement must be taken.

2. The student in the Basic Chemical Engineering curriculum must take three chemical engineering technical electives, two other approved technical electives and an approved advanced chemistry elective or equivalent.

3. The student in the Biological Engineering option must take one technical elective from the recommended list of courses.

4. The student in the Nanomaterials option must take four technical elective from the recommended list of courses and an approved advanced chemistry elective or equivalent.

5. The student in the Nuclear Engineering option must take one technical elective from the recommended list of courses, another approved technical elective and an approved advanced chemistry elective or equivalent.

6. The student in the Paper Engineering option must take one technical elective from the recommended list of courses, another approved technical elective and an approved advanced chemistry elective or equivalent.

7. To qualify for graduation, students are required to obtain an overall GPA of 2.0 or higher in departmental courses, in addition to satisfying the general degree requirements of the university.

Course of Study

View the complete courses of study for:

- Chemical Engineering - General (pdf)
- Chemical Engineering - Biological Engineering Option (pdf)
- Chemical Engineering - Nuclear Option (pdf)
- Chemical Engineering - Paper Option (pdf)
- Chemical Engineering - Nanomaterials Track (pdf)

Nuclear Science and Engineering Minor

The Nuclear Engineering Option consists of a sequence of four courses that are specifically designed to give a traditional chemical engineer concentrated training in a variety of nuclear technologies. The course selection integrates the key nuclear-related subjects usually taken as part of an undergraduate degree program in Nuclear Engineering. The four course sequence is designed to be taken during the junior and senior years, one course per semester. These courses satisfy the technical and Chemical Engineering elective requirements in the curriculum. One technical elective is required and must be selected from the following list of courses.

Elective Courses (Select one of the following)

- 24.432 Nuclear Systems Design and Analysis
Nanomaterials Engineering Option, Chemical Engineering

The Nanomaterials Engineering Option is designed to prepare the student to work in a materials related industry. Five technical electives are required and must be selected from the following list of courses.

**Elective Courses** (Select five of the following)
- 10.405 Design of Papers
- 10.501 Paper Industry Processes
- 10.523 Nanodevices and Electronic Materials
- 10.541 Nanocharacterization by SEM, TEM and AFM
- 26.575 Biomaterials
- 84.334 Advanced Inorganic Chemistry
- 84.403 Introduction to Polymer Science
- 92.593 Experimental Design

Nuclear Engineering Option, Chemical Engineering

The Department of Chemical Engineering offers an option in Nuclear Engineering, with a focus on nuclear processes and technology and on nuclear electric power generation. This degree is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org The option gives concentrated training in a variety of nuclear technologies. Engineering graduates with the Nuclear Engineering Option can work in the nuclear industry in areas such as the continued safe and economical operation of existing nuclear power plants and processing facilities, improved plant performance, design of new facilities, the safe disposal of nuclear waste, and other advanced industrial and medical applications of nuclear technology. The option requires three Nuclear Engineering courses and one elective course within the Basic Chemical Engineering curriculum.

For more information visit Chemical Engineering or contact us.

Chemical Engineering with Paper Option

The Department of Chemical Engineering offers an option in Paper Engineering, in which courses are taught on paper processing and paper and paper-like materials. The option requires three Paper Engineering courses and one elective course within the Basic Chemical Engineering curriculum.

As the demand for paper and paper products continues to grow, concerns about deforestation and waste have prompted legislation at both the state and federal levels requiring minimum recycle fiber contents in many consumer grades of paper. There is a particular interest in exploring the expanded use of recycled cellulose waste fibers in commercial and industrial products and in the evaluation of the properties of paper and paper products. The Department has nationally recognized expertise in determining recycled fiber content and in testing and evaluating paper and paper-like materials.

The Paper Engineering Option consists of four courses that are designed to give chemical engineers training in the processing and testing of paper and paper-like materials in order to prepare them for work in the paper industry. One technical elective is required and must be selected from the following courses:

**Elective Courses** (Select one of the following)
- 10.402 Engineering Analysis of Coating & Converting Systems
- 10.541 Nanocharacterization by SEM, TEM and AFM
- XX.XXX Approved Technical Elective

Department of Chemical Engineering Professional Activities

Students have the opportunity to join the student chapter of the American Institute of Chemical Engineers and/or the student chapter of the Technical Association of the Pulp and Paper Industry. Students in the Nuclear Engineering Option and others with an interest in the peaceful use of nuclear technologies have the opportunity to join the student chapter of the American Nuclear Society. Local chapters of the Chemical Engineering Honor Society, Omega Chi Epsilon, and the Nuclear Engineering Honor Society, Alpha Nu Sigma, are open to qualified students.
The Department of Chemical Engineering encourages students to take the Fundamentals of Engineering examination in the senior year as a first step toward professional registration.

Undergraduate Program

The chemical engineering curriculum provides a thorough grounding in chemistry and an understanding of chemical processing. While the undergraduate program maintains its traditional role to educate students for employment in the chemical industry and to prepare them for advanced study in chemical or a related field, the curriculum provides students with a unique opportunity to specialize in areas of individual interest. Options in Biological Engineering, Nanomaterials Engineering, Nuclear Engineering and Paper Engineering or concentrations in Engineered Materials and Computer-Aided Process Design and Control are offered.

The students are constantly made aware that chemical engineering is a dynamic profession and that there are frontiers with exciting opportunities in traditional areas as well as in the new fields such as biotechnology and nanomaterials. The faculty highlight new applications as well as the fundamentals in the curriculum, and students are given the tools to play a role in commercializing new technologies.

The curriculum requires a series of courses in basic science and mathematics. These provide a firm understanding of fundamentals, help the student to develop analytical techniques, and serve as the basis for specialized engineering courses. Another component of the curriculum consists of courses that serve as an introduction to engineering, link the basic sciences and engineering, and introduce engineering analysis, synthesis and design. Woven throughout the curriculum are courses in the arts and humanities and the social sciences. These courses broaden perspectives, maintain and improve communication skills, and expose the engineering students to concepts of values and ethics. The curriculum emphasizes the study of advanced problems and topics in engineering design. The purpose is to develop skills in the use of science, sensitivity in the application of ethical considerations, sensibility in economic matters, and creativity in solving engineering problems. Laboratory work and computer applications are extensive in the program.

Students seeking admission into chemical engineering should be familiar with the admission and retention requirements of the College of Engineering. The curriculum is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET), http://www.abet.org. All undergraduate students are assigned a faculty advisor and are encouraged to meet with their advisor each semester or whenever there is some matter of concern. Students must meet with their advisor at least once each semester during the advising and registration period.

Nuclear Engineering Option

The Nuclear Engineering Option consists of a sequence of four courses that are specifically designed to give specialized education useful for working in a variety of nuclear technologies. The course selection integrates the key nuclear-related subjects usually taken as part of an undergraduate degree program in Nuclear Engineering. The courses in the Nuclear Engineering Option provide a well balanced mix of engineering science, nuclear theory, design experience, and hands-on laboratory projects. The Nuclear Option courses combined with their other required courses give the student all the elements necessary to apply advanced mathematics, science and engineering science, including atomic and nuclear physics, and the transport and interaction of radiation with matter, to nuclear and radiological systems and processes. Students will be able to work in the areas of analysis and design, and to safely utilize nuclear technology in a variety of areas. The four-course sequence is designed to simultaneously satisfy the bulk of the technical electives required as part of the Chemical Engineering curriculum.

Nuclear Science and Engineering Minor

The Nuclear Science and Engineering Minor is for science majors such as Physics, Health Physics, Chemistry or Mathematics; or engineering majors such as Chemical, Civil, Electrical or Mechanical. Any qualified student with interests in this area of specialization can be admitted into the program.

Most technical disciplines already have a solid mathematics, science, and engineering foundation, and a few specialized courses in nuclear technology would open up additional avenues for employment and career growth. Most students in science and engineering can satisfy the requirements for the Nuclear Science and Engineering Minor with only three additional courses beyond the normal sequence for their major program of study. In addition, the core courses from the nuclear minor may also satisfy a portion of the technical electives required by the major program.

The Nuclear Science and Engineering minor consists of 18 credits of required course work that follows either an engineering or science track. Three core courses, common to both tracks, form the basis of the nuclear focus. These three courses are identical with those required as part of the Nuclear Engineering Option in Chemical Engineering.

Nuclear Engineering Program Scholarships

The Nuclear Engineering Program is fortunate to have outside support from such sponsors as Seabrook Nuclear Power Station, the Department of Energy and the Institute for Nuclear Power Operations. A large portion of the funds from these organizations is being used to support students.

Student scholarships, up to $2500, are available on a competitive basis from the Institute for Nuclear Power Operations, Department of Energy and American Nuclear Society. Students are also eligible to apply for $3500 need based scholarships through the American Nuclear Society and the UMass Lowell Hoff Scholarships which award up to full tuition for a maximum of six semesters. Several of our students have received these scholarships.
Summer industrial internships, cooperative education work experience opportunities, UMass Lowell Research Reactor summer internships and part-time jobs are also available to qualified candidates.

Professional Development Activities in Nuclear Engineering

Students have the opportunity to gain practical experience at operating nuclear reactors through course work and through part-time work at the UMass Lowell Research Reactor and through cooperative education and summer work at nuclear power reactors and nuclear engineering firms. Students can study to take the U.S. Nuclear Regulatory Commission License examination and become a federally licensed reactor operator at the University of Massachusetts Lowell research reactor. Cooperative education appointments and summer internships are available for students to work at a power reactor such as Seabrook Station and at other local companies involved in nuclear related operations and support.

Students interested in the nuclear field are encouraged to join the student chapter of the American Nuclear Society (ANS). This entitles them to receive the journal Nuclear News and to attend regional and national meetings and to otherwise participate with other nuclear engineering students around the country. A local chapter of the Nuclear Engineering Honor Society, Alpha Nu Sigma, is open to qualified students. In addition students are encouraged to attend American Nuclear Society local and national meetings.

Both faculty and students participate in the annual ANS Regional Student Conference. UMass Lowell students attend and typically present papers based on their research, in competition with their peers at other schools. In recent years, the University has taken several awards for “best paper” in a session. There is financial support for students to participate in these professional development activities.

Required Courses for Nuclear Engineering Option

Introduction to Nuclear Engineering I/II

This two-course sequence provides an overview of pertinent topics in basic nuclear physics, nuclear reactor physics and shielding, health physics concepts, heat generation and removal in a nuclear reactor, power conversion, and overall system integration and safety.

Nuclear Reactor Systems and Operations

This course involves a detailed study of the operation and integration of the various systems needed in any nuclear reactor facility. Hands-on training is provided in the UMass Lowell 1 MW research reactor, including actual operation of the reactor and familiarization with several support systems (water cleanup system, primary coolant system, heat exchangers, etc.).

The fourth course for the Nuclear Engineering Option can be selected from a wide variety of nuclear-related courses offered within the Chemical and Nuclear Engineering Department or within other programs at the University. This last course is chosen in consultation with the student’s advisor and is based on the particular interests of the individual student. This gives some flexibility in focusing the student’s education in one of several areas. Qualified seniors can also select the fourth course for the Nuclear Engineering Option from a variety of approved graduate courses.

Research Facilities in Nuclear Engineering

Students in the Nuclear Engineering Option or Nuclear Science and Engineering Minor can participate in ongoing faculty and graduate research using a variety of modern research tools and facilities. Program faculty are involved with the UMass Lowell Radiation Laboratory which includes a 1 MW research reactor, a Co-60 irradiation facility, a 5 MeV van de Graaf accelerator, and a variety of radiation counting laboratories. The Center for Advanced Materials also houses state-of-the-art analytical equipment for the micro-characterization of materials. In addition to a large array of networked computer facilities throughout the University, the Department of Chemical Engineering also maintains a computer laboratory where students can work individually or in small teams to address a variety of homework and design projects, or perform advanced research. One of the major strengths of the UMass Lowell nuclear program lies in its emphasis in advanced computational techniques, with special focus towards the development and application of numerical methods for the analysis of nuclear systems.

Programs in Nuclear Engineering

The nuclear programs in the Department of Chemical Engineering offer a series of courses and research opportunities that allow specialization in the field of nuclear engineering. At the undergraduate level the program supports a formal Nuclear Engineering Option for Chemical Engineering students and a Nuclear Science and Engineering Minor for other engineering and science students at the University. At the graduate level the program offers an M.S. degree in Energy Engineering with a Nuclear Option.

Graduates with focused training via the undergraduate Nuclear Engineering Option or Nuclear Science and Engineering Minor programs, can help the nuclear industry face the technical challenges of the future in areas such as continued safe operation of existing nuclear power plants, improved plant performance, design of new power plants, safe disposal of radioactive waste, and other advanced industrial and medical applications of nuclear technology.

Additional Information:

Nuclear Engineering Program Scholarships

Professional Development Activities
Research Facilities

Department of Chemical Engineering

- Policy
- Programs

Chemical Engineering is a highly diversified discipline. The program at the University is broadly based and builds upon a student's high school training in science and mathematics. It provides a fundamental base from which graduates can develop their skills by entering general engineering practice or pursuing an advanced degree.

The Department has many focus areas that reflect its strengths such as biotechnology, bioprocessing, advanced engineered materials, nuclear engineering, paper engineering and process controls. Students may select a general chemical engineering curriculum or an option in biological, nanomaterials, nuclear, or paper engineering stemming from the general program.

The faculty are involved with University Centers and research facilities such as the Massachusetts Biomanufacturing Center, the Toxic Use Reduction Institute, the Center for Advanced Materials, and the University Research Nuclear Reactor. The Department is associated with several specialized laboratories such as the biotechnology and bioprocessing laboratories, the ceramics laboratory, the advanced materials characterization laboratories, the pulp and paper testing laboratories and a computer laboratory.

The faculty are nationally and internationally recognized for research especially in the areas of bioprocessing and biotechnology, advanced materials, nuclear engineering, and paper engineering. For more information visit Chemical Engineering or contact us.

Allowable Course Substitutions

The UMass Lowell Department of Civil and Environmental Engineering allows certain courses to be substituted for an equivalent course listed.

<table>
<thead>
<tr>
<th>UMass Lowell Courses</th>
<th>Permissible Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.107 Introduction to Engineering I</td>
<td>Any computer programming or intro. to computer course, 91.101 Computing</td>
</tr>
<tr>
<td>25.108 Introduction to Engineering II</td>
<td>Any computer aided drafting course</td>
</tr>
<tr>
<td>14.203 Statics</td>
<td>22.211 Statics</td>
</tr>
<tr>
<td>14.204 Strength of Materials</td>
<td>22.212 Mechanics of Materials</td>
</tr>
<tr>
<td>14.205 Dynamics</td>
<td>22.213 Dynamics</td>
</tr>
<tr>
<td>14.286 Probability &amp; Statistics for Engineers</td>
<td>92.386 Probability &amp; Statistics I, a course in statistics</td>
</tr>
<tr>
<td>14.225 Surveying</td>
<td>15.123 Surveying I</td>
</tr>
<tr>
<td>92.236 Engineering Differential Equations</td>
<td>92.234 Differential Equations</td>
</tr>
<tr>
<td>49.201 Economics I</td>
<td>49.202 Economics II</td>
</tr>
<tr>
<td>10.347 Elements of Thermodynamics &amp; Heat Transfer</td>
<td>22.242 Thermodynamics; 26.247 Elements of Thermodynamics</td>
</tr>
<tr>
<td>14.470 Engineering Economics</td>
<td>23.414 Engineering Economics</td>
</tr>
</tbody>
</table>

Five-Year Bachelor of Science/Master of Science in Civil Engineering Program

The purpose of this program is to offer qualified undergraduate students an accelerated program of study leading to a Master of Science in Civil and Environmental Engineering at the end of five years of study. Students benefit from the efficiency of a continuous, coordinated sequence of subjects that allows for reduced credit hour requirements. Students can receive the B.S. in Engineering at the end of the fourth year and the M.S. in Engineering at the end of the fifth year if all requirements are met.

General Requirements

Application to the five-year program is made during the second semester of the junior year. A minimum grade point average of 3.0 based upon the first five semesters of grades, is required for admission into the program.

Applicants who satisfy the Graduate School and departmental admission requirements for the five-year program will be assigned to a graduate faculty member who will act as their program advisor. The M.S.C.E. degree requires the successful completion of a minimum of 30 credit hours. These 30 hours include at least 24 hours in class and seminar study, of which at least 18 hours must be at the 500 level or higher. Courses at the 400 level are designed for seniors, but may be taken by graduate students for graduate credit if written approval is given by the student's advisor.

Special Requirements

Office of the Registrar 83 Broadway Street, Dugan 101, Lowell, MA 01854-5129
A student seeking a five-year M.S.C.E. must choose an area of specialized study. These areas include: environmental, geotechnical, geoenvironmental, structural, and transportation engineering. Programs of study in each of these areas are described in the Graduate Catalog.

Course of Study

The first year of undergraduate study is devoted to developing writing skills and proficiency in the areas of mathematics and science that serve as a foundation for upper level professional studies. During the second year of study, students learn the principles of engineering mechanics, strength of materials, and surveying. Junior and senior year course work gives students a working knowledge of structural, environmental, geotechnical, and transportation engineering. In addition to education in these four basic areas of civil engineering practice, advanced elective courses are available in each area during the senior year. Engineering design concepts and computer-aided engineering are integrated throughout the program.

Course of Study (pdf)

Flowchart (pdf)

Course Substitutions

Program Goals and Objectives

The goal of the Department of Civil and Environmental Engineering is to provide its students with a well balanced, high quality education in four principal areas of civil engineering: environmental, geotechnical, structural, and transportation engineering that will permit them to practice civil engineering at a professional level, that will prepare them for graduate study, that will promote life long learning and continuing professional development and that will provide them with the skills and knowledge necessary to develop into active contributors to the economic and social vitality of the region.

To this end, the Educational Objectives of the CEE Department are:

1. Graduates, who wish to pursue professional employment, will obtain a position in Civil Engineering or related engineering field, and will be successful in that position.
2. Graduates will pursue lifelong learning, professional development, and registration as appropriate for their employers.
3. Graduates will engage in service activities related to their profession.

Please visit the UMass Lowell Civil Engineering site for more information.

Undergraduate Degree Programs in Engineering

The College of Engineering offers four-year undergraduate programs leading to the degree of Bachelor of Science in Engineering; programs leading to Associate and Bachelor of Science in Engineering Technology (in evening part-time programs through Continuing Education), five-year dual-degree programs with the College of Arts and Sciences leading to a Bachelor of Science degree in Engineering and a Bachelor of Arts, and five-year programs leading to both Bachelor of Science in Engineering and Master of Science in Engineering.

The degree of Bachelor of Science in Engineering is offered in the following fields: Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Plastics Engineering and a new program in Computer Engineering. Course requirements for engineering degrees have been determined by specific professional objectives and are subject to the recommendations of the Engineering Accreditation Commission and the Accreditation Board for Engineering and Technology (ABET). All undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

The degree of Bachelor of Science in Engineering Technology is awarded in the areas of Civil Engineering Technology, Electronic Engineering Technology, and Mechanical Engineering Technology, offered in the evenings through the Division of Corporate Studies and Continuing Education. The Electronic and Mechanical Engineering Technology bachelor's degree programs are currently accredited by the Technology Accreditation Commission of ABET, http://www.abet.org.

Courses of study in engineering and engineering technology provide a basic general education, scientific-technological preparation in the sciences, and a comprehensive introduction to an engineering or technology field. Students must select a single major field of study. However, candidates for degrees in the College of Engineering may be permitted to elect additional majors in other colleges of the University, provided that all curriculum requirements for their degree program in the College of Engineering are satisfied.

Five-Year Bachelor of Science/Master of Science in Engineering Degrees Program

The purpose of this program is to offer qualified undergraduate students an accelerated program of study leading to a Master of Science in Engineering at the end of five years of study. Students benefit from the efficiency of a continuous, coordinated sequence of subjects and reduced credit hour requirements. Students can receive the Bachelor of Science in Engineering at the end of the fourth year and the Master of Science in Engineering at the end of the fifth year if all requirements are met.

To be considered academically eligible for this program, a student should have a cumulative GPA of 3.0 or greater by the end of their junior year. The student must file a formal Graduate School application prior to graduation (noting “BS/MS” on the application). Academically eligible applicants are not required to take the Graduate Record Examination and the application fee is waived. Upon
Thus, the products, but also an understanding of the management involved in the creation of new products, companies, and service organizations.

The education of engineers in state-of-the-art areas of advanced technology and the University's commitment to national and regional economic development are the major premises upon which the graduate programs in the College of Engineering are based. These programs are intended to produce engineers whose education not only develops expertise in the design, development and production of products, but also an understanding of the management involved in the creation of new products, companies, and service organizations.

Graduate Programs in Engineering

The education of engineers in state-of-the-art areas of advanced technology and the University's commitment to national and regional economic development are the major premises upon which the graduate programs in the College of Engineering are based. These programs are intended to produce engineers whose education not only develops expertise in the design, development and production of products, but also an understanding of the management involved in the creation of new products, companies, and service organizations. Thus, the graduate programs in engineering are intended to educate engineers capable of keeping abreast with the rapidly changing technology that characterizes the high technology economy of the Northeast. The programs lead to degrees of Master of Science in Engineering, Master of Science, Doctor of Science, Doctor of Philosophy, and Doctor of Engineering.

Double Major: Electrical Engineering & Computer Science

The Electrical and Computer Engineering Department offers double majors in electrical engineering/computer science and electrical engineering/physics. Students must adhere to the University and College policies on double majors. All curriculum requirements in engineering must be satisfied. Students should inform both departments and colleges by the start of their junior year and submit a major form to the Office of Enrollment. The grades in these courses should be "B" or better and they will count toward the MSE as graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as graduate courses as their technical electives.

Note: To satisfy prerequisites for upper level courses, EE/CS double majors may substitute 16.317 for 91.203, 16.363 for 92.386, and 92.360 for 92.321 & 92.322.

View the complete Course of Study (pdf)

Double Major: Electrical Engineering & Physics

The Electrical and Computer Engineering Department also offers double majors in electrical engineering/computer science and electrical engineering/physics provided the students adhere to the University and college policy on double majors.

View the complete Course of Study (pdf)

Five-Year BSEE/MSEE Combined Program

To encourage outstanding undergraduate students to continue study toward a Master's degree, the Electrical and Computer Engineering Department offers an accelerated program. If all the requirements of the department and of the Graduate School are met, the students will receive the BSE in EE at the end of the fourth year. To complete the work for both degrees within five years, the student must make a commitment to the BSE in EE/MSE in EE program before the end of their senior year and they must take two 500-level graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as well as the BSE Degrees.

Graduate Programs in Electrical & Computer Engineering

Graduate programs include the degrees of Master of Science in Electrical Engineering (MSE in EE), Master of Science in Computer Engineering (MSE in CPE) and Doctor of Engineering. Flexibility is the hallmark of these degree programs. They require 3 core courses and permit specialization in one of several concentration areas. The Doctor of Engineering program requires a research dissertation and some additional technical and engineering management courses. Several certificate programs are also offered to provide an opportunity for part-time students to be exposed to developments in this field.

This information is offered for general guidance. It interprets information in the UMass-Lowell Graduate Catalog. Specific applications of requirements in the Graduate Catalog may differ from case to case. The Department also offers several certificate programs at the graduate and undergraduate levels. Certificate programs are offered in the areas such photonics, telecommunication, energy conversion, biomedical engineering and VLSI and microelectronics.
Electrical and Computer Engineering Mission Statement

The ECE Department mission for undergraduate education is to provide a thorough grounding in electrical science, electrical engineering, and computer engineering, together with an intensive training in mathematics. The techniques of experimental science and technology are emphasized through investigative laboratory work and classroom lecture/demonstrations.

The curriculum includes engineering science and design courses that provide a balanced view of hardware, software, application trade-off and the basic modeling techniques used to represent the computing process, and include the following student experiences: requirements analysis and specification, evaluation and testing, hardware-software integration, use of computer aided design tools and documentation. Such experiences are integrated throughout the curriculum and designed to encourage each student to engage in a major and meaningful design experience. An important aspect of the electrical and computer engineering curricula is the technical elective program of the senior year. Technical electives provide opportunities for broadening or deepening technical knowledge in a flexible manner and according to student interests and competencies. New tracks with a focus in computing skills as well as double majors in EE and Computer Science and EE and Physics are also offered. The capstone project is organized to bring together knowledge from several courses toward solving a real-world engineering problem. The ECE Department has also linked with many local companies, both large and small, in order to offer co-op opportunities for which course credit can be earned.

A significant portion of the curriculum is also devoted to studies in the humanities and social sciences and considerable choice of subjects is allowed. These subjects broaden the student's outlook and serve to focus attention on the importance of non-technical knowledge in determining the student's ultimate level of responsibility in professional life.

Electrical and Computer Engineering Policy in Double Majors

The Electrical and Computer Engineering Department also offers double majors in Electrical Engineering/Computer Science, and Electrical Engineering/Physics provided the students adhere to the following university policy.

College Policy on double majors requires that:

1. ALL curriculum requirements in Engineering must be satisfied.
2. Must inform both Departments/Colleges by the start of the junior year.
3. Must submit a program for approval by the Departments involved.
4. The Dean or Deans in the case of a double major involving two colleges must approve a declaration of a second major.
5. Must file the approved declaration of a second major with the Office of Enrollment Services.
6. Students may not present less than 57 credits outside the two major fields in order to satisfy the minimum degree requirements of 120 credits.
7. Students are candidates for only one degree in one College. They must choose which degree they want; if they do not it will be the degree for which they originally enrolled.

Electrical and Computer Engineering Program Objectives

Specific program objectives in support of our undergraduate educational mission are that after 4-5 years of experience, our graduates should:

1. Be established and recognized as a valued professional and effective communicator in industries related to electrical, computer and electronic technologies.
2. Practice their profession in a collaborative, team-oriented manner that embraces the multidisciplinary and multicultural environment of today's business world.
3. Engage in lifelong learning and professional development via post graduate education and participation in professional organizations.
4. Function as a responsible member of society with willingness to mentor fellow employees and an understanding of the ethical, social and economic impact of their work in a global context

Program of Study for BSE in Computer Engineering

The UMass Board of Trustees and the Massachusetts Board of Higher Education, approved the new program in computer engineering. A copy of the four-year BS Cpe program curriculum and the corresponding list of courses for this new major is available in the Department of Electrical and Computer Engineering Office. The Department began offering courses for this program in Fall 2001, (e.g. 16.317, and 16.322 that are new for Electrical Engineering and Computer Engineering major. However the first two years of this computer engineering program are identical to the EE.

View the complete Course of Study (pdf).

For additional information visit the Department of Electrical & Computer Engineering or contact us.

Program of Study for BSE in Electrical Engineering
The traditional EE track is the BSE in Electrical Engineering degree, providing a thorough grounding in the fundamentals of electrical engineering that would allow a graduate to function effectively in industry or continue on to graduate school.

Students seeking admission into electrical engineering should be familiar with the admission and retention requirements of the College of Engineering. This curriculum is accredited by the Accreditation Board for Engineering and Technology (ABET), [http://www.abet.org](http://www.abet.org)

All undergraduate students are assigned faculty advisors and students are required to meet with their advisors during each semester, especially during registration periods or whenever there is some matter of concern.

We have also provided for a BSE in EE/Physics double major. We note that the semester by semester outline for this double major sometimes includes a large number of courses. However it is the sequence in which courses are taken that is more important than in which semester they are taken.

Students should consult with their advisor on the best path through each track. This is especially true for co-op and part-time students, since the need to adhere to prerequisite courses is very important.

In addition to the above EE track, the ECE Department also offers a BSE in EE/CS double major and a BSEng in EE/Physics double major, as mentioned earlier, to cater to those students who want a significant amount of math and basic sciences.

View the complete Course of Study (pdf).

for more information visit the Department of Electrical & Computer Engineering or contact us.

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**Electrical and Computer Engineering Program Outcomes and Assessment**

Given our student body and our particular constituencies, our program outcomes can be summarized as follows:

When a University of Massachusetts Lowell ECE student graduates he/she shall have:

1. A strong grounding in the fundamentals including the ability to formulate and solve engineering problems by applying the principles of mathematics, science and electrical & computer engineering.
2. Ability to analyze and synthesize engineering problems including design and conduct experiments, use standard test equipment and interpret experimental data.
3. Ability to design reliable systems, devices or processes from initial specifications to a deliverable system.
4. Ability to work in a multidisciplinary team environment.
5. Ability to communicate effectively in both verbal and written forms.
6. Ability to appreciate the complexities of professional environments, including taking responsibility for oneself, working effectively and professionally as a team member, and being mindful of ethical, economic, and contemporary concerns.
7. Competence in taking the initiative for one's own professional development and recognition of the need and ability in engaging in post graduate education and lifelong continual learning.
8. Ability to independently accomplish engineering tasks.
9. Ability to enter industry with the engineering techniques, skills, and tools required to be able to solve real-world problems in electrical and computer engineering.

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**Sound Recording Technology Minor**

This supportive minor in Sound Recording Technology for Electrical Engineering majors is designed to assist in the development of qualified individuals to enter the recording industry as maintenance technicians (for recording studios, television and radio stations, equipment distributors, video houses, sound reinforcement and systems design companies) and careers in audio engineering research and development.

The sequence of study focuses on providing the student with practical knowledge of the function and usage of audio and video equipment, equipment maintenance and design theories and applications, theory of audio equipment, and basic music skills. The student is introduced to artistic concepts and applications of audio and music synthesis and production, while being taken through advanced concepts in audio theory.

The minor culminates with a research project in hardware design, including the building of a prototype of the design project.

The Minor in SRT is specifically devised to support the University of Massachusetts Lowell's Bachelor of Science in Electrical Engineering program. A major in EE from UMass Lowell's Department of Electrical and Computer Engineering, the College of Engineering, must be taken concurrently with the minor in SRT. Students apply to the College of Engineering for admission into the Electrical Engineering major.

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**The Education We Offer**

The Electrical and Computer Engineering Department has been long known throughout the region for producing competent "hands-on" engineers who are the mainstay of the region's industries. For example, Raytheon, a major employer in the region has more Electrical Engineering and Computer Engineering graduates from our Department than from any other Department in the country. We value this reputation and, in concert with industry's needs, but without compromising the long term value of the educational needs, we strive to maintain and enhance this image.

The Department offers a co-op program, which the College and the University have helped to formalize. We believe that making such
opportunities available to students greatly enhances their experience of engineering both with respect to the relevance of our courses as well as the exposure to working with other professionals.

Constant attention is paid to the state of our laboratories with a view to acquiring new equipment, developing new experiments and maintaining equipment. Thanks to our close ties with industry four new laboratories have been created recently. These are: The Cadence – Sun Microsystems Laboratory in which state-of-the-art VLSI circuit design techniques can be learnt; the Analog Devices Laboratory which was funded to promote the education of students in analog to digital conversion and hybrid analog and digital integrated circuits; a new laboratory was funded by EST/Wind River to allow students to gain experience in programming embedded microprocessors for a large number of control applications; the industrial technology teaching laboratory supported by UPS which will be available for use by all of our students. The sophomore laboratory has been upgraded (partially funded by Bell Atlantic) in the summer of 1999. A new capstone project laboratory with a special emphasis on Assistive Technology projects (in which over 40 students are typically engaged in each year) is under development funded by a substantial donation of $250,000 from an alumnus.

Strategic alliances have been formed with several of our Industry Board members. For example, Analog Devices has started a scholarship program with us, providing four BSE in ECE students each year a guaranteed internship for each of them during the winter and summer vacations. A pipeline of co-op students is in place with several companies that provides for very close interaction and feedback between our programs and their expectations. Ten other companies have since joined this program and offer scholarships to prospective electrical and computer engineering students.

Most of our students go into industry and a significant percentage among them goes into companies within 100 miles of Lowell. Industry is our main constituency. While some go to graduate school directly, our typical graduates go directly into the workforce, with the expectation that the employer will most likely fund graduate school education. Since the majority of our graduate student body is part time, our graduate courses are only offered in the evenings, enabling them to take one or two courses per semester.

The Industry Advisory Board plays an important role in considering our program objectives providing us immediate industrial needs. These have to be balanced against the need to identify truly fundamental topics that will serve our particular student body well in the long term. Technical areas sometimes take second place to a “can-do” attitude, excellent communication skills and the initiative required to teach oneself. Meetings with our Board are typically once per semester. Our close ties with industry through the co-op program, research and consulting, as well as alumni also provide valuable feedback on our program about the expectations of these entities.

Electrical & Computer Engineering

The UMass Lowell Department of Electrical and Computer Engineering (ECE) offers two undergraduate degrees: a B.S. Eng. in Electrical Engineering and a B.S. Eng. in Computer Engineering. The ECE Department also offers opportunities for double majors with computer science (CS) and physics.

- Bachelor of Science in Electrical Engineering (B.S. in EE)
- Bachelor of Science in Computer Engineering (B.S. in CpE)
- Double major Electrical Engineering/Computer Science (EE/CS)
- Double major Electrical Engineering/Physics (EE/Physics)

All undergraduate students are assigned faculty advisors and students are required to meet with their advisors, especially during registration periods or whenever there is some matter of concern. Students should consult with their advisor on the best path through each track. This is especially true for coop and part-time students, since the need to adhere to prerequisite course requirements is very important.

Department of Electrical & Computer Engineering

- Policy
- Programs

Electrical and computer engineering are dynamic fields, advancing as a result of breakthroughs in technology as well in the pure sciences. Because engineering disciplines continuously incorporate new concepts and developments, a viable engineering education cannot be limited to the acquisition of specific skills and methods, but also must provide the student with a deep understanding of both the current and the emerging engineering fields.

The Electrical and Computer Engineering Department is well placed to help fulfill the campus’ role within the UMASS system. The faculty embrace the mission of serving a technologically oriented department, closely linked to regional and national industry.

The Electrical and Computer Engineering Department strives to be a department of choice for students and is actively repositioning itself. We have responded to our ties to industry by offering focused programs both at the undergraduate and graduate levels in order to provide a thinking and technically literate engineer of immediate value to the community. Our graduates are knowledgeable and practical problem solvers, most of whom remain to work in the State.

In several areas like atmospheric research, electromagnetic scattering, properties of materials, acoustics, signal processing and imaging, the Department is nationally and internationally recognized for its research. The Department has successfully developed a program of project-based R&D specifically designed to provide support to the disabled. Many different electronic and microprocessor based systems have been delivered that have made a major impact on the freedom and quality of life for the disabled. The Department continues to make extensive use of the excellent computing facilities offered by the Center for Computer Man/Machine Intelligence, Networking and Distributed Systems, the Department, the college, the University computer centers, the Center for Advanced Computation and Telecommunications. New directions in the Department include an increased emphasis on teaching and research in computer engineering.
Mechanical Engineering Educational Objectives and Outcomes

Mechanical Engineering Educational Objectives

Objectives are defined as the expected accomplishments of graduates of the program in first few years after graduation.

Graduates of the BSE Mechanical Engineering program at the University of Massachusetts at Lowell will be able to:

- Pursue successful careers in mechanical engineering, or related engineering fields.
- Engage in lifelong learning and continued professional development in engineering or non-engineering fields.
- Engage in service activities related to their profession.

Mechanical Engineering Educational Outcomes

At graduation, students of the BSE Mechanical Engineering program at the University of Massachusetts at Lowell should:

- Be able to apply the principles of advanced engineering math, physics, and chemistry to the solution of problems in engineering science. These problems should be in the fields of mechanics, fluid flow, heat transfer, materials engineering, and vibrations.
- Be able to design, perform, and analyze experiments.
- Be able to design, build, and test a system, component, or process to meet specified requirements.
- Be able to seamlessly integrate the use of computers into engineering projects. This must include 3D computer aided design, spreadsheets, and a programming language.
- Be able to communicate technical information. This must include oral presentations, written reports, and an ability to work on and communicate with multi-disciplinary team members.
- Understand the need to assess the impact of engineering designs on society. This should include factors such as economics, ergonomics, the environment, and sustainability.
- Understand the concept of the engineering profession through an exposure to professional societies, professional registration, the need for lifelong learning, and professional ethics.

BSE/MSE Program

For its undergraduate students, the department offers a combined BSE/MSE program. This program is available to undergraduates with a minimum 3.0 cumulative g.p.a. at the end of their Junior year. Application for the BSE/MSE program should be made to the graduate coordinator by the eighth week of the second semester of the junior year. The graduate coordinator will hold the application until the grades for the complete junior year are obtained.

Benefits of the BSE/MSE Program:

- The graduate application fee is waived.
- The university requirement that all graduate school applicants take the Graduate Record Examination (GRE) is waived.
- Two graduate courses (500 level) are taken in the senior year and the six credits obtained are applied to the B.S. degree requirements. In addition, if a grade of B or better is obtained in these courses they may be applied to the M.S. degree requirements. Students may take more graduate courses as a BSME student. However, only six credits may be counted toward both degrees.
- Any technical elective credits taken above the department minimum (9 credits) may be applied to the MS degree.
- You end up with both a Bachelors and a Masters degree.

See more information on the bachelor's/master's degree program

Mechanical Engineering Major

The Bachelor of Science in Engineering (Mechanical Engineering) program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org, and provides its graduates with a very comprehensive engineering education. A major strength of the program is its emphasis on hands-on experience. Graduates are fully prepared to pursue work in industry, or to continue on for graduate education in engineering, business, and medicine. The curriculum is designed to graduate engineers who can apply fundamental principles of mechanical engineering with competence and sensitivity to the needs of society. To achieve this goal, students follow a sequence of courses beginning with basic mathematics and science, followed by their application to courses in engineering science and engineering design. Relevant clusters of studies in the humanities and social sciences are included within the context of engineering education.

View the course of study for students entering Fall 2011 and later (pdf).

For additional information visit the Mechanical Engineering Department or contact us.
Policy

- Educational Objectives and Outcomes
- Industrial Advisory Board

Programs

- Course Listing
- Course of Study
- Mechanical Engineering Major
- BSE/MSE in Mechanical Engineering Program

Mechanical Engineering offers a broad spectrum of career choices. Mechanical engineers can be found in every sector of our technologically complex society. There are jobs in manufacturing, power generation, materials processing, ship building, aircraft, automotive, and construction companies; as well as with government organizations and consulting firms, to name a few. Opportunities are available in the design of machinery, product design, plant design, system integration, testing, analysis, research and development. In addition to these traditional activities, mechanical engineers are deeply involved in problems of the future such as the development of new power systems, advanced composite materials, and new methods of productivity and quality enhancement in manufacturing. In view of this breadth, mechanical engineers as the general practitioners of the engineering profession have the flexibility to move into a wide variety of fields. The mechanical engineering program is structured to offer this flexibility.

There are three primary components to the mechanical engineering program. The first is comprised of the mathematical, physical, and engineering sciences. These form the permanent bedrock upon which the program is built and, provide the necessary basis for lifelong learning and adaptation to a changing technologically based society. The second component involves the application of these principals in conjunction with modern computer aided design tools, to the design, testing, and manufacture of products, systems, devices, etc. These technological tools change continually as a result of advances in computer software and hardware, and also as a result of changing demands from the marketplace (for example, there is more emphasis on manufacturing and commercialization and less emphasis on defense than there was only a few years ago). The third component is comprised of the humanities and social sciences that are so necessary for students to continue their growth as citizens and as professionals in a global economy. These subjects enhance the student's ability to communicate with and understand a diversity of individuals both on and off the job.

The curriculum is designed to graduate engineers who can apply fundamental principles of Mechanical Engineering with competence and sensitivity to meeting the needs of society and to continue a lifelong process of learning and growth in the profession. To achieve these goals, the program begins with a heavy concentration in mathematics, physics and chemistry. These courses form the foundation upon which the engineering curriculum is built. In addition the student is introduced to computational tools and to basic engineering practice. Subsequently, there is an emphasis on engineering science and design courses where the principles of mathematics, physics, and chemistry are applied and expanded upon in the context of engineering analysis, design, and practice. Students are exposed to experimental methods for testing and evaluation of materials, thermal/fluid processes, and equipment. The senior year offers an introduction to the multiplicity of technical areas with which mechanical engineers are concerned. Through technical electives and the capstone design experience the student can explore various specialties according to their interest.

A unique feature of the program is the dispersion throughout the curriculum of the design-build-test process. Relatively simple team projects are executed in the freshman year. The complexity of the designs, the use of analytical tools, the fabrication methods, and testing techniques required, increase with each subsequent year. Students learn, hands-on, about different manufacturing techniques, about design methodologies, testing techniques, teamwork, and how to communicate their designs and work. Additionally they learn the importance and the place of applying the principals of the engineering sciences in accomplishing successful designs.

Students take a number of courses in the humanities and social sciences. A considerable choice of subjects is allowed. These subjects broaden the student's outlook and serve to focus attention on the importance of non-technical knowledge in being successful professionally and as a person.

The program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org, which sets the standards for all engineering programs in the US.

Objectives of the Francis College of Engineering

The Francis College of Engineering seeks to prepare men and women to be successful in engineering or their chosen profession.

The faculty and staff of the Francis College of Engineering are strongly committed to providing our students with a high quality education relevant to the needs of society and industry. We will do this in a cooperative atmosphere that facilitates learning and cares about the needs of our students.

Programs are available in several engineering disciplines to accommodate varied interests. In addition, within each discipline students may prepare for various careers such as research, development, design, production, construction, teaching, and management. A faculty advisor is assigned to each student to provide experienced guidance in selecting programs and courses and in career planning.

Each student is encouraged to develop his or her full potential as an engineer with a high degree of awareness of the technological needs of society, the nation, and particularly those of Massachusetts industry, government, and educational institutions.

The College stresses professional needs by continuously updating courses and options in the standard engineering and selected specialty programs. The departments use all available resources to advance the level of excellence of their programs. All undergraduate...
engineering programs are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. Departments adhere to the standards of the National Society of Professional Engineers. The college also follows the careers of successful graduates, and solicits their views on making programs more relevant and effective.

In each discipline, the College of Engineering offers graduate research programs that not only serve as a source of updating the undergraduate course offerings, but also ensure that faculty are on the cutting edge of their particular disciplines. These programs advance the general level of information and knowledge that is so essential in fast-moving technological fields, while providing the highly specialized research required by industry. By functioning as an educational resource to the engineering profession and industry of the Commonwealth through instruction, consulting services, and research, the College of Engineering at the University of Massachusetts Lowell provides its students with an ever-current view of the working world for which they must prepare.

The College also offers associate and baccalaureate degree programs in Engineering Technology in the evenings through Online & Continuing Education.

Plastics Engineering Industrial Advisory Board

Each semester, the faculty and student representatives in the Department of Plastics Engineering meet with a Plastics Industry Advisory Board (PAB). The PAB is comprised of engineers working in leadership positions at their respective companies. The group provides advice on changing industry trends so that the faculty can keep the Plastics Engineering program relevant to industry's needs.

Larry Acquarulo, Jr.
Foster Corporation
Dayville, CT 06241

Erik Bates
BioProcessors
Woburn, MA 01801

Charles Burke
Entec Engineered Resins
Manchester, TN 37355

Fred Charpentier
Ferromatik Milacron
Leominster, MA 01453

Paul Colby
Spirex Corporation
Youngstown, OH 44513

Jim Culhane
Boston Scientific Corp.
Watertown, MA 02472

John Cuneo
Rehrig Pacific Corp.
Raymond, NH 03077

Jim Dandeneau
Putnam Plastics Corporation
Dayville, CT 06241

Richard J. Donahue
Integra Companies, Inc.
Devens, MA 01432

Nick Fountas
JLI-Boston
Boston, MA 02109

Michael V. Gionfriddo
Quabaug Corporation
North Brookfield, MA 01535

Kara Goeken
Boston Scientific
Natick, MA 01760

Paul Hailey
Freudenberg-NOK
Manchester, NH 03103-3388

Mark Hamilton
Complete Systems Co.
Warwick, RI 02886

William Hellmuth
Battenfeld Gloucester Eng.
Gloucester, MA 01931-0900

Joe Hennessey
RTP Company
Chelmsford, MA 01824

Gail Bristol
Society of Plastics Engineers
Brookfield, CT 06804

John Hudson
Keller Products, Inc.
Manchester, NH 03108-4105

Vishal Kadakia
Teknor Apex
Pawtucket, RI 02861

Nickolas Latorre
Gerber Products Company
Fremont, MI 49413-0001

Wally Mallett
The Gillette Company
Boston, MA 02127-1096

Jim McDonough
Applied Product Development, LLC
East Greenwich, RI 02818

Leo Montagna
Lee Plastics Inc.
Sterling, MA 01564

Paul Nazzaro
Injectronics, Inc.
Clinton, MA 01510

Tony Olender
Thermo Electron Corporation
Newington, NH 03801

Rob Peterson
Integral Group, Inc.
Hudson, WI 54016

Dean Piepiora
Performance Polymers, Inc.
Leominster, MA 01453

John Puglia
Millipore Corporation
Bedford, MA 01730

Richard Quigley
Foster Corporation
Dayville, CT 06241

Peter Rucinski
Moldflow Corporation
Wayland, MA 01778

Steven Rocheleau
Rocheleau Tool & Die Co. Inc.
Fitchburg, MA 01420

Mark Saab
Advanced Polymers, Inc.
Salem, NH 03079
Plastics Engineering Minor in Business Administration

Most engineers become managers of people and projects. As a result, it is important for engineers to have an understanding of business practices. The Department of Plastics Engineering has worked closely with the College of Management to develop an optional, streamlined business program for undergraduate Plastics Engineering students. Plastics Engineering students can receive a minor in Business Administration by taking only four (4) extra courses.

These extra business courses can be taken during the normal school year or during the summer. Most can be taken online as well. A total of seven courses are actually required to obtain a Business Minor, but three of these seven courses count as credits towards the Plastics Engineering B.S. Degree. Therefore only four “additional” courses are required.

The course requirements for the Business Minor are:

- 49.201 Economics 1*
- 60.201 Accounting / Financial
- 60.202 Accounting / Managerial (optional but recommended)
- 61.301 Business Finance
- 62.201 Marketing Principles
- 66.301 Organizational Behavior
- 26.537 Business Law for Engineers**

and one of the following courses:***

- 26.507 Plastics Industry Organization
- 26.540 Commercial Development of Polymeric Systems
- 26.590 Survey of Intellectual Property
- 22.576 Engineering Project Management

* Already required for the Plastics Engineering Program.

** Counts as a “Design Elective” for Plastics Engineering

*** Counts as a “Technical Elective” for the Plastics Engineering.

Plastics Electives

The Plastics Engineering Department offers electives that have a technical focus, a materials focus, or a design focus. Please use the links below to see what courses satisfy the requirements for each.

- Technical Electives
- Materials Electives
- Design Electives

Technical Electives

During the senior year, Plastics Engineering students are required to take a “Technical” Elective. Students can select a course from the course list below. Some courses are available only when there is sufficient demand. Students may also take an upper level technical course offered by another College of Engineering Department if it is approved by the Plastics Engineering Chairperson or Executive Officer. The Technical Elective is waived for students enrolled in the Co-op Program who have successfully completed both 26.310 Co-op Assessment I and 26.410 Co-op Assessment II. Plastics Engineering students doing a Minor in Business Administration should take either 26.507, 26.540, 26.590 or 22.576 for their technical elective.

- 26.409 Senior Research in Plastics I (3 credits)
- 26.502 New Plastics Processing Techniques (3 credits)
- 26.504 Mechanical Behavior of Polymers II (3 credits)
- 26.505 Polymer Structure II (3 credits)
- 26.507 Plastics Industry Organization (3 credits)
Plastics Processing Theory I (3 credits)
Plastics Processing Theory II (3 credits)
Polymer Blends and Multiphase Systems (3 credits)
Porous Polymers (3 credits)
New Plastics Materials (3 credits)
Statistics for Six Sigma (3 credits)
Lean Plastics Manufacturing (3 credits)
Screw Design Principles (3 credits)
Process Analysis, Instrumentation, and Control (3 credits)
Nanoscale Plastics Processing (3 credits)
Design of Automated Assembly Systems (3 credits)
Adhesives and Adhesion (3 credits)
Coatings Science and Technology I (3 credits)
Coatings Science and Technology II (3 credits)
Rubber Technology (3 credits)
Rheology of Coatings (3 credits)
Business Law for Engineers (3 credits)
Commercial Development of Plastics (3 credits)
Computer Applications in Plastics (3 credits)
Colloidal Nanoscience and Nanoscale Engineering (3 credits)
Additives for Polymer Materials (3 credits)
Mixing in Plastics Processing (3 credits)
Materials for Renewable Energy and Sustainability (3 credits)
Analytical and Numerical Methods in Plastics Processing (3 credits)
Product Design for Elastomers (3 credits)
Processing with Elastomers (3 credits)
Extrusion Die Design (3 credits)
Machine Design (3 credits)
Medical Device Design I (3 credits)
Medical Device Design II (3 credits)
Elements of Packaging (3 credits)
Thermosets (3 credits)
Polymer Material Systems Selection (3 credits)
Dynamic Mechanical Properties I (3 credits)
Dynamic Mechanical Properties II (3 credits)
Biomaterials I (3 credits)
Advanced Mold Design (3 credits)
Problems in Biomaterials Directed Studies (3 credits)
Computer Aided Engineering I (3 credits)
Computer Aided Engineering II (3 credits)
Injection Molding (3 credits)
Polymer Nanocomposites (3 credits)
Survey of Intellectual Property (3 credits)
Thermoplastic Elastomers (3 credits)
Plastics, Elastomers, and Additives from Renewable Resources (3 credits)
Plastics Manufacturing Systems Engineering (3 credits)
Supply Chain Management (3 credits)
Plastics Industry Development (3 credits)
Structural Product Design (3 credits)
Biomaterials II (3 credits)
Engineering Project Management (3 credits)

Materials Electives

Plastics Engineering students are also required to take a "Materials" Elective. Students can select a course from the materials elective course list below. Some courses are available only when there is sufficient demand. Students can take an upper level design course offered by another College of Engineering Department (e.g. material science, composites…) if it is approved by the Plastics Engineering Chairperson or Executive Officer.

Polymer Blends (3 credits)
Porous Polymers (3 credits)
New Plastics Materials (3 credits)
Composite Materials (3 credits)
Adhesives and Adhesion (3 credits)
Coatings Science and Technology I (3 credits)
Rubber Technology (3 credits)
Commercial Development of Plastics (3 credits)
Colloidal Nanoscience and Nanoscale Engineering (3 credits)
Advanced Plastics Materials (3 credits)
Additives for Polymer Materials (3 credits)
Materials for Renewable Energy and Sustainability (3 credits)
• 26.559 Elements of Packaging (3 credits)
• 26.565 Thermosets (3 credits)
• 26.566 Polymer Materials Systems Solution (3 credits)
• 26.575 Biomaterials I (3 credits)
• 26.579 Problems in Biomaterials Directed Studies (3 credits)
• 26.589 Polymer Nanocomposites (3 credits)
• 26.595 Thermoplastic Elastomers (3 credits)
• 26.596 Plastics, Elastomers, and Additives from Renewable Resources (3 credits)
• 26.610 Plastics Industry Development (3 credits)
• 26.615 Lean Plastics Manufacturing (3 credits)
• 26.523 Screw Design Principles (3 credits)
• 26.531 Design of Automated Assembly Systems (3 credits)
• 26.537 Business Law for Engineers (3 credits)
• 26.541 Computer Applications in Plastics (3 credits)
• 26.549 Product Design for Elastomers (3 credits)
• 26.551 Extrusion Die Design (3 credits)
• 26.552 Machine Design (3 credits)
• 26.553 Medical Device Design I (3 credits)
• 26.554 Medical Device Design II (3 credits)
• 26.576 Advanced Mold Design (3 credits)
• 26.585 Computer Aided Engineering I (3 credits)
• 26.586 Computer Aided Engineering II (3 credits)
• 26.618 Structural Product Design (3 credits)

Design Electives

Plastics Engineering students are also required to take a "Design" Elective. Students can select a course from the design elective course list below. Some courses are available only when there is sufficient demand. Students can take an upper level design course offered by another College of Engineering Department if it is approved by the Plastics Engineering Chairperson or Executive Officer.

Plastics Engineering students doing a Minor in Business Administration should take 26.537 for their design elective.

• 26.515 Lean Plastics Manufacturing (3 credits)
• 26.531 Design of Automated Assembly Systems (3 credits)
• 26.537 Business Law for Engineers (3 credits)
• 26.541 Computer Applications in Plastics (3 credits)
• 26.549 Product Design for Elastomers (3 credits)
• 26.551 Extrusion Die Design (3 credits)
• 26.552 Machine Design (3 credits)
• 26.553 Medical Device Design I (3 credits)
• 26.554 Medical Device Design II (3 credits)
• 26.576 Advanced Mold Design (3 credits)
• 26.585 Computer Aided Engineering I (3 credits)
• 26.586 Computer Aided Engineering II (3 credits)
• 26.618 Structural Product Design (3 credits)

Five-Year BS/MS in Plastics Engineering

The Plastics Engineering Department offers a program of accelerated study in order to encourage outstanding (GPA 3.0 and above) undergraduate students to continue their studies toward a Master of Science degree in Plastics Engineering. Interested students should file a Graduate Application prior to the last day of classes in the final semester as an undergraduate. Applicants for this program are not required to take the Graduate Record Examination.

The student will receive a Bachelor's degree at the end of the fourth year of study, if all course requirements have been met. Acceptance as a matriculated graduate student is contingent upon the further recommendation of the department graduate committee. Up to six credit(s) of the B.S. degree may be applied to the Graduate Program. As a result, the MS Degree credit requirement drops from 30 to 24 credits for BS/MS Plastics Engineering Thesis Option Students, and from 33 to 27 credits for BS/MS Plastics Engineering Non-Thesis Option Students.

In some cases, an undergraduate student may take additional graduate courses (up to an additional 6 graduate course credits), credits which are not applied to the Bachelor of Science in Plastics Engineering, and apply these to the Master of Science in Engineering. However, no student may transfer more than 12 credits into the Graduate Program.

During the summer preceding the fifth year, the student, if accepted as a matriculated student in the Master's program, may begin his or her thesis research if they are enrolled in the thesis option MS. Students taking full advantage of the combined program ordinarily may expect to finish the M.S. Engineering degree at the end of the fifth year of study. Actual completion will depend upon the student's progress in the program.

A student seeking a five-year BS/MS Plastics Engineering degree must also meet the requirements for a Plastics Engineering Certificate as their area of specialization. Approved graduate certificates include:

- plastics materials
- plastics processing
- plastics design
- elastomers
- medical plastics design & manufacturing
- sustainable plastics materials and additives
- commercial development

Refer to the Graduate Catalog for a detailed listing of the courses required for each graduate certificate.

A student may be eligible for financial assistance, i.e., fellowships and teaching assistantships, during the fifth year of study, but acceptance of such assistance and the attendant responsibilities may delay the completion of the program beyond the period specified in the preceding paragraph.
Course of Study for Plastics Engineering

Plastics Engineering Curriculum - Standard Track

Undergraduate Plastics Engineering students who are not enrolled in the formal Cooperative Education Program should follow the Plastics Engineering “Undergraduate Curriculum: Standard Track”. The standard track has a large number of required science, engineering and materials courses, along with a number of elective courses. The elective courses include both technical electives and general education electives (Arts and Humanities and Social Science courses).

Course of Study – Standard Track (pdf)
List of Technical, Materials and Design Electives
List of AH and SS General Education Electives

Plastics Engineering – Summer Co-op Track

Undergraduate Plastics Engineering students who are enrolled in the formal Summer Cooperative Education Program should follow the Plastics Engineering “Undergraduate Curriculum: Summer Co-op Track”. Like the standard track, the summer co-op track has a large number of required science, engineering and materials courses, along with a number of elective courses. The elective courses include both technical electives and general education electives (Arts and Humanities and Social Science courses). In addition, co-op track students seek employment in the Plastics Engineering field in the summers following their junior and senior years. Students that successfully complete two rounds of co-op receive technical elective credits (3 credits). Students that do not complete two rounds of co-op in a satisfactory manner must complete a technical elective in order to satisfy the program credit requirement. Students also have the option to do semester long co-ops but the specific course sequence to be followed by the semester co-op student will be developed on a case by case basis with guidance from the student’s academic advisor and a Career Services Co-op Coordinator.

Course of Study – Summer Co-op Track (pdf)
Co-op Program Forms
List of Technical, Materials and Design Electives
List of AH and SS General Education Electives

For more information visit Plastics Engineering or contact us.

Department of Plastics Engineering

Programs

- Course of Study – Standard Track or Summer Co-op Track
- Technical, Material and Design Electives
- General Education Electives
- Course Listing
- BS/MS in Plastics Engineering

This program is designed to prepare the graduate for a professional career in the polymer industries of which plastics is the largest. Other segments include rubber, coatings and adhesives.

The Plastics Engineering B.S. Program has been designed to provide a well-rounded and comprehensive level of engineering education, with a curriculum offering a solid foundation in the basic sciences, engineering fundamentals, plastics materials science, processing, mold design, die design, product design testing and characterization. In addition, the program has emphasized interaction and communication skills and laboratory experiences related to plastics materials, properties, processing and design. The program also puts special emphasis on engineering ethics and safety. A list of program outcomes that have been established for the Plastics Engineering program appears below. As a result of such a multi-faceted emphasis students are expected to possess the following skills at graduation:

1. The ability to apply principles of engineering, math, physics, and chemistry to the solution of problems related to: plastics engineering, plastics materials, plastics manufacturing, plastics/polymer characterization, plastics machine design/optimization, plastics mold design/optimization, die design and product design.
2. The ability to critically design, perform and analyze experiments related to plastics processing and testing of plastics materials or products.
3. The ability to design, select materials, and manufacture a given plastics product, or the ability to design and modify manufacturing systems and parameters to meet specified requirements.
4. The ability to use computers in engineering practice, including spreadsheets, graphing programs, and computer aided design or analysis software.
5. The ability to communicate technical information. This includes oral and written reports and an ability to communicate with multi-disciplinary team members.
6. The ability to understand and appreciate the impact of changes in engineering practices on society. This includes issues such as economics, environmental impact, sustainability, ethics and global outsourcing.
7. The ability to understand and appreciate the responsibility of the engineering profession via exposure and interaction with professional societies and the need for continuing and on-going education in the field of plastics engineering.
8. Plastics Engineering graduates shall satisfy the outcome requirements of ABET* Criterion 3:
• an ability to apply knowledge of mathematics, science and engineering
• an ability to design and conduct experiments, as well as to analyze and interpret data
• an ability to design a system, component, or process to meet desired needs
• an ability to function on multi-disciplinary teams
• an ability to identify, formulate, and solve engineering problems
• an understanding of professional and ethical responsibility
• an ability to communicate effectively
• the broad education necessary to understand the impact of engineering solutions in a global and societal context
• a recognition of the need for, and an ability to engage in life-long learning
• a knowledge of contemporary issues
• an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

*Accreditation Board for Engineering and Technology*

The Bachelor of Science in Engineering (Plastics Engineering) program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org

The program includes sufficient flexibility for further specialization in areas of individual interest. Undergraduates may join the nation’s first student chapter of the Society of Plastics Engineers (SPE). The Plastics Engineering Department also has student chapters of the Institute of Packaging Professionals (IoPP), the American Chemical (ACS) Society Rubber Group, and SAMPE.

Since the program started in 1954, approximately 2000 graduates have been employed by polymer industries throughout the United States, South America, Europe, and Asia. Major plastics producers and users recruit annually on campus. While most job openings are in product and process development, plastics materials development, technical service, medical device design and manufacturing, or marketing, some graduates go into research, consulting, or teaching.

**General College of Engineering Requirements**

Each candidate for the undergraduate degree must satisfy the general requirements of the University of Massachusetts Lowell in order to graduate. The student must also meet the specific academic requirements of the College of Engineering as indicated in this section, as well as complete all credits and courses required by the department in which the student majors. The number of credits required for the completion of each College of Engineering program is established by the department offering the program.

Courses taken by freshmen entering any engineering discipline are for the most part similar and include calculus, physics, chemistry, college writing, and engineering design.

Introduction to Engineering I (25.107) introduces first-year students to the engineering design process for solving open-ended problems. Introduction to Engineering II (25.108) is department-specific and continues with computer tools and applications to department-specific problems.

Students who have completed their freshman programs with a grade-point average of 2.50 or better automatically qualify for admission to the sophomore program of their choice. Students who fail to achieve that required average will be admitted to the sophomore year of engineering programs only upon the recommendation of appropriate departmental committees.

Please refer to the University grade-point average policy for satisfying retention and graduation requirements.

Individuals who are not granted continued matriculation in the College of Engineering but who satisfy University retention requirements may file for intercollegiate transfer within the University. Students who are dismissed from the College of Engineering and who are ineligible to file for intercollegiate transfer, or who are denied admission to another college following application for intercollegiate transfer, are dismissed from the University.

**Change of Program**

Students who wish to change their declarations of program within the College of Engineering are required to follow the procedure stipulated under University Academic Policies: Change of Major within College of Enrollment. It should be noted that College of Engineering students who change their programs within the College of Engineering after the first semester of the sophomore year should expect to have to take semester credits beyond the minimum degree requirement, and thus extend the normal four-year period of study.

Students who wish to change from engineering to a major that is offered by another college within the University of Massachusetts Lowell must apply for an intercollegiate transfer. These procedures are described under University Academic Policies: Change of Major with Intercollegiate Transfer.

Qualified students from other colleges in the University of Massachusetts Lowell may transfer into degree programs of the College of Engineering using the same procedure. However, these students may expect to extend their period of study beyond the normal four-year period, particularly if they transfer after the first semester of the sophomore year.

**Declaration of a Second Major**
Candidates for degrees in the College of Engineering may be permitted to elect additional majors offered in other colleges of the University, provided that all curriculum requirements in engineering are satisfied.

Engineering students who wish to take on a second major that is offered by the College of Engineering or by another college must formalize this intent by the start of the junior year. At that time the student is also required to submit for approval his or her intended program of study to the advisor in the department offering the second major. It should be noted that in most cases, the election of an additional major will extend the normal four-year period of undergraduate study. Students who elect to take a second academic major in another college are candidates for one degree in the College of Engineering only. A student who pursues an academic major in the College of Engineering and another college or two majors in the College of Engineering is subject to all degree requirements of the College of Engineering and is subject only to major course requirements specified by the department of the secondary major. For a complete statement of University Policy on double majors, refer to University Academic Policies: Major Field Requirements.

Transfer Policies of the College of Engineering

General Policies

Transfer from Other Institutions

2+2 and 2+3 Transfer Programs

Repetition of Transferred Courses

Intercollegiate Transfer to the College of Engineering

General Policies

It is the policy of the College of Engineering to accept transfer students from other institutions as well as from other colleges within the University of Massachusetts Lowell. Such students may expect recognition of previously completed courses if these are equivalent to those that are specified by the curricula of the College of Engineering. Transfer students are required to have at least a 2.5 grade-point average in order to be admitted to the College of Engineering.

Transfer from Other Institutions

UMass Lowell participates in the Joint Admissions Program of the Massachusetts Community Colleges and the University of Massachusetts. According to this program, a student from one of these community colleges is guaranteed admission to UMass Lowell provided the student is enrolled in a designated transfer program and earns an associate degree with a 2.5 or higher cumulative grade point average.

Courses that are transferred from other institutions are initially evaluated by the Office of Admissions in terms of general University of Massachusetts Lowell requirements. Professional courses are subsequently evaluated by the departments in which the student has been accepted. Credit is given for completed courses where the grade is C (2.000 on a 4.000 scale) or better.

The University of Massachusetts Lowell also subscribes to the Commonwealth Transfer Compact. Under this compact, the holder of an associate degree from a compact institution receives up to 66 credits for this work toward a Bachelor of Science in engineering or technology. Courses which are transferred to the University of Massachusetts Lowell under the provisions of the Commonwealth Transfer Compact, but which do not meet the credit requirements of the College of Engineering, or which are not acceptable as unrestricted elective courses, will be listed on the student’s transcript, but will not apply to the minimum degree requirements.

In the event that a student has first transferred to some other college in the University of Massachusetts Lowell under the Commonwealth Transfer Compact and subsequently makes a transfer to the College of Engineering, all previously completed courses, including transferred courses from other compact institutions, will be re-evaluated in terms of their applicability toward degree requirements of the College of Engineering.

The policies of each of the colleges in the University determine the applicability of grades received in transfer to the grade-point average of the student’s major at the University of Massachusetts Lowell. It is the policy of the College of Engineering not to count such grades for the purpose of determining the student’s grade-point average in his or her professional area.

2 + 2 and 2 + 3 Transfer Programs

The College of Engineering has been a leader in the development and implementation of 2 + 2 and 2 + 3 Programs in the Commonwealth of Massachusetts. More and more students who are interested in earning a Bachelor of Science degree in one of the engineering disciplines pursue their first two years of the curriculum at selected community and state colleges and complete the degree requirements during two to three final years at the University of Massachusetts Lowell. The program is ideal from the standpoint of the student who is not ready to enter a four-year college, allowing the participant to ease into college life while still remaining close to home and within the environment of a smaller college.

The contractual agreements among participating schools require an on-going review of coursework normally offered in the first two years. Curricula and other requirements are carefully established and examined by faculty at both institutions.

Transfer agreements vary with each institution participating in the 2 + 2 or 2 + 3 programs. Some participating colleges offer programs that prepare students for transfer to mechanical and electrical engineering; programs in other schools lead to entry into chemical, civil or plastics engineering. High school students who are considering this program should consult the office of admissions at the University of
Massachusetts Lowell for information about available programs in participating institutions.

**Repetition of Transferred Courses**

A student who has been granted transfer credit from another institution, and on this basis has been assigned to advanced courses for which the transferred course is a prerequisite, may be subsequently advised to repeat such transferred work at the University of Massachusetts Lowell. Such cases arise when preparation of the student is demonstrably inadequate to allow successful performance.

To repeat a transferred course a student must file an academic petition with the Dean of the College. Since credit may not be granted more than once for the completion of any course, a condition for filing such a petition is the simultaneous filing of a “request to revoke recognition” statement to dispose of the previously transferred course credit.

**Intercollegiate Transfer to the College of Engineering**

Students wishing to transfer to the College of Engineering from another college within the University of Massachusetts Lowell, or from a baccalaureate (degree granting) Division of Continuing Education program, must file a form for change of major together with a transcript, with the Dean of the College of Engineering and with the appropriate engineering department head. Petitions for transfer must be filed no later than November 1 in order to transfer in the spring semester, and no later than April 1 in order to transfer in the fall semester.

Any student who wishes to transfer from another college in the University to the College of Engineering must have a minimum grade-point average of 2.500. Irrespective of the grade received, all courses that may not be applied to the College of Engineering program requirements will be deleted from the student’s cumulative grade-point average.

For further procedural details about the University’s policies concerning intercollegiate transfers, students are referred to University Academic Policies: Change of Major with Intercollegiate Transfer.

**Minor in Business Administration for Engineers**

The minor in business administration for engineers is offered by the College of Management (CoM) in conjunction with the College of Engineering.

**Courses in the Minor in Business Administration for Engineers**

*Required courses:*

- 49.201 Economics I (may count as Gen Ed course)
- 60.201 Accounting/Financial
- 61.301 Business Finance
- 62.201 Marketing Principles
- 66.301 Organizational Behavior

*Elective courses:*

Two courses from a selected list which is approved by the Engineering department and College of Management or 63.301 Management information Systems plus one additional course from a selected list which is approved by the Engineering department and CoM.

*For Civil & Environmental Engineering, these two additional courses are:*

- 14.372 Civil Engineering Systems (already core in CEE)
- And one from the following list:
  - 14.475 Construction Management (*)
  - 22.576 Engineering Project Management (*)

Courses marked with * and 66.301 Organizational Behavior may be used as Technical Electives in CEE.

*For Plastics Engineering, these two additional courses are:*

- 26.537 Business Law for Engineers (†)
  - And one from the following list:
    - 26.507 Plastics Industry Organization (*)
    - 26.540 Commercial Development of Polymeric Systems (*)
    - 26.590 Survey of Intellectual Property (*)
    - 22.576 Engineering Project Management. (*)

† Course 26.542 counts as a Design elective, and courses marked with * count as a Technical Elective in Plastics. In addition, Plastics students not taking 22.576 are encouraged to take 60.202 Accounting/Managerial or 14.470 Engineering Economics or 10.409 Economics & Process Analysis.

*For Chemical Engineering, these two additional courses are:*

- 10.409 Economics and Process Analysis
and one from the following list:

- 14.372 Civil Engineering Systems (*)
- 63.210 Operations Analysis Techniques
- 22.576 Engineering Project Management (*)
- 26.542 Business Law for Engineers (*)
- 26.590 Survey of Intellectual Property (*)

Courses marked with * may count as a Technical Elective in ChE.

For Mechanical Engineering, these two additional courses are:

- 22.576 Engineering Project Management (*)
- 22.575 Industrial Design of Experiments (*)
- 14.372 Civil Engineering Systems or 63.210 Operations Analysis Techniques
- 14.470 Engineering Economics (*) or 10.409 Economics & Process Analysis (*)
- 26.542 Business Law for Engineers (*)

Courses marked with * may count as a Technical Elective in ME.

For Electrical and Computer Engineering, these two additional courses may be:

- 14.372 Civil Engineering Systems or 63.210 Operations Analysis Techniques
- 14.470 Engineering Economics or 10.409 Economics and Process Analysis
- 22.576 Engineering Project Management
- 26.542 Business Law for Engineers
- 26.590 Survey of Intellectual Property

Additional courses may be added by each Engineering Department to their list of elective courses, with the approval of the College of Management.

Francis College of Engineering

Engineering is a profession that is concerned with the application of scientific knowledge and technology in service to society. It is involved with the identification of societal needs and creative technological solutions which address these needs in ways which are sensitive to societal, environmental and economic concerns and constraints.

The James B. Francis College of Engineering recognizes that the engineering needs of society are as complex and varied as the diverse interests, motivations, competencies, and backgrounds of its students. Therefore, it has developed a broad spectrum of programs to serve the needs of the student society and the high technology sector of the Massachusetts economy. The emphasis within each engineering program is on technical rigor, utilizing the latest advances in technology for the solution of engineering problems. At the same time, each program is characterized by a curriculum that is broad enough to produce engineers who are qualified to meet contemporary demands.

The College has active chapters of professional engineering and engineering honor societies in all major engineering disciplines, as well as the National Society of Black Engineers, Society of Women Engineers, Society of Hispanic Professional Engineers, and Tau Beta Pi - the national engineering honor society. In addition, Student Advisory Councils in each Department provide direct feedback to each Department Chair, and the College’s Engineering Student Council helps foster a sense of community in the students by planning and directing social functions and advising. Student participation in these societies and groups is strongly encouraged.

For more information, visit the College of Engineering website.

Joseph Hartman, Dean of Engineering

- Policies
- Programs

Departments

- Chemical Engineering
- Civil & Environmental Engineering
- Electrical & Computer Engineering
- Mechanical Engineering
- Plastics Engineering

Mission of the Francis College of Engineering

Policy

- Change of Program
- Declaration of Second Major
- Degree Requirements
- Transfer Policies
Civil Engineering is a profession that applies the basic principles of science in conjunction with mathematical and computational tools to solve problems associated with developing and sustaining civilized life on our planet. Civil Engineering is one of the broadest of the engineering disciplines both in terms of the range of problems that fall within its purview and in the range of knowledge required to solve those problems. Civil engineers plan, design, build, manage and rehabilitate the facilities essential to modern society: homes and work places; transportation systems for commerce and recreation, and water treatment and waste disposal systems for a healthful life. As part of the construction industry, they build bridges, buildings, tunnels, dams, canals, irrigation systems, harbors, highways, airports, water supply systems, and waste disposal facilities. They develop solutions to environmental problems, study new methods to control traffic, and design outer space and under sea structures.

Civil and Environmental Engineering practice encompasses a wide range of specialties, including: construction management, engineering mechanics, environmental engineering, geotechnical and foundation engineering, hydraulics, intelligent transportation systems, irrigation and drainage, materials engineering, structural engineering, surveying and site engineering, urban planning and development, urban transportation, water and wastewater treatment system design, water resources planning and management, hazardous waste site remediation, and waterway, port, coastal and ocean engineering.

Civil engineers work in both the public and private sector. They serve as city, town and state public works and environmental engineers. They own and are employed by consulting firms, construction companies and industries. They are employed by a variety of federal and state agencies such as, the Corps of Engineers, the Department of Transportation, the Environmental Protection Agency, the Federal Aviation Administration, Massachusetts Water Resources Authority and the Massachusetts Highway Department.

For more information visit the Civil & Environmental Engineering Department or contact us.
Studies major completes 36 credits in American Studies courses.

Student following the traditional major will then choose two disciplines from which to take 12 credits at the 300 level or above (six credits from each discipline) and an interdisciplinary course.

Students choosing the thematic option will identify a theme to explore and choose five to six courses from the list approved for each theme. Three of these courses must be at the 300 level or higher.

All students are also encouraged to do a practicum.

**BA/MA Option in Economic and Social Development of Regions**

The American Studies Program offers a five-year BA/MA option in conjunction with the Program in the Economic and Social Development of Regions. The option allows students to take selected courses from Economic and Social Development of Regions graduate offerings while completing the American Studies major.

For further information [Contact Us](#).

**American Studies minor**

A minor in American Studies consists of 18-24 credits selected from the list maintained by the program director. These courses must include:

- Two 300 level American Studies Courses
- 40.248 Values in American Culture
- At least three additional courses from the approved list

**American Studies Transfer Policy**

Students transferring to the College of Fine Arts, Humanities & Social Sciences who wish to major in American Studies must make individual arrangements with the coordinator of the program regarding credit for major and collateral course requirements. Some introductory courses at the 100 level may be applicable to the American Studies major, but they cannot be applied to the first 30 hours of the major.

**American Studies Program**

American Studies invites students to examine the development of American society and its culture. It also encourages students to explore the relationships among ideas, institutions, values, and aesthetic forms as they have evolved in the United States. Reflecting the pluralistic nature of the American experience, this program provides opportunities for students to explore multiculturalism and diversity in America.

American Studies allows students to combine a number of scholarly disciplines to better comprehend the many facets of American life. By completing courses from a variety of disciplines, students in American Studies not only sharpen their analytical powers and critical insights, but will, in the long term, be well prepared for employment in education, government, social services, business, and other professions.

Students who can analyze American culture by combining the concepts and approaches of a variety of disciplines - the arts, history, literature, political science, psychology, economics, sociology - are capable of making decisions with an understanding of the available alternatives. Many current problems relating to family life, medical ethics, gender and minorities, technology, the environment, international relations, government, and the influence of business, require an interdisciplinary approach. The American Studies major is an avenue by which students can obtain a liberal arts education. At the same time, the American Studies Committee encourages students to elect career-oriented courses as free electives, including management and computer science. Because of its flexibility, the American Studies major is a good choice for students who are unsure about their ultimate career choices, but who seek a foundation in the humanities, social sciences, and fine arts.

**European Summer Program**

The Art Department offers photography courses for credit in various countries in Europe during the summer. The courses generally take place in Finland, Italy and Switzerland.

**Art Major Requirements**

The art major prepares students for the challenges of professional life through a rigorous and innovative course sequence that includes studio, aesthetics and art history requirements.

The Art Department offers a professional Bachelor of Fine Arts degree with concentrations in Art and Design as well as a Minor in Studio Art. The BFA degree is anchored around a strong Foundations program that emphasizes the theoretical, analytical and practical aspects of art and design.

Art majors go on to graduate school or careers in fine art, graphic design, photography, interactive-media, animation, illustration, web
Accreditation

The Art Department of the University of Massachusetts Lowell is an accredited member of the National Association of Schools of Art and Design (NASAD).

General Education Requirement

A minimum of 33-35 credits must be completed as part of the University General Education requirement.

BFA studies in Art consist of 87 credit hours and must include at least five courses (15 credits hours) at the 300 level, including the following distribution requirements:

1. **Six Studio Foundation courses (18 credits):** Art Concepts I, Art Concepts II, Digital Foundations, Form and Content, Drawing I, and Drawing II must be completed prior to starting the concentration.
2. **Fourteen Concentration courses (42 credits)** are required within the student’s chosen concentration in Art or Design. Students may choose to focus on graphic design, advertising design, animation, digital imaging, drawing, illustration, interactive-media, painting, photography, sculpture or web design.
3. **Internship (3 credits).** Students are encouraged to secure an internship that is relevant to their concentration and will help them launch their careers in art or design.
4. **Four courses (12 credits) in Art History and two courses (6 credits) in Aesthetics and Critical Studies.**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>58.203</td>
<td>History of Art I (Prehistoric to Medieval Art)</td>
</tr>
<tr>
<td>58.204</td>
<td>History of Art II (Renaissance to Modern)</td>
</tr>
<tr>
<td>58/79.221</td>
<td>20th Century Art</td>
</tr>
<tr>
<td>58/79.352</td>
<td>Contemporary Art and Culture</td>
</tr>
<tr>
<td>79.XXX</td>
<td>Discipline specific Aesthetics and Critical Studies</td>
</tr>
<tr>
<td>79.XXX</td>
<td>Aesthetics and Critical Studies elective</td>
</tr>
</tbody>
</table>

5. **Senior Studio Requirement (6 credits):**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>70.497</td>
<td>(last semester of senior year)</td>
</tr>
</tbody>
</table>

Senior Studio Seminar is the BFA degree capstone course and can only be taken in the last semester of a student’s course sequence. There is a portfolio requirement for Senior Studio. Students who have completed 105 BFA applicable credit hours are eligible to apply for Senior Studio.

An exhibition of work completed in Senior Studio is required in the student's final semester. A minimum grade of C+ is required to pass Senior Studio. Students who receive a grade below C+ must repeat the course.

The Senior Studio Seminar course is regarded as a professional course and for this reason it is restricted to matriculating BFA majors only and may not be credited to any other major. Students should be aware that transferring from the BFA program to another degree major will normally entail a loss of credits and the completion of degree requirements within the customary four-year period may not be possible.

View the complete Course of Study (pdf):

- [Art & Design](#)

Students admitted to the BFA program are exempt from a language requirement.

Art Minor

A minor in studio art consists of 18-24 credits selected in accordance with the following specifications: 15-21 credits must be completed in studio art courses and at least one Aesthetics and Critical Studies course must be completed. Two courses of the minor must be at the 300 level or above.

Portfolio Admission Requirements

While a portfolio is not required for freshmen admissions into the art program, a portfolio is recommended to properly place new students in an appropriate course sequence. Freshmen who have completed High School AP credits in art may be eligible for credit toward the BFA degree.

Transfer students from compact colleges are not required to present a portfolio and will have their credits accepted when course work has an equivalent to or direct correlation with University of Massachusetts Lowell course work, provided that the grades meet the C- minimum accepted by the University.
Transfer students from non-compact colleges are not required to present a portfolio and will have their credits accepted when course work has an equivalent to or direct correlation with University of Massachusetts Lowell course work, provided that the grades are honors grades of B or above. A portfolio must be presented for course work that received a grade lower than a B (and within the C- minimum accepted by the University).

Students transferring from pass/fail programs or where further clarification of course work is needed will be asked to present portfolios for transfer evaluation.

University of Massachusetts Lowell students interested in transferring from other academic programs into Art will be asked to present a portfolio as well as interview with the Department Chairperson.

When preparing portfolios, slides must be labeled with: name, date, title, media and size. Slides should be submitted in slide sheets and consist of representative samples of work executed in high school or at the student’s previous institution. Digital, Mac formatted, CD's may also be submitted. Digital files must be clearly numbered and titled with the student's first intiial and last name (example: 1. J.Smith, 2 .J.Smith, etc). In addition, there must be a word document on the CD that functions as an image annotation list.

Art Department Policies

Registration for Art Courses

The Art Department reserves the right to pre-register its major students in order to assure completion of their degree requirements. In the event of over-subscription of art courses by art majors, the department will grant first preference to seniors and second preference to juniors. During the two week designated advising period each semester, full-time faculty are available for advising and assisting in course selection.

Attendance and Personal Conduct

Studio art courses consist of lectures, demonstrations and critiques. Because of the complex nature of these courses, students are expected to attend all scheduled classes and be on time. Excessive absences may cause failure of the course or a lower grade. The study of art provides an environment for creativity and artistic freedom. However, students enrolled in the BFA program will be expected to conduct themselves in a professional and academic manner.

Policy Concerning Student Work

The Art Department reserves the right to keep student work for a period of time not to exceed one year for inclusion in exhibitions. The Department reserves the right either to photograph student work for it's slide collection or, in the case of photography, printmaking and computer courses where many copies can be made, to keep actual examples of work. Unless otherwise specified, artwork and term papers left for more than one semester following the semester in which they were completed, become property of the Department.

Senior Studio students are required to submit visual documentation of their course work; this documentation becomes part of their department records. Students who do not meet this requirement will receive an incomplete grade.

Academic Integrity

Students should be aware of the issues of creative honesty and of the prohibition against unwarranted use of the work of others, of the dishonesty of misrepresenting the source of work and ideas, and the penalties established by the University for cheating and plagiarism. The department expects that work passed in by the student will be the product of the student's own effort. Particulars of the University policy on academic dishonesty can be found in the academic policies section of the University.

Equipment Care and Replacement Repair

The Art Department has limited resources that allow it to provide equipment for student use. Students are responsible for replacement costs of any items that they lose or damage in the course of their studies. In most cases, students are responsible for materials and expendible supplies required by their studio courses.

Criminal Justice Major

The University of Massachusetts Lowell offers a Bachelor of Science Degree in Criminal Justice. While our program seeks to provide students with a comprehensive knowledge of the criminal justice system, we are also committed to ensuring that students receive the benefits of a well-rounded liberal arts education. We not only familiarize students with the correlations of crime and the workings of the criminal justice system, but we also teach students how to apply this knowledge to related social problems and changing situations. This includes the development of critical thinking, communication skills and the ability to conceptualize ideas.

We provide students with multiple courses to represent these substantive areas. Our degree requirements and core curriculum focus specifically on the areas below:

- Criminal justice and juvenile justice processes (law, crime and administration of justice)
- Criminology (the causes of crime and typologies)
- Law enforcement (police organization, discretion, subculture, and legal constraints)
- Law adjudication (criminal law, prosecution, defense, and court procedures and decision-making)
- Corrections (incarceration, community-based corrections and treatment of offenders)
• Prevention of crime (social, community, situational interventions and public policy)
• Research and evaluation (principles of social science research and policy evaluation)
• Technology and crime analysis (crime mapping, data analysis and criminal justice information systems)

Through our curriculum, the program emphasizes the mastery of seven (7) skill areas to promote the education and employability of our students. These are:

• **Writing skills:** In undergraduate courses that the 300-level and above, writing skills are emphasized through course papers, essay examinations and other writing projects. Faculty spend large amounts of time grading and critiquing student writing and believe that the development of this skill is essential for employability and future success both within and outside of the criminal justice field.

• **Oratory skills:** In both lower- and upper-level undergraduate classes, we also emphasize the development of verbal communication skills. These are encouraged through general and focused class discussions, class presentations of semester papers, and the use of in-class debates.

• **Research/Evaluation Methods skills:** Due to the increasing emphasis on the ability to write grants, design demonstration and research projects and evaluate the success of program outcomes both within and outside of the criminal justice field, we offer students training in the art of research design. The undergraduate program requires that students take a research methods course that emphasizes logic, critical thinking, and the practical demands of planning and executing a research project. Many of our students over the years have assisted research faculty in several phases of actual research work including data collection, survey design, data coding and entry, and the preparation of human subjects’ protection materials.

• **Information and Technology skills:** The majority of our students take our Information and Technology sequence to fulfill their skills requirement. We believe that it is important that students become conversant with the variety of tools that are now utilized by criminal justice professionals, policy makers, and researchers worldwide. Students need to develop the capability to approach technological change with confidence and skill if they are to be competitive in the job market and keep pace with the constantly changing criminal justice environment. Students choosing the technology sequence are qualified for a variety of jobs, often civilian positions in law enforcement agencies in the area, such as crime analysis and/or research and planning.

• **Quantitative Analysis skills:** We increasingly encourage our students to gain familiarity with basic statistical concepts and data analysis skills. In addition to the problem-solving skills that can be developed through such courses, statistical knowledge and application is becoming a necessary skill for employment in many criminal justice organizations.

• **General Knowledge of Criminal Justice Administration:** The chief objective behind our school’s core requirements is to familiarize students with the workings of key components of the criminal justice system. One of the most valuable experiences for our undergraduates with little or no criminal justice experience has been an internship or practicum.

• **Specific Concentrations in Criminal Justice Topic Areas:** Our school is committed to providing a better understanding of social problems and policy. In an effort to provide a focus on one of the many key areas of the criminal justice system, we offer six optional degree concentrations within the Criminal Justice Major:
  - General
  - Police
  - Corrections
  - Violence
  - Information Technology
  - Homeland Security

Like other academic fields, our school does not offer courses nor award credit for vocational training courses designed for specific job preparation or advanced job training. Such courses are characterized by training for specific job skills rather than education involving conceptual learning. Instead, we use either a three (3) or six (6) credit Internship/Field Studies course for upper-level students as a mechanism for students to assess their interest and apply their classroom knowledge in an area of criminal justice.

In addition, students majoring in criminal justice will fulfill a professional skills requirement. This consists of either attaining intermediate proficiency in a foreign language, or completing four courses in information and technology. In the event that student chooses a foreign language skill, the school recommends Arabic or Spanish. In addition, a strength of our school is its emphasis on students developing applied skills in areas such as statistics and data analysis.

### Degree Requirements

The Criminal Justice major consists of at least thirty-six (36) credits in criminal justice courses (not to exceed 60 credits in criminal justice courses), of which at least five (5) courses must be at the 300-level or above. In accordance with University policies, students MUST have a minimum of 120 credits for graduation. Students majoring in Criminal Justice must maintain at least a 2.200 grade point average (GPA) overall and at least a 2.500 GPA in their Criminal Justice courses. Transfer students will also have to meet residency requirements that have been established by the University. Information on residency requirements can be found [here](#).

The following degree requirements pertain to students who entered Fall 2012 and beyond. Students who entered prior to Fall 2012 can view their degree requirements [here](#).

#### Required Courses (19 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.101</td>
<td>First Year Experience Seminar*</td>
</tr>
<tr>
<td>44.101</td>
<td>The Criminal Justice System</td>
</tr>
<tr>
<td>44.141</td>
<td>Police Process</td>
</tr>
<tr>
<td>44.151</td>
<td>Introduction to Corrections</td>
</tr>
</tbody>
</table>

Office of the Registrar 83 Broadway Street, Dugan 101, Lowell, MA 01854-5129
Criminology
Criminal Law
Criminal Justice Research Methods

Note: 59.101 First Year Experience Seminar is only required for Freshman entering after Spring 2010. Transfer students are not required to complete this course.

Note: 44.395 Statistics in Criminal Justice is required for a student’s acceptance into the 5-year BS/MA program. Students must receive a minimum grade of 'B' or better in this course and have a minimum overall GPA of 3.000.

Criminal Justice Electives (18 credits)
- A minimum of six (6) additional criminal justice courses are required, at least three (3) of which need to be 300-level or above.
- Students who choose to have a concentration are obligated to complete the specific requirements for that particular minor. Completion of a minor results in eighteen (18) criminal justice credits.

Criminal Justice Professional Skills Requirement (12 credits)
Students majoring in Criminal Justice are required to meet proficiency standards in one of the following:

- Intermediate Proficiency in a Modern Foreign Language
  - Students should consult policies in the University Catalog under the heading of University Academic Policies: Language Requirement for a list of avenues by which certification of language proficiency may be pursued.
- Criminal Justice Information and Technology
  - Students must demonstrate proficiency by passing the following:
    - 44.203 Technology and the Criminal Justice System
    - 44.395 Statistics in Criminal Justice
    - 44.398 Criminal Justice Data Analysis
    - One of the following:
      - 44.397 Crime Mapping
      - 91.113 Exploring the Internet

Students are welcome to complete both options in the professional skills area. Students who are interested in this route should discuss the best course of action with their advisor.

Six (6) additional courses for the Criminal Justice/Social Sciences (CJ/SS) option or the selection of a second major or minor (18-36 credits).

Students are encouraged to consider including the completion of a second major or minor relevant to their interests and future goals. Selection of a second major or minor may require more than six (6) additional courses. At least two (2) out of the six (6) courses must be at the 300-level or above regardless of the option selected. Selection of a second major or minor is NOT required. For a list of undergraduate minors please go here and for a list of undergraduate majors please go here. Students who decide to declare a second major or minor must fill out a Declaration of Second Major/Minor Form and then submit that paperwork to the department in which they are looking to add the major/minor.

Those students who choose not to do a second major or minor must do the CJ/SS option. The CJ/SS option requires the following courses:

- Two (2) Criminal Justice OR social science courses.
  - Social science courses may be taken from the following departments:
    - 41.xxx Legal Studies
    - 46.xxx Political Science
    - 47.xxx Psychology
    - 48.xxx Sociology
    - 49.xxx Economics
  - These can be any level and can be any combination (i.e., 2 CJ courses, 2 SS courses, or 1 CJ and 1 SS course).
- Two (2) 300-level or above social science courses.
- Two (2) 300-level or above Criminal Justice courses.

Free Electives
Students must take electives outside of Criminal Justice totaling their remaining credit requirements (i.e., the number of credits remaining to reach the 120 credit requirement for graduation or residency).

Degree Concentrations
Students have the option of selecting one or more concentrations during their course of study. Selection of more than one concentration must be approved by the student’s advisor and will depend on that individual student’s planned course of study. Concentrations are NOT required and those students who do not wish to concentrate in a particular subject/field will complete a general concentration.
Selection of a concentration should be made before students take no more than two Criminal Justice Electives or at the start of the first semester after transferring. Transfer students should meet with an advisor before declaring a concentration to ensure eligibility. Students who wish to declare a concentration must fill out a Declaration of Concentration Form and turn it in to their advisor.

Students may choose from the following concentrations:

- General
- Police
- Corrections
- Violence
- Information Technology
- Homeland Security

**General Concentration**

Students who do not wish to concentrate in a particular subject/field must complete a General Concentration. General Concentrations consist of the following requirements (18 credits):

- Three (3) Criminal Justice Electives that can be any level.
- Three (3) Criminal Justice Electives that need to be 300-level or above.

**Police Concentration**

Criminal Justice majors may complete a concentration in the area of policing by completing coursework based on the following requirements (18 credits):

- Required Courses (6 credits):
  - 44.347 Police Innovations
  - 44.373 Issues in Police Administration
- Police Concentration Electives – Choose four (4) of the following courses and no more than three (3) can be lower-level (12 credits):
  - 44.203 Technology and the Criminal Justice System
  - 44.233 Criminal Procedure
  - 44.248 Terrorism
  - 44.261 Juvenile Delinquency
  - 44.280 Criminal Justice Ethics
  - 44.327 Violence in America
  - 44.348 Advanced Seminar in Weapons of Mass Destruction and Terrorism
  - 44.370 Criminal Justice Management
  - 44.385 Crime and Mental Illness
  - 44.397 Crime Mapping
  - 44.401 Substance Abuse and Crime
  - 44.422 Victimology
  - 44.495 Criminal Justice Field Studies (6 credits – counts as 2 electives)
  - 44.496 Criminal Justice Internship

*Note: Students admitted prior to Fall 2012 who have selected the Police Concentration are required to take 44.141 Police Process and only choose three (3) electives from the list provided above.

**Corrections Concentration**

Criminal Justice majors may complete a concentration in the area of corrections by completing coursework based on the following requirements (18 credits):

- Required Courses (6 credits):
  - 44.350 Institutional Corrections
  - 44.351 Community-Based Corrections
- Corrections Concentration Electives – Choose four (4) of the following courses (12 credits):
  - 44.203 Technology and the Criminal Justice System
  - 44.327 Violence in America
  - 44.370 Criminal Justice Management
  - 44.385 Crime and Mental Illness
  - 44.387 Criminal Mind and Behavior
  - 44.388 Forensic Psychopathology
  - 44.401 Substance Abuse and Crime

**Violence Concentration**

Criminal Justice majors may complete a concentration in the area of violence (cause, prevention and control) by completing coursework based on the following requirements (18 credits):

- Required Course (3 credits):
  - 44.327 Violence in America
Violence Concentration Electives – Choose five (5) of the following courses (15 credits):

- 44.248 Terrorism
- 44.326/44.365 Hate Crimes
- 44.341 International Perspectives on Crime and Crime Control
- 44.342 Criminal Profiling
- 44.343 Forensic Psychology
- 44.360 Gender, Race, and Crime
- 44.385 Crime and Mental Illness
- 44.387 Criminal Mind and Behavior
- 44.388 Forensic Psychopathology
- 44.422 Victimology
- 44.477 Intimate Partner Violence
- 44.478 Child Maltreatment

Information Technology Concentration

Criminal Justice majors may complete a concentration in the area of information technology by completing coursework based on the following requirements (18 credits):

- Required Course (3 credits):
  - 44.203 Technology and the Criminal Justice System
- Information Technology Concentration Electives – Choose five (5) of the following courses (15 credits):
  - 44.237 Civil Liberties, Law and Politics
  - 44.280 Criminal Justice Ethics
  - 44.380 Selected Topics in Criminal Justice
  - 44.397 Crime Mapping
  - 44.398 Criminal Justice Data Analysis
  - 44.493 Issues in Technology and Security

Homeland Security Concentration

Criminal Justice majors may complete a concentration in the area of homeland security by completing coursework based on the following requirements (18 credits):

- Required Courses (9 credits):
  - 44.115 Introduction to Homeland Security
  - 44.213 Emergency Management
  - 44.248 Terrorism
- Homeland Security Concentration Electives – Choose three (3) of the following courses (9 credits):
  - 44.312 Security Management
  - 44.340 Criminal Networks
  - 44.348 Advanced Seminar in Weapons of Mass Destruction and Terrorism
  - 44.397 Crime Mapping
  - 44.493 Issues in Technology and Security

Master of Arts in Criminal Justice

The Department also offers a Master of Arts degree in Criminal Justice. For information regarding the objectives and requirements of this graduate program, please consult the Graduate School Catalogue or website. Qualified students have the option of applying for a combined BA/MA program. Interested students should contact the Criminal Justice Graduate Coordinator for further information.

Bachelor of Science Degree in Criminal Justice

Mission Statement

Our undergraduate program seeks to develop core competence in the basic components of the criminal justice system. We prepare criminal justice graduates to fill positions in all areas related to criminal justice, as well as to provide them with the skills and knowledge needed to pursue their education in the social sciences or law. The undergraduate program prepares our graduates to pursue career interests in the core criminal justice areas of policing (both public and private), courts and corrections, as well as positions seeking knowledge of criminal justice information and data, homeland security, victim services, and other social service agencies that are typically linked in many ways to the criminal justice system.

Program Overview

The School of Criminology & Justice Studies at UMass Lowell has been a major academic unit within the University since its inception in 1977. The school has always placed a high priority on its efforts to be a nationally recognized criminal justice program emphasizing applied policy research and public service to the University, communities of Massachusetts, and nation as a whole.

The Criminal Justice program aims to integrate liberal arts with a criminal justice education by offering a curriculum, at both the undergraduate and graduate levels, reflecting the changing needs of students, practitioners, policy makers, and academic communities. We have a commitment to establishing and maintaining working relations with our service communities by fostering the teaching and
research necessary to address current and projected problems and needs.

In accordance with the outreach and service mission of our University, our faculty currently work with agencies to solve real problems by assisting them in the development and execution of research and evaluation studies. Our faculty has worked, often with student involvement, with numerous federal, state, and local agencies in this capacity. The faculty also undertakes public speaking engagements to help in public awareness and education endeavors and serve on advisory boards for our service community. These outreach efforts set the school apart from traditional academic departments, reflecting our real world approach to criminal justice education. As such, faculty involvement in these areas is viewed as an integral component of the school’s mission.

The School of Criminology & Justice Studies also acknowledges the stated mission of the University to provide a stimulating environment for teaching, learning, research, dissemination of professional skills, and the pursuit of knowledge. The University believes that the quality of the faculty is the most important factor contributing to excellence in teaching and scholarly research.

In accordance with this objective, our school has actively recruited faculty who are, or have the potential to become (in the case of junior faculty), nationally recognized researchers. All our faculty contribute to improving the delivery of criminal justice services by providing an extensive array of innovative research and publishing books and articles widely read by students, researchers, criminal justice professionals, and policy-makers. This accumulated knowledge is not only made available to our students but, in many cases, students themselves have also actively participated in the research and scholarly pursuits of the faculty.

In addition, our University has now established Lecturer positions. Lecturers focus entirely on teaching and service and thus help support the need for tenure track and tenured faculty to engage in quality research and scholarship.

Goals and Objectives

The goal of our undergraduate program is to develop core competence in the basic components of the criminal justice system. We prepare criminal justice graduates to fill positions in all areas related to criminal justice, as well as to provide them with the skills and knowledge needed to pursue their education in the social sciences or law.

Our curriculum provides students with multiple courses to represent these substantive areas. Students now begin their studies with a one (1) credit Freshman Seminar providing them with an overview of the University. Our core curriculum focuses specifically on the areas below:

- Criminal justice and juvenile justice processes (law, crime and administration of justice)
- Criminology (the cause of crime and typologies)
- Law enforcement (police organization, discretion, defense and court procedures, and decision-making)
- Corrections (incarceration, community-based corrections and treatment of offenders)
- Crime prevention (social, community, situational interventions and public policy)
- Research and evaluation (principles of social science research and policy evaluation)
- Technology and crime analysis

Overall, the key objectives of our undergraduate program with regard to our curriculum are:

- To provide students with a thorough understanding of the criminal justice system and current issues in criminal justice;
- To assist students in applying theory and research to real world problems in criminal justice;
- To provide students with knowledge about methods of crime prevention and crime control in public and private settings;
- To train students in the application of technology in the criminal justice system and;
- To prepare students to apply critical thinking skills and apply knowledge to positions in the criminal justice field and/or their graduate education.

Additional Programs in Criminal Justice

The School of Criminology & Justice Studies also offer graduate programs for those students who wish to further their education. For more information please see Criminal Justice graduate catalog.

5-Year BS/MA Program

Juniors and seniors at the University of Massachusetts Lowell who have a 3.000 GPA or higher and have earned a 'B' or better in 44.395 Statistics in Criminal Justice are eligible to apply for the BS/MA program. This program allows completion of both degrees in five (5) years if desired. As part of that program, two (2) graduate classes may be counted towards both the 120-credit hours required for the undergraduate BS degree and the 33-credit hours required for the MA degree.

Once a student graduates with his/her undergraduate degree and enters the Master’s program, he/she must transfer the credits for the graduate courses taken in his/her undergraduate degree to the graduate program. This is done by filing an academic petition asking for the credit to be transferred into the student’s Master’s program.

For application information, please visit the Graduate Admission’s website.

Art History Program

DEPARTMENT OF CULTURAL STUDIES-ART HISTORY (58 Code)

Art History holds front-line responsibility for teaching aesthetic, cultural diversity and visual literacy in all its forms relying on the tradition
and discipline of art history. The faculty of Art History seeks to serve the students of the university as a whole as well as the greater regional community.

The development of analytical and critical thinking skills and of intelligent appreciation is the aim of the art history classes taught at UMASS Lowell. The acquisition of analytical and critical thinking skills introduces the students to the analysis and interpretation of works of visual art, as well as to the subjective matters of taste and patronage in historical eras. Within art history the material defined as visual arts has extended beyond canonical works to encompass commercial and popular imagery, including graphics, photography, film, video, television, and computer art, in sum multimedia.

Art history classes are designed to cultivate, visually literate viewers of artwork. Application of the idea of literary to vision assumes that may be understood as a language. A language of vision is built upon an understanding of visual images and an increase the perception of visual awareness. The skills in visual analysis and interpretation designed in art history courses introduce students to methods of visual analysis and to specific subjects of cultural importance, at the same time as they learn features of different cultures. Common to all of art history courses are emphasis upon the interpretation of visual texts; meaningful introduction to cultural activities from a range of nations, the historical context in which art forms were created, sponsored and acquired. Students taking courses in art history who are new to art learn to clearly organize their perceptions of and thoughts about artwork. Students are taught in art history classes to translate experience of artwork into written form; therefore, paradigms of descriptive art criticism are provided for study, interpretation, and analysis. Art history classes provide appreciation in aesthetic experience as well as distinction and analogies between aesthetic and ordinary experience. Art history students educated and trained in the humanities achieve these skills in order to professionally compete in our technological society.

Teaching a student in the sciences to be creative in his or her thinking is not very different from molding and shaping a humanist. Recognizing that we are a university focused on the sciences, engineering, management, education, and health, we are confident, nevertheless, that our educational strategies and humanistic and art historical goals support the mission of the university, emphatically and wholeheartedly.

There are two-degree programs in Art History. A Bachelor of Art in History with a concentration in Art History offered in the Department of History and a Bachelor of Liberal Arts with a concentration in Art History offered by the Department of Cultural Studies. Minor and Interdisciplinary studies are also offered.

**Bachelor of Art in History**

**with a Concentration in Art History**

The Bachelor of Art in History with an Art History Concentration is a baccalaureate degree program offered in the Department of History in the College of Arts and Sciences. A Bachelor of Art in History with a concentration in Art History consists of the following.

**ART HISTORY CONCENTRATION**

Art History is a humanistic discipline that is philosophically related to the liberal arts. It aims to study the arts in relation to the life and time out of which they spring from western and non-western cultures. It includes a comprehensive study of the historical periods, cultural expressions, aesthetic judgments, and artistic choices manifested in architecture, painting, sculpture, graphics and related processes, and artifacts from Ancient to the present. By examining the intellectual and scientific events that have shaped the creation of art and civilization, students are able to assess aesthetically and critically the artistic products of past and present cultures. Art History assists students to develop aesthetic and critical judgments as well as writing and verbal skills.

By pursuing a concentration in art history students can prepare for a variety of careers in art history and related liberal art majors, such as museum researchers, museum, gallery or corporate curator, museum conservator, slide librarian, architectural and museum tour guide, urban and architectural landscape designer, art editor and director in publishing companies, book and journal designers, teaching, graduate studies as well as community oriented cultural programs.

**REQUIREMENTS:**

An art history concentration in the Bachelor of Arts in History consists of 36 to 45 credits distributed with the following requirements. All courses are selected in consultation with the Art History Coordinator in the Department of Cultural Studies affiliated with the Department of History.

1. **Two Foundations Art History courses (6 credits)**
   - History of Art I (58-203) and History of Art II (58-204). All art history students must take History of Art I and II before enrolling in upper level art history courses

2. **Two Foundations History courses (6 credits)**
   - Western Civilization to 1715 (43-105) and The Modern World (43-106)

3. **Art History Elective (9 credits or three courses minimum, from this selection 6 credits or two courses must be at the 300 level and above, or maximum 18 credits or 6 courses, from this selection 12 credits or four courses must be at the 300 level and above)**

4. **History Elective (9 credits or three courses, at least 6 credits or two courses at the 300 level, related to the art historical period of the student's course of study)**

5. **Practicum Experience or Directed Studies in Art History or History (6 credits)**
6. Reading knowledge of foreign language related to art historical interest or concentration is strongly encouraged.

For course descriptions, see catalogue in http://isis.uml.edu

Bachelor in Liberal Arts

Art History Concentration (CU 58)

The Bachelor of Liberal Arts (BLA) is a baccalaureate degree program offered only to humanities and social sciences students in the College of Arts and Sciences. A Bachelor of Liberal Arts (BLA) with an Art History Concentration consists of the following.

ART HISTORY CONCENTRATION

Art History is a humanistic discipline that is philosophically related to the liberal arts. It aims to study the arts in relation to the life and time out of which they spring from western and non-western cultures. It includes a comprehensive study of the historical periods, cultural expressions, aesthetic judgments and artistic choices manifested in architecture, painting, sculpture, graphics and related processes, and artifacts from Ancient to the present. By examining the intellectual and scientific events that have shaped the creation of art and civilization, students are able to assess aesthetically and critically the artistic products of past and present cultures. Art History assist students to develop aesthetic, analytical and critical judgments as well as writing and verbal skills.

By pursuing a concentration in art history students can prepare for a variety of careers in art history and related artistic cultural professions, such as museum researcher and conservator, museum, gallery or corporate curator, multimedia librarian, art editor and director in publishing companies, teaching K-12, undergraduate and graduate education as well as community oriented cultural programs.

REQUIREMENTS

Art history courses fulfill the General Education Requirement for Historical Studies, Aesthetics and Cultural Diversity. The art history concentration is designed to develop and foster historical, aesthetic and multicultural appreciation of art as well as analytical, critical and theoretical knowledge of art. Art history courses are taken under the auspices of the History Department in the College of Arts and Sciences.

An art history concentration in the Bachelor of Liberal Arts consists of 24-30 credits (8 to 10 courses) distributed with the following requirements, all courses are selected in consultation with the Art History Coordinator:

1. Two Foundations Art History courses (6 credits)
   History of Art I and History of Art II
   (All art history students must take History of Art I and II before enrolling in upper level art history courses)

2. Art History Elective (15 to 18 credits or five courses to six courses, from this selection 9 credits or three courses must be at the 300 level and above)

3. Practicum Experience or Directed Studies in Art History (3 or 6 credits or one to two courses)

4. The second concentration in the Bachelor of Liberal Arts must be selected in the following areas: Cultural Studies, Economics, English, History, Languages, Legal Studies, Philosophy, Political Science, Psychology, Sociology and Gender Studies (24 to 30 credits or 8 to 10 courses) with at least half at or above the 300 level.

5. Reading knowledge of foreign language is strongly encouraged.

6. Correlated courses in music history, comparative arts or interdisciplinary programs (Cultural Studies, Western and Non-Western Cultural Heritage, Film Studies, Latin American Studies, Gender Studies) are strongly encouraged as free electives.

For course descriptions, see online catalogue in Isis: http://isis.uml.edu

ART HISTORY MINOR

A minor in art history consists of 18-24 semester credits selected in accordance with the following specifications: two foundation art history courses (History of Art I and II). In addition, 12 to 18 credits must be completed in art history courses, and no fewer than six semester credits offered for the minor shall be completed at the 300 level or above. Practicum in art history is strongly encouraged. Course work is selected in consultation with the Art History Coordinator.

ONLINE INSTRUCTION: Art History Without Boundary

The goal of these specialized on-line classes is to provide instruction in art history to non-traditional students. Although Art History is a traditional humanistic discipline its pedagogy and methodology are multicultural and multimedia; therefore, the field is open to the application of the new teaching technology, such as distance learning or classroom without walls. Hence the aim is to (1) incorporate contemporary technology in art history courses and (2) to make available this new type of instruction to a wider student audience at UMASS. See http://www.umassonline.net

Internship

Open to all art history students who wish to develop special skills in museum research preservation and curatorial experience, art
historical visual apprenticeship in local museums and multimedia application for art corporations or private industry.

**Undergraduate Student Symposia**

Every academic year there is a symposium in art history. Outstanding undergraduate students in art history are selected for the presentation.

**Honors Program**

Students who wished to receive advanced excellence in Art History may enroll in the Honors Program and attend classes under such coding. Under the tutorship of an art historian an Art History thesis on a specific theme, art theory or artist is required by the completion of the program.

**Transfer Students**

Student transferring to the College and wishing to concentrate in Art History must make individual arrangements with the Art History Coordinator regarding satisfaction of art history course requirements.

**European Summer Program**

Art History courses for credit are offered in various countries in Europe during the winter and summer sessions. The art history courses generally take place in Europe (England, France, Italy, Greece and Spain) or Latin America (Mexico and Costa Rica).

**Art History Club**

Provides an opportunity for all art history students to participate in field trips, conferences and symposia as well as visiting exhibition and museums in New England, New York and Washington DC.

**Cultural Studies**

Cultural Studies is a concentration within the Bachelor of Liberal Arts degree. This interdisciplinary program provides an understanding of the humanities, such as literature, history, music history, art history, philosophy and language. It demonstrates the interrelations, interaction and influences of the humanities on one another as well as the significant impact of their diversity. Cultural Studies provides students with an understanding of cultural diversity within the United States and how it is affected by its global context.

The requirements of the Bachelor of Liberal Arts program and the Cultural Studies concentration are flexible. Students can focus their Cultural Studies program around particular area of interest in the humanities. The Cultural Studies concentration is one of two 24-30 credit concentrations the student takes for the Bachelor of Liberal Arts degree.

**General Requirements: Cultural Studies Concentration I (24 - 30 credits)**

At least 12 credits must be earned at or above the 300 level.

**Foundation course** (choose one - 3 credits)

- 58.101 Art Appreciation
- 58.105 Comparative Arts or
- 59.105 Comparative Arts
- 59.110 Foundations of Cultural Studies

**Methodology** (choose one 3 - credits)

- 42.431 Contemporary Linguistic Theory
- 45.301 Theory of Knowledge
- 58.352 Critical Issues: History of Art, Theory and Criticism
- 59.208 Cultural Studies I
- 59.209 Cultural Studies II

**Critical Discourse in the Humanities** (choose one 3 credits)

- 42.430 Literary Criticism
- 45.342 Critical Theory of Society
- 45.305 Language, Signs and Symbols
- 47.365 Psychology of Language
- 48.260 Mass Media and Communication

**Diasporas and Cultures in America** (choose 5 to 6 courses - 15-18 credits) Other appropriate courses may be substituted with the permission of the BLA advisor.

- 42.372 Comparative World Literature
- 42.248 Values in American Culture
- 42.277 Cross-Cultural Perspectives in American Literature
• 43.383 Technology in American Culture
• 48.110 Introduction to Social Values
• 48.357 Sociology of Religion
• 48.310 Ethnicity in Massachusetts
• 48.102 Social Anthropology
• 49.322 Japan and the Global Economy
• 49.323 The Economy of East Asia
• 50.376 French Cinema in Society
• 52.378 Italian Cinema and Culture
• 58.205 Studies of World Art
• 58.313 American Art
• 58.370 Art History and Film
• 74.301 American Music
• 74.320 African American Concert Music
• 74.355 Jazz
• 71.110 Basic Music Theory
• 74.466 Music of the Early Twentieth Century
• 74.356 American Musical Theatre

Requirements: Concentration II

Choose a second concentration from the list below: 24 credits. In Concentration II, at least 12 credits must be earned at or above the 300 level.

• Art History
• Comparative Arts
• English/Literature
• Economics
• Gender Studies
• History
• Languages
• Legal Studies
• Music
• Philosophy/Communication
• Psychology
• Sociology
• Theater Arts
• Writing/Journalism

Internship (optional): 3 credits
Selected in consultation with the BLA advisor.

Cultural Studies Department

The aim of the department is to reflect Lowell’s historic and ongoing culture as a vibrantly colorful fabric woven of varied diverse threads brought over the decades by each ethnic group drawn here by the city's industries. And incorporate the University's explicit mission as a resource for the city's economic, industrial (and cultural) well-being.

Students trained under this program will serve other urban (and rural) areas of America. Some will go on to professional training as humanities educators with breadth and awareness in multicultural, urban settings; to legal training as urban advocates educating for and promoting an appreciation of the ever increasing diversity that will continue to characterize American culture in the next century.

Students, then, will become custodians of the American culture, as museum curators, coordinators of urban cultural programs, media professionals and filmmakers, and scholars of the constantly evolving cultural organism that the humanities in America have always been.

DEGREE PROGRAMS

The Department of Cultural Studies (CU) offers two degree programs:

• Bachelor of Arts in Modern Languages (BA)
• Bachelor of Liberal Arts (BLA)

In addition, the department sponsors several interdisciplinary minors in the fine arts, humanities and social sciences: interdisciplinary minors and studies.

Cultural Studies also oversees the Art History Program, including the Concentration in Art History.

GENERAL EDUCATION REQUIREMENTS

All students must complete the general education requirement of the university. For a full list of requirements, please go to: University of
ONLINE INSTRUCTION

The goal of these specialized on-line classes is to provide instruction to non-traditional students. The aim of distance learning courses is to share, collaborates and correlates classroom instruction in Cultural Studies Programs, such as Art History and Languages with our sister campuses UMASS Boston and UMASS Dartmouth. This type of non-traditional classroom teaching assists students in obtaining original instruction on a variety of courses from specialized faculty through the UMASS system.

See: UMass Online

HONORS PROGRAM

Students who wish to receive advanced excellence in Cultural Studies Programs may enroll in the Honors Program and attend classes under such coding.

TRANSFER STUDENTS

Student transferring to the college and wishing to concentrate in Cultural Studies Programs must make individual arrangements with the Coordinator of the specific program regarding satisfaction of course requirements.

CONTINUING ED COURSE TRANSFERS

In consultation with their advisor, students may transfer courses from the Continuing Education program to the daytime program.

Economic and Social Development of Regions

Currently, the Economic and Social Development of Regions program does not grant an undergraduate major, but does offer several undergraduate courses. Many of the graduate courses are also open to advanced undergraduates.

Juniors and seniors are eligible to apply for admission into the joint BA/MA degree program in Economic and Social Development of Regions. Students must be University of Massachusetts Lowell undergraduates in good standing. Applicants must have an undergraduate grade point average of 3.0 or better (on a 4.0 scale).

No examination test scores such as the Graduate Record Examination Aptitude Test, GMAT, or any Graduate Achievement tests are required to be included with the application.

Visit the Graduate Catalog for more information on the Master of Arts program.

Economics Department

Economics as a discipline is concerned with the principles underlying the production and exchange of products and services. The study of economics stems from the scarcity of resources and the limitless nature of our demands for products and services. Societies must therefore choose the goods and services that will be produced from among the larger range of production possibilities. Economics develops the principles and concepts that follow from this fact of scarcity and applies them to the analysis of various aspects of human activity.

5 Year Program: BA in Economics, MA in Regional Economic and Social Development

Students who have maintained a 3.0 GPA may enroll in a 5 year program, which earns them a BA in Economics and a MA in Regional Economic and Social Development. Students who elect this option may count two of their 500 Level RESD courses towards fulfillment of their Economics BA requirement. These courses would count as upper division elective courses. Students electing this option are also automatically enrolled in the graduate school at UMass Lowell and need not take the GRE exams, provided they maintain a 3.0 GPA.

- 57.513 Foundations of Comparative Regional Development
- 57.537 Development Principles for Developing Economies
- 57.503 Work, Technology and Training
- 57.515 Politics and Economics of Public Policy

Economics Major

All Economics majors must take the following courses:

49.201 Economics I
49.202 Economics II
49.211 Statistics I
49.212 Statistics II
49.303 Microeconomic Theory
49.304 Macroeconomic Theory

Introductory courses in the Economics Department (49.201 and 49.202), which may be taken in either order, survey economic problems, policies, and theory. Required courses in microeconomic and macroeconomic theory and in statistics provide a deeper analytical foundation and the necessary quantitative tools to pursue graduate study in economics.

In addition to these required courses, the student chooses 6 economics electives from the listed courses below. These electives provide students with opportunities to explore subject areas that are of personal interest and consistent with career objectives.

Besides these twelve courses, a major in Economics must choose one of two options: proficiency in a modern language, or proficiency in quantitative skills. (Consult the “University Academic Policies: Language Requirement” section for details of the language proficiency requirement).

The following courses are recommended for students who wish to specialize in quantitative skills:

1. At least two courses from the following Mathematics Department offerings
   - 92.121 Management Pre-Calculus
   - 92.122 Management Calculus
   - 92.221 Linear Algebra I
   - (Calculus I & Calculus II may be substituted for 92.121 & 92.122)

2. At least two of the following quantitative economics courses:
   - 49.211 Statistics I
   - 49.212 Statistics II
   - 49.407 Econometrics

3. Upper Division Requirements

   **Required**
   - 49.303 Microeconomic Theory
   - 49.304 Macroeconomic Theory

   **Upper Division Economics Electives (choose 6 of the following courses):**
   - 49.302 Labor Economics
   - 49.312 Managerial Economics
   - 49.315 Environmental Economics
   - 49.316 Investments: Instruments and Strategies
   - 49.317 Capital Markets
   - 49.318 Financial Markets and Monetary Policy
   - 49.319 Public Finance
   - 49.325 American Economic History
   - 49.345 Health Economics
   - 49.401 Special Topics in Economics
   - 49.403 International Trade
   - 49.407 Econometrics
   - 49.410 Economic Growth and Development
   - 49.485 Economics Internship
   - 49.499 Directed Studies

View the complete Course of Study (pdf)

**General Economics Track**

This track is designed to provide the student with a strong and flexible background in economic theory and some important applications of that theory. In addition to the six required courses, the student chooses six additional economics courses. The minimum mathematics requirement for an economics major, even those choosing the language proficiency option, is Management Pre-Calculus (92.121).

For more information visit the Economics Department or contact us.

**Economics Minor**

Eighteen (18) credit hours are needed for a minor in Economics. All minors must take Economics I (49.201) and Economics II (49.202). Four additional economics electives are required; two of which must be at the 300 level or 400 level.

Liberal Art students electing a concentration in Economics must complete 8 to 10 courses (24-30 credit hours), with at least half of the courses above the 300 level.

Within this general framework, a wide variety of options is open to students who minor in economics. Courses can be taken to emphasize a particular area like international, quantitative or environmental economics, or a series of courses can be chosen from...
different areas to strengthen or complement the student's major discipline. Some of these courses are required in many MBA programs and some schools waive them if they have been taken at the undergraduate level.

**English Department**

The Department of English offers an intellectually engaging program of study that fosters skills in critical reading and analytical writing, creative thinking and effective communication. Leading to the Bachelor of Arts degree, concentrations within the major in Literature, Creative Writing, Journalism and Professional Writing, and Theatre Arts recognize students' differing interests and career paths. These concentrations include coursework that helps to prepare students for work in a variety of fields as well as for graduate work in the professions and in the discipline.

Many courses offered by the department are appropriate for students who have selected concentrations in English, Writing, or Theatre Arts within the Bachelor of Liberal Arts program. In addition, the general minor in English and specialized minors in Writing and Theatre Arts complement degree programs in other disciplines.

For more information on the program, see the [English Department's website](#).

**English Major**

The Department of English offers an undergraduate major that allows students to choose one of four concentrations: Literature, Creative Writing, Journalism and Professional Writing, or Theatre Arts. Each concentration requires specific foundation courses that prepare students for advanced study; students then select specialized courses that complement this core and allow for exploration of individual interests. All majors in the Department fulfill a diverse literary traditions requirement as part of their program of study. For additional information visit the [English Department](#) or [contact us](#).

To graduate, all English majors must earn a minimum of 120 credits appropriately distributed:

1. General Education requirements (33-38 credits) which all University students must fulfill;
2. English Department requirements (maximum 45 credits); and
3. Requirements which you must fulfill as a student in the College of Arts and Sciences. At least 75 credits must be for courses taken outside of the English Department. Students who complete double majors must present 48 credits outside the two concentrations.

**Concentrations**

- Literature Concentration
- Creative Writing Concentration
- Journalism and Professional Writing Concentration
- Theatre Arts Concentration

**Literature Concentration**

The Literature concentration prepares students for graduate work in literary and cultural studies as well as for careers in teaching and other related fields. The curriculum introduces students to the major critical approaches in literary study and to the history of British and American literature. The capstone provides a culminating opportunity to complete a substantial research project on a topic of the student's choice. Those who know teaching is of interest may wish to explore UMass Lowell's Fast Track to Teaching Program. This option allows students to complete the bachelor's and master's degrees in a total of five years.

Courses in the Literature Concentration include:

Three foundations courses (9 credits):

42.200 Critical Methods of Literary Inquiry  
42.281 British Literary Traditions  
42.282 American Literary Traditions

One of the following Theory/Rhetoric/Language courses is required (3 credits):

42.307 History of the English Language  
42.308 Analysis of Modern English  
42.315 Old English Language and Literature  
42.377 Theories of Rhetoric and Composition  
42.388 Seminar on Teaching Writing  
42.429 Introduction to Literary Theory  
or other approved English course

One of the following is required (3 credits):

42.423 Shakespeare 1  
or  
42.424 Shakespeare 2
Six upper level literature electives are required including 3 courses that meet specific period requirements (18 credits):

(Lists of approved courses for period categories may be found in the Literature Advisement Report in ISIS.)

One capstone course is required (3 credits):

The capstone is meant to provide a culminating activity, providing majors with an opportunity to complete a substantial research project. Students should discuss their research interests with their academic advisor to plan ahead for the capstone. Choose one of the following:

42.401 Selected Authors
42.479 Senior Seminar
42.491 Directed Study in Literature

A complete course of study is listed in the Literature Concentration Curriculum Checksheet.

Creative Writing Concentration

Students who enter the Creative Writing concentration learn, hands-on, about craft, genre, and audience. The course sequence requires an introduction to creative writing, coursework that focuses on acquiring the various skills of different forms of writing, and a capstone that generally entails producing a large body of work. Ultimately, the goal of the concentration is to prepare the student for life as a writer beyond the classroom.

Courses in the Creative Writing Concentration:

Two foundation courses are required and must be completed before taking any advanced writing courses (6 credits):

42.200 Critical Methods of Literary Inquiry
42.238 Introduction to Creative Writing

One 200-level Genre/Traditions course (students may take only one of these to fulfill this requirement – 3 credits):

42.201 Great Books of Antiquity
42.202 Great Books Modern
42.210 Drama
42.211 Poetry
42.212 Short Story
42.218 Comedy
42.281 British Literary Traditions
42.282 American Literary Traditions

One of the following is required (3 credits):

42.423 Shakespeare 1
or
42.424 Shakespeare 2

Four upper level creative writing electives are required (12 credits):

(Lists of approved courses may be found in the Creative Writing Advisement Report in ISIS):

Three 300/400 level literature courses (any 300 or 400 level literature course qualifies – 9 credits).

One capstone course is required (3 credits):

42.401 Selected Authors
42.490/493 Directed Study in Writing/Creative Writing
42.450 Creative Writing workshop

A complete course of study is listed in the Creative Writing Concentration Curriculum Checksheet for Fall 2013 and after.

Creative Writing Concentration Curriculum Checksheet for Fall 2010 Spring 2013.

Journalism and Professional Writing Concentration

In this concentration, students will learn how to write for an audience as a journalist or a writer in other professional contexts. The course sequence requires an introduction to professional writing, coursework that focuses on learning different modes of professional writing, and a capstone project that generally involves writing in a professional setting, often as an internship. Ultimately, the goal of the concentration is to prepare students for writing situations and challenges beyond the classroom.

Courses in the Journalism and Professional Writing Concentration:
One foundation course is required and must be completed before taking any advanced writing courses (3 credits):

42.227 Essay Writing for English Majors

A 200-level Genre/Traditions course (students may take only one of these to fulfill this requirement – 3 credits):

42.201 Great Books of Antiquity
42.202 Great Books Modern
42.210 Drama
42.211 Poetry
42.212 Short Story
42.218 Comedy
42.281 British Literary Traditions
42.282 American Literary Traditions

One of the following Theory/Composition/Language courses is required (3 credits):

42.307 History of the English Language
42.308 Analysis of Modern English
42.315 Old English Language and Literature
42.377 Theories of Rhetoric and Composition
42.388 Seminar on Teaching Writing
42.429 Introduction to Literary Theory
or other approved English course

One of the following is required (3 credits):

42.423 Shakespeare 1
or
42.424 Shakespeare 2

Five approved upper level writing electives are required (15 credits):

(Lists of approved courses may be found in the Creative Writing Advisement Report in ISIS).

Two 300/400 level literature courses (any 300 or 400 level literature course qualifies – 6 credits).

One capstone course is required (3 credits):

42.496 Practicum
42.406 Community Writing 2
42.490 Directed Studies in Writing

A complete course of study is listed in the Journalism and Professional Writing Concentration Curriculum Checksheet.

**Theatre Arts Concentration**

The Theatre Arts Concentration prepares students for graduate study in theatre and drama and for careers in the professional theatre, the entertainment industry, and many other fields. Training in theatre produces well-rounded students with strong analytical and communication skills who work well as a team and under pressure - abilities that many employers in business and industry also look for in the people they hire. The program includes coursework in dramatic literature and theatre history, acting, directing, design, playwriting, and technical theatre. Students are encouraged to concentrate a substantial portion of their upper-level coursework within a particular area of their choice - for example: performance, writing/dramaturgy, or design/tech. For outstanding students, internships as part of the Theatre Arts Program's annual Production Team are available on a competitive basis.

**Courses in the Theatre Arts Concentration:**

Three 200-level foundation courses are required (9 credits):

42.233 Play Analysis
42.281 British Literary Traditions
42.282 American Literary Traditions

ONE of the following courses in Shakespeare is required (3 credits):

42.423 Shakespeare 1
or
42.424 Shakespeare 2

At least 3 CREDITS in Production courses are required (3 credits):

THEA.311 Play Production (may be repeated for credit)

SEVEN approved Theatre Arts electives must be distributed among the following FOUR areas (21 credits):
Dramatic literature / theatre history at the 300 or 400 level (min. 6 credits):
(Lists of approved courses may be found in the Theatre Arts Advisement Report in ISIS.)

Performance (Acting and Directing) (min. 3 credits)
(Lists of approved courses may be found in the Theatre Arts Advisement Report in ISIS.)

Creative electives (min. 3 credits)
- 42.304 Creative Writing: Playwriting
- 42.367 Creative Writing: Playwriting II
- THEA.230 Foundations of Theatrical Design
- THEA.340 Directing Workshop
- THEA.401 Topics in Theatre: Dramaturgy

Technical theatre (min. 3 credits)
- THEA.211 Stagecraft
- THEA.311 Play Production (may be repeated)

ONE capstone course is required (1-3 credits):
- THEA.492 Technical Theatre Practicum
- THEA.494 Directed Study in Theatre
- THEA.495 Senior Seminar in Theatre

A complete course of study is listed in the Theatre Arts Concentration Curriculum Checksheet.

Minor Requirements

English Department minors are open to students enrolled in any undergraduate college at the University. The minor requires 18-24 credits, six of which must be at the 300 level or above. Students who choose to complete a minor in English should consult with the English Department. The Department offers the following minors:

English - General Minor
This minor consists of 18-24 credits of coursework including six credits at the 300 level or above.

English - Writing Minor
This minor offers students an opportunity to focus on journalism, creative and/or professional writing. The minor consists of 18 to 24 credits. Students in the Writing Minor must take:

1. 42.227 Essay Writing for English Majors, or 42.229 Essay Writing for Non-English Majors, or 42.238 Introduction to Creative Writing
2. At least two 300 or 400 level writing courses
3. English Department electives

Also, check out our Theatre Arts Minor.

History Department

The Department of History provides students with a broad introduction to civilizations of the past and present including those of antiquity, Europe, America, and the Third World. Through a broad exposure to the complexities shaping the forces of civilization, the history major develops a thorough grounding in the historical process, a greater empathy, and a special perspective for viewing human thought and action. The student of history is aware of the distinctiveness of past individuals and societies but also recognizes the continuities connecting the experiences of different people over time. Sensitive to the realities of continuity and change, the student of history develops the ability to determine bias, to make valid generalizations, to draw valid inferences, and to perceive the significance of fact within the framework of interpretations. A major in History provides a meaningful background for students who desire to enter government service, politics, law, teaching, or business.

The major consists of 36-45 credits in History with at least 15 credits at the 300/400 level. Students must earn an average GPA in the major of 2.2.

History Minor Requirements

American History
A minor in American History consists of 18 to 24 credits. At least six credits must be taken in courses at the 300 level or above. Coursework is selected in consultation with the faculty advisor.

**European History**

A minor in European History consists of 18 to 24 credits. At least six credits must be taken in courses at the 300 level or above. Coursework is selected in consultation with the faculty advisor.

**General History Minor**

A minor in History consists of 18 to 24 credits. At least six credits must be taken in courses at the 300 level or above. Coursework is selected in consultation with the faculty advisor.

**Interdisciplinary Minors**

Students should refer to the [listing of interdisciplinary minors](#) in the social sciences and humanities.

**History Major Requirements**

**Current Requirements**

**Course of Study**

**Upper-Level Courses for 2008 - 2010**

**Course Level Guidelines**

**History Major Requirements**

**Required Courses**

43.105 Western Civilization

43.106 The Modern World

43.111 US History to 1877 OR 43.112 US History since 1877

43.298 Historical Methods

Historical Methods should be taken **no later** than the Junior year.

History majors should plan to complete the relevant survey courses before they take courses at the 300 level or above.

**Additional Course Requirements for the Major**

Completion of 6 credits (2 courses) from each of the following three groups:

- **US History**
- **European History**
- **Global, Comparative, and Under-represented populations:** 43.204, 207(formerly 43.209), 208, 209, 211, 212, 228, 233, 239, 270, 272, 273, 275, 295, 281,295, 322, 345, and 393. This requirement also may be fulfilled with 46.368, Middle East Politics, which carries history credit.

Students should check with the Department Chair/Advisor for recent additions.

**Recommendations**

It is strongly recommended that students who anticipate entering the College of Education at UMass Lowell complete 45 credits, including both halves of the US History survey, and the following courses:

43.310 History of New England

43.432 Research Seminar

Students who anticipate entering a graduate or professional program other than the College of Education should plan to complete 45 credits (unless they are earning a second major), including the following course:

43.432 Research Seminar

The Department also requires two courses at or above the 200 level in both European and American History, two additional courses in either European or American History, and two of the following courses dealing with Global, Comparative, and Under-represented populations: 43.204, 207(formerly 43.209), 208, 212, 228, 233, 270, 272, 273, 275, 295, 306, 322, 345, 388, and 393. This requirement also may be fulfilled with 46.368, Middle East Politics, which carries history credit. The remaining courses for the major may be selected from any of the history courses at the 200 level and above.
Students transferring to the College who wish to major in history must make individual arrangements with the Chairperson of the Department regarding satisfaction of major requirements.

Course of Study

View the complete: Course of Study (pdf).

For more information visit the History Department or contact us.

Arabic Studies Minor

Contact: Department of Cultural Studies
Phone: 978-934-4701
Office: Coburn Hall 113

The Arabic Studies Minor introduces students to critical approaches to the study of Islam, Muslim societies and cultures of the Middle East. The goal of this interdisciplinary minor in the humanities and social sciences is to broaden and deepen students’ understanding of Arabic societies and cultures in order to meet the demands of business, government and academia for skilled specialists in the language, culture, history and politics of the Middle East.

A minor in Arabic Studies consists of 18 to 24 credits (6 to 8) courses, at least two courses at the 300 level from the section of electives, including the following requirements:

Required Language courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>53.115</td>
<td>Arabic I and Culture</td>
</tr>
<tr>
<td>53.116</td>
<td>Arabic II and Culture</td>
</tr>
<tr>
<td>53.215</td>
<td>Arabic III and Culture</td>
</tr>
<tr>
<td>53.216</td>
<td>Arabic IV and Culture</td>
</tr>
</tbody>
</table>

Selection of Electives

Students may take 2 to 4 courses from the list below, two of which (6 credits) must be at the 300 level or above:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>43.393</td>
<td>History of the Middle East and Islamic World</td>
</tr>
<tr>
<td>45.296</td>
<td>Intro to World Religions</td>
</tr>
<tr>
<td>45.328</td>
<td>Justice, Trauma and War</td>
</tr>
<tr>
<td>46.233</td>
<td>Islam and Politics</td>
</tr>
<tr>
<td>46.334</td>
<td>Islam and Politics</td>
</tr>
<tr>
<td>46.368</td>
<td>Middle Eastern Politics</td>
</tr>
<tr>
<td>46.389</td>
<td>Politics and Terrorism</td>
</tr>
<tr>
<td>46.402</td>
<td>Women in Islam</td>
</tr>
<tr>
<td>46.406</td>
<td>Research Seminar: Middle East Politics</td>
</tr>
<tr>
<td>48.234</td>
<td>Study of Minorities</td>
</tr>
<tr>
<td>52.315</td>
<td>Islam and Medieval World</td>
</tr>
<tr>
<td>53.494</td>
<td>Directed Studies in Arabic</td>
</tr>
<tr>
<td>59.315</td>
<td>Islamic Culture</td>
</tr>
</tbody>
</table>

Asian Studies Minor

Coordinator: George Chigas, Ph.D.
Email: George_Chigas@uml.edu
Phone: 978-934-4341
Office: Coburn Hall 113B

Asian Studies is an interdisciplinary minor that explores the complex interaction between artistic, cultural political, social, literary and religious spheres of life in Asia. Emphasis is placed not only on the diversity and achievements of Asian civilizations, but also on the ways an understanding of Asia may shed new light on western cultural traditions. Asian Studies encompasses the geographical areas of East Asia, South Asia, and Southeast Asia and includes courses that address the Asian American experience. Asian Studies minor courses are based primarily in the humanities and social sciences; classes other than language courses are taught in English. The minor is open to all students.
Students selecting an Asian Studies Minor are required to complete 6 to 8 courses (18 to 24 credits) in two or more disciplines; 6 credits must be at the 300 levels or above. Students are encouraged, but not required, to take an Asian language as part of the minor.

### Cultural Studies Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>53.135; 53.136; 53.235; 53.236</td>
<td>Cambodian Language and Culture (1 - 4)</td>
</tr>
<tr>
<td>53.493</td>
<td>Directed Study in Cambodian Culture</td>
</tr>
<tr>
<td>53.105; 53.106; 53.205; 53.206</td>
<td>Chinese Language and Culture (1-4)</td>
</tr>
<tr>
<td>53.101; 53.102; 53.201; 53.202</td>
<td>Japanese Language and Culture (1-4)</td>
</tr>
<tr>
<td>53.491</td>
<td>Directed Study in Japanese Literature</td>
</tr>
<tr>
<td>53.492</td>
<td>Directed Study in Japanese Composition</td>
</tr>
<tr>
<td>58.205</td>
<td>Studies in World Art</td>
</tr>
<tr>
<td>58.331</td>
<td>Asian Art</td>
</tr>
<tr>
<td>59.105</td>
<td>Comparative Arts</td>
</tr>
</tbody>
</table>

### History Courses

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>43.204</td>
<td>China and the Modern World</td>
</tr>
<tr>
<td>43.207</td>
<td>Women in China</td>
</tr>
<tr>
<td>43.242</td>
<td>World War II</td>
</tr>
<tr>
<td>43.320</td>
<td>American East Asian Relations</td>
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</table>

### Political Science Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>46.316</td>
<td>Politics and Film</td>
</tr>
<tr>
<td>46.348/59.349</td>
<td>Literature, Politics and Genocide in Cambodia</td>
</tr>
<tr>
<td>46.361</td>
<td>Southeast Asian Politics</td>
</tr>
<tr>
<td>46.363</td>
<td>Politics of China</td>
</tr>
<tr>
<td>46.376</td>
<td>Democratic Movements in Southeast Asia</td>
</tr>
<tr>
<td>46.377</td>
<td>China and India in the Global Economy</td>
</tr>
</tbody>
</table>

### Philosophy Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>45.296</td>
<td>Introduction to World Religions</td>
</tr>
<tr>
<td>45.340</td>
<td>Mysticism East and West</td>
</tr>
<tr>
<td>45.371</td>
<td>Buddhist and Zen Philosophy</td>
</tr>
</tbody>
</table>

### Literature

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>42.277</td>
<td>American Ethnic Literature</td>
</tr>
<tr>
<td>42.378</td>
<td>Asian American Literature</td>
</tr>
</tbody>
</table>

### Course Listing Asian Studies

### Comparative Arts Minor

The Comparative Arts concentration surveys some of the fundamental aspects of music, literature, culture, and art; such as the nature of aesthetic judgement, the task of art, literature and music criticism, including formalist, representational, and contemporary theories on viewing, analyzing, and interpreting the arts. In addition, with comparative analysis between the modes of visual, literary, and aural representation, different aspects of artistic theories are investigated. The concentration analyzes the principal forms and genres of the visual, literary, and aural elements in various cultural disciplines, providing and understanding for human creativity and expression.

Bachelor of Liberal Arts with a Comparative Arts Concentration consists of the following:

- a selection of two disciplines or concentrations within the BLA list of concentrations. One of the concentrations must be Comparative Arts [24 to 30 credits]
- a second concentration is selected according to the student's interest [24 to 30 credits]
- a completion of the competency requirement [12 credits]
- an overall GPA of 2.5 is required
- no minor is permitted

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.210</td>
<td>Drama</td>
</tr>
<tr>
<td>42.211</td>
<td>Poetry</td>
</tr>
</tbody>
</table>
The interdisciplinary minor in Cultural Studies requires 18-24 credits of coursework. At least six credits must be from courses which are numbered 300 or above.

The courses offered in this program are interdisciplinary in their content and structure and explore a topic in greater depth and from broader perspectives than is ordinarily possible in other courses. Many courses are team-taught by faculty chosen from various academic departments and colleges within the University. Courses emphasize the sources (artistic, literary, philosophical, and historical) of the period studied and focus on the aspirations and achievements of our own civilization.

Additional Interdisciplinary and Intercollegiate Courses

Technology, Society, and Human Values

59.303 Understanding Technological Risk
59.309 The Engineer in Society
59.321 Literature on Technology and Human Values
UNDERGRADUATE MINOR IN EDUCATION
For information contact John Brown, Ph.D.
541 O'Leary Library
978-934-4656
John_Brown@uml.edu

- The minor in Education consists of 18 credits exclusive of any coursework taken to satisfy the Gen. Ed. requirements.
- All course pre-requisites must be satisfied.
- Freshmen are not eligible to begin the minor.
- Students who begin the minor in their sophomore year will take two courses each year in the minor.
- Students who begin the minor in their junior year will take 4 courses in their junior year and two in their senior year.
- No student can enroll in the field experience course before officially declaring their intention to complete the minor.
- Those students who wish to become teachers should apply to the M.Ed. program during their senior year.

Fast Track To Teaching -- M.Ed. with Teacher Licensure

Those candidates who seek to enter the fast track to teaching M.Ed. must complete their application during the fall of the senior year. A student who has maintained a 3.5 GPA in four undergraduate minor courses and has favorable faculty evaluations that speak to knowledge and skills and dispositions for teaching will not be required to take the GRE or MTEL for admission. The MTEL is required for licensure and must be completed before entry to the practicum. Students accepted to the Fast Track Program may take one or two required graduate courses in Education during the spring semester of their senior year.

PROGRAM OF STUDY

<table>
<thead>
<tr>
<th>Course</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sophomore/Junior</td>
<td>01.371 Educational Psychology</td>
</tr>
<tr>
<td></td>
<td>47.101 General Psychology or 48.101 Introduction to Sociology</td>
</tr>
<tr>
<td>Sophomore/Junior</td>
<td>01.384 Education and Cultural Diversity</td>
</tr>
<tr>
<td></td>
<td>47.101 General Psychology or 48.101 Introduction to Sociology</td>
</tr>
<tr>
<td>Sophomore/Junior</td>
<td>01.391 Understanding Education</td>
</tr>
<tr>
<td></td>
<td>College Writing I</td>
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<tr>
<td></td>
<td>College Writing II</td>
</tr>
<tr>
<td>Sophomore/Junior/Senior</td>
<td>02.401 Exploring Teaching</td>
</tr>
<tr>
<td></td>
<td>01.384 and 01.371</td>
</tr>
<tr>
<td></td>
<td>CORI check required</td>
</tr>
<tr>
<td>Junior/Senior</td>
<td>Elective (Seniors accepted into the Fast Track Program may take a specified Graduate Education course with permission of coordinator)</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Senior</td>
<td>02.xxx Field Experience and Seminar</td>
</tr>
<tr>
<td></td>
<td>or Specified Graduate Education Course if accepted into the Fast Track Program with permission of coordinator</td>
</tr>
<tr>
<td></td>
<td>✦ Cannot be taken until minor is declared.</td>
</tr>
<tr>
<td></td>
<td>✦ Four required &quot;minor&quot; courses</td>
</tr>
<tr>
<td></td>
<td>✦ CORI check required</td>
</tr>
</tbody>
</table>

Environment and Society Minor

Environment and Society is an interdisciplinary minor that provides students with analytical and communication skills, as well as the scientific foundation needed to succeed in environmental planning, environmental policy, environmental philosophy, sustainable development, environmental education, and other fields. Topics explored include climate change, sustainability, resource rights, law and regulation, environmental ethics, and the role of environmental issues in domestic and international conflicts.

Students are encouraged to participate in collaborative environmental research and service projects with government agencies, non-profit organizations, local businesses and other environmental actors such as state and national park systems.

A minor in Environment and Society requires completion of a minimum of 18 credits of coursework distributed as follows:

**REQUIREMENTS:** One foundation course and one capstone

**Foundation course (one social science)**
• Social Science Foundation Course (required)
  46.175 Introduction to Environmental Politics (Political Science)
  \( \text{NB: Formerly "Introduction to Environmental Studies." We have requested the name change to eliminate confusion between}
\) Environment and Society and the Environmental Studies Program housed in EEAS (Environmental, Earth, and Atmospheric
  Sciences).

1 Capstone course (choose 1 of following)
  • 81.416 Climate Change: Science, Communication, and Solutions
  or
  • 59.497 Directed Study in Environmental Policy

STRONGLY RECOMMENDED

In addition to three semesters of Gen Ed science, students are strongly urged to take a fourth science foundation course, such as
  • 85.141 Weather and Climate
  • 81.315 Principles of Ecology (with permission from instructor)
  • 81.317 Principles of Ecology Laboratory

ELECTIVE COURSES: 3—4 courses selected from this list or by permission

Depending on whether student has elected the highly recommended 4th science course, student must select 3 or 4 courses from these
regularly offered courses:
  • 31.313 Principles of Environmental Health
  • 41.367 Environmental Law
  • 43.316 American Environmental History
  • 45.327 Environmental Philosophy
  • 46.357 Thoreau in Our Time
  • 46.358 Global Environmental Policy
  • 48.236 Environmental Sociology
  • 48.330 Fast Food, Hot Planet: Sociological Approaches to Climate Change, Food Justice, and Community Sustainability
  • 49.315 Intro to Environmental Economics
  • 57.211 Sustainable Development
  • 57.518 Comparative Environmental Studies
  • 57.539 Justice and Trade in the Global Economy

GOVERNANCE

The Environment and Society minor is housed in the Sociology Department, and coordinated with the Political Science Department. The
Environment and Society minor works in tandem with the Environmental Health minor (School of Health Sciences) and the Climate
Change/Sustainability minor (Environmental, Earth, and Atmospheric Sciences) to ensure the best programmatic fit for each student.
The Environment and Society minor collaborates with the Climate Change Initiative to advance UML’s Climate Action Plan, and to serve
the region, the state, and beyond.

Contact:
Charlotte Ryan, Sociology Dept.
Email: Charlotte.Ryan@uml.edu
Susan Gallagher, Political Sciences Dept.
Email: Susan.Gallagher@uml.edu
  • Course Listing Environment and Society

Film Studies Minor

Contact: Maria Matz, Ph.D., Coordinator, Department of Cultural Studies
Phone: 978-934-4364
Office: Coburn Hall, Room 113C

The interdisciplinary minor in Film Studies consists of 18-24 credits. Six credits must be at the 300 level or above. Courses relevant to
the Film Studies minor are listed below. For course descriptions, see the department listing as indicated next to the course title.
Additional courses to complete the required credits may be selected from the following list or other course listings in this catalog.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.386</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>41.372</td>
<td>Sports, Entertainment and Art Law</td>
</tr>
<tr>
<td>41.489</td>
<td>Seminar in Law: Visual Fine Arts</td>
</tr>
<tr>
<td>42.230</td>
<td>Film Classics</td>
</tr>
</tbody>
</table>
Gender Studies Minor

Gender affects everything in our lives: personal relationships, job opportunities, worldview, economic conditions, self-esteem, safety, etc. In our program, students learn how ideas about gender shape our knowledge of the world and our experience of everyday life. Gender Studies courses explore how research on gender (and its intersection with race, class, sexual orientation, age, and culture) has transformed our understanding of social institutions, human behavior, cultural expression, and intellectual inquiry.

The Gender Studies Program at University of Massachusetts Lowell is offered by the College of Arts and Sciences: Division of Fine Arts, Humanities, and Social Sciences, but any University of Massachusetts Lowell student can participate. Our curriculum is comprised of a wide range of designated courses in these departments: Criminology & Justice Studies, Cultural Studies, Economics, English, History, Legal Studies, Music, Philosophy, Political Science, Psychology, ESDR, and Sociology. Students create an individualized program to match their interests and career goals.

For assistance or information: Dr. Andrea Dottolo, Psychology Department and Director of Gender Studies.

Minor Requirements

The Gender Studies minor requires 18-24 credits in designated interdisciplinary courses. 6 credits must be taken at the 300 level or above. Gender Studies minors may also take courses within their major and designate them for the Gender Studies minor provided that the total number of credits in their major does not exceed 45 of the 120-credit minimum required for graduation.

Bachelor of Liberal Arts Concentration

A Bachelor of Liberal Arts concentration in Gender Studies requires 24-30 credit hours in designated interdisciplinary courses. At least half of these courses must be taken at the 300 level or above.

For more information on the program visit Gender Studies or email: genderstudies@uml.edu.

Courses

Required Course
## Gender Studies Courses

The following courses are approved for the Gender Studies Minor. Please note that new courses are approved each semester, and not all of the courses below are offered every semester.

Course descriptions may be found in the undergraduate catalog by linking to the appropriate department.

NOTE: The prefix for Introduction to Gender Studies (#240) varies according to the department in which it is taught.

### American Studies

- 40.270 Women in American History

### Legal Studies

- 41.376 Family Law
- 41.381 Women & the Law

### English

- 42.240 Literature and Women
- 42.241 Women and Film
- 42.243 Contemporary Women Writers
- 42.244 Women in the Middle Ages and Renaissance
- 42.246 Gay/Lesbian Literature
- 42.257 The Family in Literature
- 42.328 Writing About Women
- 42.335 American Women Novelists
- 42.342 Women Writers and the Past
- 42.345 British Women Novelists
- 42.395 Special Topics in English: Medieval Women Writers
- 42.395 Special Topics in English: Visual Rhetoric

### History

- 43.207 Women in China
- 43.228 Women in European History
- 43.270 Women in American History
- 43.301 The World of Things: Consumer Culture in the Modern West
- 43.319 Women, Gender and Science
- 43.338 War and Memory in Twentieth Century France
- 43.380 Work and Society
- 43.385 Kennedy Presidential Politics

### Other Interdisciplinary Courses

- American Studies
- Legal Studies
- English
- History
- Criminology & Justice Studies
- Philosophy
- Political Science
- Psychology
- Sociology
- Modern Languages
- Cultural Studies
- Economic & Social Development of Regions
- Music
- Art
- Honors
- Gender Studies
- Other Interdisciplinary Courses
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.360</td>
<td>Gender, Race, and Crime</td>
</tr>
<tr>
<td>44.422</td>
<td>Victimology</td>
</tr>
<tr>
<td>44.477</td>
<td>Intimate Partner Violence</td>
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**Philosophy**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>45.306</td>
<td>Feminist Theory Politics</td>
</tr>
<tr>
<td>45.360</td>
<td>The Goddess in World Religion</td>
</tr>
<tr>
<td>45.367</td>
<td>Feminism and Liberalism</td>
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<tr>
<td>45.375</td>
<td>Philosophy of Sex and Love</td>
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**Political Science**

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<th>Course Title</th>
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<tbody>
<tr>
<td>46.220</td>
<td>Gender and Politics</td>
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<tr>
<td>46.225</td>
<td>Gender, Culture &amp; Politics</td>
</tr>
<tr>
<td>46.230</td>
<td>Law and the Legal System</td>
</tr>
<tr>
<td>46.230</td>
<td>Gender Law and Politics</td>
</tr>
<tr>
<td>46.325</td>
<td>Terrorism Seminar</td>
</tr>
<tr>
<td>46.326</td>
<td>Gender, Law, and Politics</td>
</tr>
<tr>
<td>46.327</td>
<td>Dynamics of Sexual Politics</td>
</tr>
<tr>
<td>46.330</td>
<td>Political Society and Technology Alternatives Seminar</td>
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<tr>
<td>46.336</td>
<td>Privacy and Politics</td>
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<tr>
<td>46.402</td>
<td>Women in Islam</td>
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<tr>
<td>46.406</td>
<td>The Politics of Identity in the Middle East</td>
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**Psychology**

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<th>Course Title</th>
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<tbody>
<tr>
<td>47.335</td>
<td>Psychology and Women</td>
</tr>
<tr>
<td>47.351</td>
<td>Human Sexuality</td>
</tr>
<tr>
<td>47.523</td>
<td>Women in the Community</td>
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**Sociology**

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<tr>
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<tbody>
<tr>
<td>48.225</td>
<td>Sociology of Disability</td>
</tr>
<tr>
<td>48.231</td>
<td>Sociology of the Family</td>
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<tr>
<td>48.240</td>
<td>Sociology of Gender</td>
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<td>48.242</td>
<td>Introduction to Gender Studies</td>
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<td>48.305</td>
<td>Sociology of Family Law</td>
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<tr>
<td>48.362</td>
<td>Social Welfare Policy</td>
</tr>
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<td>48.370</td>
<td>Women in Society</td>
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<tr>
<td>48.405</td>
<td>Feminist Methodologies</td>
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<tr>
<td>48.410</td>
<td>Seminar on Sex and Gender</td>
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**Modern Languages**

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<th>Course Title</th>
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<tbody>
<tr>
<td>50.378</td>
<td>Women in French Cinema</td>
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**Cultural Studies**

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<tr>
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<tr>
<td>52.330</td>
<td>Italian Women Writers</td>
</tr>
<tr>
<td>54.335</td>
<td>Spanish Women Writers in Translation</td>
</tr>
<tr>
<td>58.340</td>
<td>Women &amp; Art</td>
</tr>
<tr>
<td>58.345</td>
<td>Pre-Raphaelite Art</td>
</tr>
</tbody>
</table>

**Economic and Social Development of Regions**

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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>57.353</td>
<td>Managing Workforce Diversity</td>
</tr>
<tr>
<td>57.420</td>
<td>Gender, Work and Public Policy</td>
</tr>
<tr>
<td>57.504</td>
<td>Gender Differences at Work</td>
</tr>
<tr>
<td>57.525</td>
<td>Gender, Work and Public Policy</td>
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**Music**
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<th>Course Title</th>
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<tbody>
<tr>
<td>74.103</td>
<td>Gender Issues in Music</td>
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<tr>
<td>74.455</td>
<td>Women in Music</td>
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**Art**

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>79.380</td>
<td>Understanding Movies: Cinema as Social Commentary</td>
</tr>
</tbody>
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**Honors**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>HON.320</td>
<td>Seminar: Special Topics in Honors</td>
</tr>
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</table>

**Gender Studies**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>GNDR.200</td>
<td>Special Topics in Gender Studies (200-level)</td>
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<tr>
<td>GNDR.240</td>
<td>Introduction to Gender Studies</td>
</tr>
<tr>
<td>GNDR.300</td>
<td>Special Topics in Gender Studies (300-level)</td>
</tr>
<tr>
<td>GNDR.301</td>
<td>Gay and Lesbian Studies</td>
</tr>
<tr>
<td>GNDR.401</td>
<td>Practicum</td>
</tr>
<tr>
<td>GNDR.410</td>
<td>Directed Studies (400-level)</td>
</tr>
<tr>
<td>GNDR.490</td>
<td>Seminar in Gender Studies</td>
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</table>

**Other Interdisciplinary Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>59.239</td>
<td>Introduction to Gender Studies</td>
</tr>
<tr>
<td>59.240</td>
<td>Introduction to Gender Studies</td>
</tr>
<tr>
<td>59.307</td>
<td>Gender Issues in 19th Century American Literature and Popular Culture</td>
</tr>
<tr>
<td>59.308</td>
<td>Gender Issues in 20th Century American Literature and Popular Culture</td>
</tr>
<tr>
<td>59.310</td>
<td>Gender Violence in the United States</td>
</tr>
<tr>
<td>59.311</td>
<td>Men, Women, &amp; the Military</td>
</tr>
<tr>
<td>59.312</td>
<td>Issues in Human Reproduction</td>
</tr>
<tr>
<td>59.322</td>
<td>Gender, Work &amp; Family</td>
</tr>
<tr>
<td>59.340</td>
<td>Women in Art</td>
</tr>
<tr>
<td>59.345</td>
<td>Pre-Raphaelite Art</td>
</tr>
</tbody>
</table>

**Italian Studies Minor**

Contact: [Department of Cultural Studies](#)
Phone: 978-934-4701
Office: Coburn Hall 113

The interdisciplinary minor in Italian Studies consists of 18-24 credits of coursework. Six credits at the 200 level or above are required for the Italian language component. At least six credits at the 300 level or above must be taken outside of the Italian language component. For course descriptions, see the department listing as indicated next to the course title.
Course Listing Italian Studies

Digital Media Minor

Our interdisciplinary minor in Digital Media is designed to provide students with an opportunity to explore the practice and theory of media as it is being produced on the ground today. Today's rapidly changing media landscape of digitization, high-speed connectivity, and endless advancement in technology is redefining the relationship between media and its audience. As a result, media outlets are seeking to hire multi-skilled media professionals. Our program prepares students to join the ranks of today's converged media with multi-skills media qualifications that will uniquely distinguish them in today's market. Students in Digital Media Program are going to engage in a well structured hands-on program that also relies on a well-established theoretical background. Students will be exposed to a wide variety of media platforms spanning from online multimedia production to TV and filmmaking.

Program Requirements

The Digital Media minor is open to all undergraduates and consists of an interdisciplinary program of 18 credits of required and elective courses.

At least two courses must be at the 300 level or above.

Required Course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGMD.100</td>
<td>Introduction to Digital Media</td>
</tr>
</tbody>
</table>

Elective Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGMD.102</td>
<td>Introductions to Telecommunications</td>
</tr>
<tr>
<td>DGMD.231/41.237</td>
<td>Media Law and Ethics</td>
</tr>
<tr>
<td>DGMD.300</td>
<td>Multimedia Storytelling</td>
</tr>
<tr>
<td>DGMD.320/70.398</td>
<td>Documentary Photography</td>
</tr>
<tr>
<td>DGMD.340</td>
<td>Lighting Principles</td>
</tr>
<tr>
<td>DGMD.400</td>
<td>Directed Study in Journalism and Media Studies</td>
</tr>
<tr>
<td>DGMD.410</td>
<td>TV Studio Production</td>
</tr>
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</table>

Art

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>70.262</td>
<td>Digital Imaging and Photography: Photoshop</td>
</tr>
<tr>
<td>70.375</td>
<td>Language of Video</td>
</tr>
<tr>
<td>70.378</td>
<td>Interactive Media</td>
</tr>
<tr>
<td>70.385</td>
<td>Streaming Video for the Web</td>
</tr>
<tr>
<td>79.380</td>
<td>Understanding Movies: Cinema as Social Commentary</td>
</tr>
</tbody>
</table>

Criminal Justice

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.223</td>
<td>Crime and the Media</td>
</tr>
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</table>

Cultural Studies

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>58.225</td>
<td>History of Picturing</td>
</tr>
<tr>
<td>59.217</td>
<td>Media and Culture</td>
</tr>
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</table>

English

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>42.221</td>
<td>Writing for Interactive Media</td>
</tr>
<tr>
<td>42.222</td>
<td>Oral Communication</td>
</tr>
<tr>
<td>42.226</td>
<td>Technical and Scientific Communication</td>
</tr>
<tr>
<td>42.300</td>
<td>Intro to Journalism</td>
</tr>
<tr>
<td>42.301</td>
<td>Newswriting</td>
</tr>
<tr>
<td>42.305</td>
<td>Reviewing the Arts</td>
</tr>
<tr>
<td>42.309</td>
<td>Writing About Issues</td>
</tr>
<tr>
<td>42.310</td>
<td>Writing Popular Fiction</td>
</tr>
<tr>
<td>42.320</td>
<td>Personal and Reflective Writing</td>
</tr>
<tr>
<td>42.369</td>
<td>Reading and Writing New Media</td>
</tr>
<tr>
<td>42.387</td>
<td>Intro to Editing and Publishing</td>
</tr>
<tr>
<td>42.407</td>
<td>Creative Writing Fiction II</td>
</tr>
</tbody>
</table>

History
43.347 History of Documentary Film
43.348 Making an Historical Documentary

Information Technology

90.232 Desktop Video Production

Political Science

46.210 Media & Politics
46.222 Politics of the Internet
46.316 Politics and Film
46.318 Politics & Advertising
46.422 Political Communications and Media Studies

For more information about the minor in Digital Media, please contact Dr. Wael Kamal, Program Director, Wael_Kamal@uml.edu

Latin American Studies Minor

Coordinator: Dr. Maria Matz - Professor of Spanish & Latin American Studies
Office - Coburn Hall #113C
Phone 978-934-4364
Email: Maria_Matz@uml.edu

Courses for a minor field in Latin American studies are selected in consultation with Professor Maria Matz of the Cultural Studies Department from a list of approved courses in history, economics, languages, and literature. Six credits at the 200 level or above are required for the Spanish language component. Coursework for the Latin American Studies minor must meet the following distribution requirement:

<table>
<thead>
<tr>
<th>Course Category</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish Language</td>
<td>6</td>
</tr>
<tr>
<td>History/Economics</td>
<td>6-9</td>
</tr>
<tr>
<td>Latin American Literature</td>
<td>6-9</td>
</tr>
</tbody>
</table>

At least six hours in non-language courses must be taken in course work at the 300 level or above.

Students majoring in Spanish or Modern Languages (with Spanish option) may elect the Latin American studies minor but may not offer any course in Spanish language or literature (prefix: 54) as part of the 18-24 semester credits

Course Listing Latin American Studies

Technology, Society, and Human Values Minor

Technology, Society and Human Values is an interdisciplinary program that unites development theories with practice by integrating classroom learning and research with regional, national, and international economic and social development projects and research in which the faculty are engaged. Courses are taught in an interdisciplinary manner, with faculty trained in economics, history, planning, political science, psychology and sociology.

The program prepares students to assume professional roles involving research, consulting, and strategic planning in business, in local, state, national, and international development and planning agencies, and in nonprofit organizations working on economic and social development. Students, if they choose to continue their education, will be prepared to continue matriculation in a wide variety of graduate programs in the sciences, social sciences and humanities, including management and public policy.

Course Listing Technology Society and Human Values

Theater Arts Minor

The interdisciplinary program in Theater Arts offers coursework in acting, directing, design, playwriting, technical theater, theater history, and dramatic literature.

Students may pursue Theater Arts either as a Minor or as a Concentration within the Bachelor of Liberal Arts major. The Minor requires 18 to 24 credits, with 6 credits at the 300 level or above. The BLA Concentration requires 24 to 30 credits, half of which must be at the 300 level or above.

For additional information contact the Theater Arts Program Director:
Nancy Selleck, Ph.D
Phone: 978-934-4185
Courses should be distributed among the following 3 categories:

**Production Credit (at least 3 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEA.311</td>
<td>Play Production (3 cr)</td>
</tr>
<tr>
<td>THEA.493</td>
<td>Practicum in Theater</td>
</tr>
</tbody>
</table>

**Theater Arts workshops (at least 6 credits)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.233</td>
<td>Play Analysis</td>
</tr>
<tr>
<td>42.304</td>
<td>Playwriting</td>
</tr>
<tr>
<td>42.367</td>
<td>Advanced Playwriting</td>
</tr>
<tr>
<td>THEA.221</td>
<td>Stagecraft</td>
</tr>
<tr>
<td>THEA.261</td>
<td>Acting I</td>
</tr>
<tr>
<td>THEA.262</td>
<td>Acting II</td>
</tr>
<tr>
<td>THEA.265</td>
<td>Voice and Movement for Actors</td>
</tr>
<tr>
<td>THEA.343</td>
<td>Directing Workshop</td>
</tr>
<tr>
<td>THEA.230</td>
<td>Fundamentals of Theatrical Design</td>
</tr>
<tr>
<td>THEA.401</td>
<td>Topics in Theater</td>
</tr>
<tr>
<td>THEA.311</td>
<td>Play Production</td>
</tr>
<tr>
<td>THEA.490</td>
<td>Performance Practicum (1 cr)</td>
</tr>
<tr>
<td>THEA.494</td>
<td>Directed Study in Theater</td>
</tr>
</tbody>
</table>

**Dramatic Literature/Theater History (at least 6 credits)**

<table>
<thead>
<tr>
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<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>42.218</td>
<td>Comedy</td>
</tr>
<tr>
<td>42.348</td>
<td>Modern American Drama</td>
</tr>
<tr>
<td>42.357</td>
<td>African-American Theater</td>
</tr>
<tr>
<td>42.359</td>
<td>Contemporary World Theater</td>
</tr>
<tr>
<td>42.360</td>
<td>Medieval and Renaissance Theater</td>
</tr>
<tr>
<td>42.361</td>
<td>Restoration Comedy</td>
</tr>
<tr>
<td>42.362</td>
<td>Modern Drama</td>
</tr>
<tr>
<td>42.363</td>
<td>English Renaissance Drama</td>
</tr>
<tr>
<td>42.382</td>
<td>Theater History 1 (Ancient to Early Modern)</td>
</tr>
<tr>
<td>42.383</td>
<td>Theater History 2 (19th Century to present)</td>
</tr>
<tr>
<td>42.423</td>
<td>Shakespeare I</td>
</tr>
<tr>
<td>42.424</td>
<td>Shakespeare II</td>
</tr>
<tr>
<td>50.442</td>
<td>Theater and Anti-Theater</td>
</tr>
<tr>
<td>55.351</td>
<td>Classical Drama</td>
</tr>
<tr>
<td>58.305</td>
<td>Theater and the Visual Arts</td>
</tr>
<tr>
<td>74.356</td>
<td>American Musical Theater</td>
</tr>
<tr>
<td>THEA.201</td>
<td>Introduction to Theater</td>
</tr>
</tbody>
</table>

**Course Listing Theater Arts**

**Work, Labor & Society Minor**

Many aspects of our lives are influenced by what we do for work – how we spend our time, how much money we have, our lifestyle, and our leisure pursuits are all connected to our occupation. And work is not just an individual experience, but is deeply embedded in our social structure. Our labor market reflects and reproduces many societal inequalities, and at the same time workers united by their identity as workers have created lasting social change through the labor movement.

The interdisciplinary minor in Work, Labor and Society is intended to give students an analytic lens on work, something most of us take for granted as part of our everyday lives. The study of work is inherently interdisciplinary, and students in this program will be asked to reach beyond their own disciplinary boundaries to explore a range of approaches to the subject.

**Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.303</td>
<td>America in the Twenties and Thirties</td>
</tr>
<tr>
<td>43.304</td>
<td>European Social and Economic History</td>
</tr>
</tbody>
</table>
FAHSS Interdisciplinary Programs & Minors

Interdisciplinary programs provide students with opportunities to learn and apply modes of inquiry essential to multiple interrelated disciplines. Special emphases are placed on writing fluency, an essential skill for success not only in college work but throughout life; on diversity and the study of foreign cultures, so that students gain an appreciation of the uniqueness of each such culture as reflected in its language and history as well as the many traditions that make up our multicultural heritage; and on an understanding of the forces, figures and events that shape our country and our world.

Some programs involve philosophical inquiry and awareness regarding issues of fundamental human importance. Some grasp of the nature of humankind, of the criteria for knowledge and for making moral decisions fosters the essential lifetime skills of clear thinking, rational evaluation and critical self-reflection. Interdisciplinary programs in the Social Sciences provide opportunities for inquiry into human behavior and its possibilities and limitations. Comparative studies in art history, literature, music history, and the humanities deepen understanding and appreciation off aesthetic cultural, and ethical values both to our own culture and of others.

Interdisciplinary minors offered by the University of Massachusetts Lowell include:

- Asian Studies
- Arabic Studies
- Art History
- Comparative Arts
- Cultural Studies
- Digital Media
- Disability Studies
- Environment and Society
- Film Studies
- Gender Studies
- German Studies
- Italian Studies
- Latin American Studies
- Peace and Conflict Studies
- Technology Society and Human Values
- Theater Arts
- Work, Labor and Society

Other Interdisciplinary and Intercollegiate Programs and Minors.

Peace and Conflict Studies Minor

Social conflicts are probably inevitable in human societies, but it is preferable to devise constructive ways, short of large-scale violence, for resolving conflicts.

Coordinator: Dr. Paula Rayman
Office: O'Leary 500K

The goals of the Peace and Conflict Studies minor are:
To communicate basic facts and insights regarding war and large-scale conflicts, especially in the contemporary world;
To discuss efforts and proposals for peacemaking, together with their principal strengths and weaknesses; and
To develop a critical yet respectful and informed awareness of the diversity of policies and values about war and peace.

Requirements for the Minor

A minor in Peace and Conflict Studies will consist of 18 to 24 credits with at least 6 credits at the 300 level or above (includes required and elective courses). The requirements are as follows:

**Required Courses**

1. PCS.125 Introduction to Peace and Conflict Studies
2. One of the following courses:
   - 43.239 The World Since 1945
   - 48.352 Sociology of Nonviolence
   - 46.384 International Politics of Human Rights
3. 4-6 electives from the list of Peace and Conflict Studies electives

**Peace and Conflict Studies Minor Elective Courses**

Other courses may be added with permission of program director

<table>
<thead>
<tr>
<th>Legal Studies</th>
<th>Peace and Conflict Studies Minor Elective Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.366 International Law</td>
<td></td>
</tr>
<tr>
<td><strong>English</strong></td>
<td></td>
</tr>
<tr>
<td>42.205 Human Values in Western Culture</td>
<td></td>
</tr>
<tr>
<td>42.251 War in Literature</td>
<td></td>
</tr>
<tr>
<td>42.278 Literature of the Vietnam War</td>
<td></td>
</tr>
<tr>
<td><strong>History</strong></td>
<td></td>
</tr>
<tr>
<td>43.106 The Modern World</td>
<td></td>
</tr>
<tr>
<td>43.204 China and the Modern World</td>
<td></td>
</tr>
<tr>
<td>43.211 Historical Dimensions of Globalization</td>
<td></td>
</tr>
<tr>
<td>43.212 Modern Latin America</td>
<td></td>
</tr>
<tr>
<td>43.240 World War I</td>
<td></td>
</tr>
<tr>
<td>43.241 World War II</td>
<td></td>
</tr>
<tr>
<td>43.281 Sub-Saharan Africa</td>
<td></td>
</tr>
<tr>
<td>43.296 United States Diplomatic History</td>
<td></td>
</tr>
<tr>
<td>43.320 American East Asian Relations</td>
<td></td>
</tr>
<tr>
<td>43.321 The Holocaust</td>
<td></td>
</tr>
<tr>
<td>43.336 Problems of Modern Ireland</td>
<td></td>
</tr>
<tr>
<td>43.356 Civil War and Reconstruction</td>
<td></td>
</tr>
<tr>
<td>43.391 America and the World</td>
<td></td>
</tr>
<tr>
<td>43.393 History of the Middle East and Islamic World</td>
<td></td>
</tr>
<tr>
<td><strong>Criminology &amp; Justice Studies</strong></td>
<td></td>
</tr>
<tr>
<td>44.115 Introduction to Homeland Security</td>
<td></td>
</tr>
<tr>
<td>44.212 Weapons of Mass Destruction</td>
<td></td>
</tr>
<tr>
<td>44.248 Terrorism (International and Domestic)</td>
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<tr>
<td>44.326 Hate Crimes</td>
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<tr>
<td><strong>Peace and Conflict Studies</strong></td>
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<tr>
<td>PCS.496 Practicum</td>
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<tr>
<td><strong>Philosophy</strong></td>
<td></td>
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<tr>
<td>45.296 Intro. To World Religions</td>
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</table>

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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>45.307</td>
<td>Theories of Justice</td>
</tr>
<tr>
<td>45.366</td>
<td>Globalization and its Critics</td>
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### Political Science

<table>
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<tr>
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<th>Course Title</th>
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<tr>
<td>46.112</td>
<td>Intro to Comparative Political Systems</td>
</tr>
<tr>
<td>46.121</td>
<td>Intro to International Relations</td>
</tr>
<tr>
<td>46.230</td>
<td>Law and the Legal System</td>
</tr>
<tr>
<td>46.233</td>
<td>Islam and Politics</td>
</tr>
<tr>
<td>46.335</td>
<td>Constitutional Law and Politics</td>
</tr>
<tr>
<td>46.337</td>
<td>Civil Liberties and Politics</td>
</tr>
<tr>
<td>46.345</td>
<td>The Politics of Discord between the Arab East and the West</td>
</tr>
<tr>
<td>46.351</td>
<td>Irish Politics</td>
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<tr>
<td>46.360</td>
<td>European Politics: Tradition and Modernity</td>
</tr>
<tr>
<td>46.363</td>
<td>Politics of China</td>
</tr>
<tr>
<td>46.368</td>
<td>Middle Eastern Politics</td>
</tr>
<tr>
<td>46.370</td>
<td>Latin American Politics</td>
</tr>
<tr>
<td>46.375</td>
<td>Politics of the Pacific Rim</td>
</tr>
<tr>
<td>46.376</td>
<td>Democratic Movements in South East Asia</td>
</tr>
<tr>
<td>46.387</td>
<td>Politics of International Organizations</td>
</tr>
<tr>
<td>46.402</td>
<td>Women in Islam</td>
</tr>
<tr>
<td>46.406</td>
<td>The Politics of Identity in the Middle East</td>
</tr>
<tr>
<td>46.422</td>
<td>Seminar in Political Communication and Media Studies</td>
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### Psychology

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<tr>
<td>47.209</td>
<td>Social Psychology</td>
</tr>
<tr>
<td>47.328</td>
<td>Dynamics of Interpersonal Relations</td>
</tr>
<tr>
<td>47.473</td>
<td>Seminar in Social Psychology: Resolving Social Conflict</td>
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</table>

### Sociology

<table>
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<th>Course Title</th>
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<tbody>
<tr>
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<td>Social Anthropology</td>
</tr>
<tr>
<td>48.216</td>
<td>Sociology of War and Peace</td>
</tr>
<tr>
<td>48.234</td>
<td>The Study of Minorities</td>
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<tr>
<td>48.240</td>
<td>Sociology of Gender</td>
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<tr>
<td>48.256</td>
<td>Political Sociology</td>
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<td>48.317</td>
<td>Sociology of Genocide</td>
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<td>48.382</td>
<td>Social Movements</td>
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<tr>
<td>48.450</td>
<td>Seminar on Peace, War, and Violence</td>
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<tr>
<td>48.469</td>
<td>Seminar on Global Society</td>
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### Economics

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>49.315</td>
<td>Intro to Environmental Economics</td>
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</table>

### Spanish

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>54.351</td>
<td>Hispanic Perspectives</td>
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</table>

### Cultural Studies

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>59.349</td>
<td>Literature, Politics and Genocide in Cambodia</td>
</tr>
<tr>
<td>59.356</td>
<td>Village Empowerment: Overcoming Global Poverty</td>
</tr>
<tr>
<td>59.470</td>
<td>Directed Study in Peace and Conflict</td>
</tr>
<tr>
<td>59.471</td>
<td>Project in Peace and Conflict</td>
</tr>
</tbody>
</table>

### Gender Studies
Alternative Elective Course(s)

These may be counted towards the minor, with the approval of the coordinator, provided they contain substantial amounts of Peace Studies material.

Peace Studies minors can also choose from a list of Peace Studies courses available at other schools in the NECCUM consortium, including the Peace Studies Minor at Salem State College. Where a Peace Studies course meets the university's General Education requirement in Values, Concepts and Choice, it can also be used to meet that requirement.

General Comments

The Peace Studies minor is interdisciplinary. It also inevitably involves issues of human rights, social justice, scientific/technological change, and environmental degradation. In Peace Studies serious attention is paid to relationships between the local and the global. Social conflicts are probably inevitable in human societies, but it is preferable to devise constructive ways to resolve conflicts, other than large-scale violence, such as wars and terrorism. There is certainly a diversity of views among the UMass Lowell faculty teaching Peace Studies courses about how to resolve conflicts—and this should ensure the Peace Studies minor is interesting and educational!

Peace and Conflict Studies after Graduation

There are many reasons why a minor in Peace Studies should be helpful to any undergraduate, no matter what his/her major. The following are some examples.

- Any student will benefit from knowing about the various conflicts in tense regions like the Middle East, and South and Central Asia, which are addressed from a variety or perspectives in many Peace Studies courses.
- UMass Lowell graduates working in any field will have to deal with the increasing ethnic diversity of the local workforce, and with minority-rights issues that are heavily influenced by conflicts in the Caribbean basin, Southeast Asia, the Middle East and other regions. These issues are important in such varied fields as business, education, engineering, health care, human services, and law enforcement.
- The economy in the Merrimack Valley, Eastern Massachusetts and Southern New Hampshire is greatly affected by current and future actions by defense contractors, and by programs for selling arms abroad--topics considered in several Peace Studies courses.
- A student going into counseling or human services should be familiar with the psychological and social impacts of terrorism, the Cambodian genocide, and the Vietnam War.

Other Activities Related to the Peace and Conflict Studies Program

Each semester there are various other events in which the Peace and Conflict Studies program is involved. Since 1989, Peace and Conflict Studies has sent student and faculty delegates to the national conferences of the Peace Studies Association (now renamed the Peace and Justice Studies Association), of which the UMass-Lowell program is a founding member.

Since Fall 1991 several Peace and Conflict Studies faculty and students have been active in the Peace & Conflict Studies Institute (PACSI), a major goal of which is public education on peace- and conflict-related questions. PACSI has since 1996 sponsored annual Days Without Violence, in collaboration with Middlesex Community College and many agencies on and off campus. PACSI has organized training and public discussions on conflict resolution. Since the terrorist attacks of September 11, 2001, PACSI has sponsored presentations on policy issues such as the war on terrorism, civil liberties and the military budget; and organized participatory discussions on reactions to terrorism and Israeli-Palestinian dialogue.

The Peace Studies program welcomes comments and suggestions from any member of the university community.

Other Links:
- Peace and Conflict Studies website.
- Undergraduate Course of Study in Peace and Conflict Studies.
- Major in Peace and Conflict Studies.
- Graduate Course of Study in Peace and Conflict Studies.
- Graduate Certificate Course of Study in PACS.

Peace and Conflict Studies BA

Undergraduate Program Curriculum Outline

- Core Courses
- General Education Courses
- Transfer Students
- Suggested Course of Study
Major Required (Core) Courses (Number of total courses required = 6)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS.125</td>
<td>Introduction to Peace and Conflict Studies</td>
<td>3</td>
</tr>
<tr>
<td>43.239</td>
<td>The World Since 1945</td>
<td>3</td>
</tr>
<tr>
<td>48.352</td>
<td>Sociology of Non-Violence</td>
<td>3</td>
</tr>
<tr>
<td>46.384</td>
<td>International Politics of Human Rights</td>
<td>3</td>
</tr>
<tr>
<td>PCS.350</td>
<td>Integrative Seminar</td>
<td>3</td>
</tr>
<tr>
<td>PCS.470</td>
<td>Advanced Seminar in Peace and Conflict Studies:</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Community and Organizational Conflict</td>
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</table>

Sub Total Core Credits 18

Elective Courses
(Number of total courses required = 6-9)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>See List of elective courses</td>
<td></td>
</tr>
</tbody>
</table>

Sub Total Elective Credits 18-27

Distribution of General Education Requirements
See List of General Education Offerings (Course Numbers, Titles, and Credits) Number of Credits

| Arts and Humanities, including Literature and Foreign Languages | 15 |
| Mathematics and the Natural and Physical Sciences              | 14 |
| Social Sciences                                                | 9  |

Sub Total General Education Credits 38

Curriculum Summary

Total number of courses required for the degree 12-15
Total credit hours required for degree 36-45

General Education

A major in Peace and Conflict Studies consists of 36 to 45 credits with at least 18 credits at the 300 level or above (includes required and elective courses).

Required are:

- PCS.125 Introduction to Peace and Conflict Studies
- 43.239 The World Since 1945 (History)
- 48.352 Sociology of Non-Violence (Sociology)
- 46.384 International Politics of Human Rights (Political Science)
- Three semesters of the PCS.350 Peace and Conflict Integrative Seminar and PCS.470 Advanced Seminar
- PCS.496 Practicum can be selected as an elective.
- A statistics course is highly recommended.

NOTE: At least 75 credits must be earned outside of the major including general education requirements, language requirement, and free electives.

Elective courses that are used to fulfill Peace and Conflict Studies major requirements cannot also be applied to satisfy a student’s general education requirements.

Transfer Students

Students transferring to the college and wishing to major in Peace and Conflict Studies must make individual arrangements with the program director regarding satisfaction of major course requirements.
Suggested Course of Study

Freshman Year/Fall Semester
- 42.101 (Gen. Ed.) College Writing I - 3 Credits
- 92.____ (Gen. Ed.) Mathematics - 3 Credits
  (92.283 Recommended)
- PCS.125 Intro to Peace and Conflict Studies - 3 Credits
- 59.109 First Year Seminar - 1 Credit
- Beginning Language I - 3 Credits
- **Total Credits: 13**

Freshman Year/Spring Semester Cr.
- 42.102 (Gen. Ed.) College Writing II - 3 Credits
- ____ (Gen. Ed.) Science w/lab - 4 Credits
- 43.239 The World Since 1945 - 3 Credits
- ____ Beginning Language II - 3 Credits
- **Total Credits: 13**

Sophomore Year/Fall Semester
- 48.352 Sociology of Non-Violence - 3 Credits
- Free Elective - 3 Credits
- ____ (Gen. Ed.) SS (Social Science) - 3 Credits
- ____ (Gen. Ed.) Science w/lab - 4 Credits
- ____ Intermediate Language I - 3 Credits
- **Total Credits: 16**

Sophomore Year/Spring Semester
- 46.384 Inter. Politics of Human Rights - 3 Credits
- ____ (Gen. Ed.) SS (Social Science) - 3 Credits
- ____ (Gen. Ed.) AH (Arts/Humanities) - 3 Credits
- ____ (Gen. Ed.) AH (Arts/Humanities) - 3 Credits
- Intermediate Language II - 3 Credits
- **Total Credits: 15**

Junior Year/Fall Semester
- PCS.350 PCS Integrative Seminar* - 1 credit
- ____ Peace and Conflict Elective - 3 Credits
- ____ (Gen. Ed.) Science (non-lab) - 3 Credits
- ____ (Gen. Ed.) SS (Social Science) - 3 Credits
- ____ Peace and Conflict Elective - 3 Credits
- ____ Free Elective - 3 Credits
- **Total Credits: 16**

Junior Year/Spring Semester
- PCS.350 PCS Integrative Seminar* - 1 credit
- ____ Peace and Conflict 300/400 - 3 Credits
- ____ Peace and Conflict 300/400 - 3 Credits
- ____ Free Elective - 3 Credits
- ____ Free Elective - 3 Credits
- ____ (Gen. Ed.) AH (Arts/Humanities) - 3 Credits
- **Total Credits: 16**

Senior Year/Fall Semester
- PCS.350 PCS Integrative Seminar* - 1 credit
- ____ Peace and Conflict 300/400** - 3 Credits
- ____ Peace and Conflict 300/400 - 3 Credits
- ____ Free Elective - 3 Credits
- ____ Free Elective - 3 Credits
- ____ Free Elective - 3 Credits
- **Total Credits: 16**

*The Integrative Seminar is a bi-weekly 2-hour seminar that a student takes for three semesters prior to the final semester to synthesize learning and develop interdisciplinary understanding of their work in Peace and Conflict Studies. Students are awarded 1 credit per semester of the Integrative Seminar.
PCS.496 Practicum can be selected as an elective

**Senior Year/Spring Semester**
- PCS.470 PCS Advanced Seminar - 3 Credits
- Free Elective - 3 Credits
- Free Elective - 3 Credits
- Free Elective - 3 Credits
- Free Elective - 3 Credits
- Total Credits: 15

**Minimum Total Credits = 120**

**B.A. Elective Courses**

Six Elective Courses within Peace and Conflict Studies are required. A maximum of 9 electives can be taken for 45 credits in the major. Students must ensure that they take a total of 18 credits at the 300/400 level through core and elective courses.

Additional courses besides those listed below may count towards the Peace and Conflict Studies degree upon approval of the director of the program.

For those accepted into the Plus-One M.A. program 2 electives can be at the graduate level and counted for both B.A. and M.A. degrees.

Elective courses that are used to fulfill Peace and Conflict Studies major requirements cannot also be applied to satisfy a student's general education requirements.

**Legal Studies**
41.366 International Law

**English**
42.205 Human Values in Western Culture
42.251 War in Literature
42.278 Literature of the Vietnam War

**History**
43.106 The Modern World
43.204 China and the Modern World
43.211 Historical Dimensions of Globalization
43.212 Modern Latin America
43.240 World War I
43.241 World War II
43.281 Sub-Saharan Africa
43.296 United States Diplomatic History
43.320 American East Asian Relations
43.321 The Holocaust
43.336 Problems of Modern Ireland
43.356 Civil War and Reconstruction
43.391 America and the World
43.393 History of the Middle East and Islamic World

**Criminology & Justice Studies**
44.115 Introduction to Homeland Security
44.212 Weapons of Mass Destruction
44.248 Terrorism (International and Domestic)
44.326 Hate Crimes

**Peace and Conflict Studies**
PCS.496 Practicum

**Philosophy**
45.296 Intro. To World Religions
45.307 Theories of Justice
45.366 Globalization and Its Critics

**Political Science**
46.112 Intro to Comparative Political Systems
46.121 Intro to International Relations
46.230 Law and the Legal System
46.233 Islam and Politics
46.335 Constitutional Law and Politics
Civil Liberties and Politics
European Politics: Tradition and Modernity
Politics of China
Middle Eastern Politics
Latin American Politics
Politics of the Pacific Rim
Democratic Movements in South East Asia
Politics of International Organizations
Women in Islam
The Politics of Identity in the Middle East
Seminar in Political Communication and Media Studies

Psychology
Social Psychology
Dynamics of Interpersonal Relations
Seminar in Social Psychology: Resolving Social Conflict

Sociology
Social Anthropology
Sociology of War and Peace
The Study of Minorities
Sociology of Gender
Political Sociology
Sociology of Genocide
Social Movements
Seminar on Peace, War, and Violence
Seminar on Global Society

Economics
Intro to Environmental Economics

Spanish
Hispanic Perspectives

Cultural Studies
Literature, Politics and Genocide in Cambodia
Village Empowerment: Overcoming Global Poverty
Directed Study in Peace and Conflict
Project in Peace and Conflict

Gender Studies
Introduction to Gender Studies

Other Links:
Peace and Conflict Studies website
Undergraduate Course of Study in Peace and Conflict Studies
Minor in Peace and Conflict Studies
Graduate Course of Study in Peace and Conflict Studies
Graduate Certificate Course of Study in PACS

Peace and Conflict Studies

Through the Peace and Conflict Studies Inter-disciplinary Program at UMass Lowell, undergraduate and graduate students explore the causes of violence, methods to resolve violence, and practices to build peace. We combine theoretical and experiential education to prepare students for success in graduate school and their careers.

The need for practitioners trained in conflict resolution, human rights advocacy, and violence prevention has never been greater. Peace and Conflict Studies graduates go into government, the business sector, and non-profit organizations in order to make a difference and apply their skills towards improving the world.

Undergraduate students can major or minor in Peace and Conflict Studies. UMass Lowell juniors and seniors can apply for the Accelerated BA to MA. Graduate Students can earn a Graduate Certificate or Master of Arts in Peace and Conflict Studies.

Other Links:
Peace and Conflict Studies website
Undergraduate Course of Study in Peace and Conflict Studies
Minor in Peace and Conflict Studies
Graduate Course of Study in Peace and Conflict Studies
Legal Studies Minor Requirements

Most of the nation's law schools reject the idea of a rigid pre-law curriculum as a means of preparing for entrance into law school. The undergraduate pre-law student is actually working toward two different objectives: vigorous academic preparation for law school and an undergraduate education that will complement the law degree once obtained.

The type of undergraduate degree pursued may depend on the type of law in which you intend to specialize. For example, if you want to become a tax attorney, you might concentrate in accounting and economics. If copyright law interests you, an undergraduate degree in music or art would be beneficial. Those students interested in law school as a prelude to government service or politics may want to pursue an undergraduate degree in political science. Many students do not have a particular field of law identified prior to entering college. For such students, a broad liberal arts preparation is important. All pre-law students should be aware that communications skills are very important, and for this reason, courses in English, speech, and foreign languages should be considered.

Legal Studies Minor

The Legal Studies Minor is a program offered by the Legal Studies Department that allows the student to gain a valuable insight into substantive law courses. Many of the Legal Studies courses serve as previews to the courses offered in law schools.

A Legal Studies Minor consists of a minimum of 18 credits chosen from the Legal Studies courses (41 prefix), with at least 9 of the 18 credits at the 300 level or higher. Note that only one of the introductory courses (41.261, 41.262) may be credited toward the minor.

Professors of Legal Studies, in their advisory roles, will tailor the student's Legal Studies Minor to complement the student's major. For example, an Accounting major might take the following as his or her Legal Studies courses: Introduction to Business Law, Corporate and Property Law, Law for the CPA and Pre-Law Student, The Legal Environment of Business, Business Planning, and Federal Income Tax Law.

Six of the following courses are required for the Legal Studies Minor, with 3 of the 6 courses at the 300 level or higher. For further information, inquire at the Legal Studies Office in Falmouth 302.

- 41.102 The Development of the American Legal System
- 41.103 Introduction to Paralegal Studies
- 41.199 Introduction to Legal Studies (General)
- 41.210 Restorative Justice
- 41.234 Criminal Law
- 41.250 Disability and the Law
- 41.261 Introduction to Legal Concepts
- 41.262 Introduction to Business Law
- 41.287 Legal Writing
- 41.299 Legal Studies (General)
- 41.360 Legal Issues in Racism
- 41.363 Corporate and Property Law
- 41.364 Law for the CPA and Pre-Law Student
- 41.365 The Legal Environment of Business
- 41.366 International Law
- 41.367 Environmental Law
- 41.368 Employment and Labor Law
- 41.369 The Courts and the Constitution
- 41.370 Real Estate Law
- 41.371 Legal Issues in Health Care
- 41.372 Sports, Entertainment and Art Law
- 41.373 Consumer Law
- 41.374 Computers and the Law
- 41.375 Securities Regulation
- 41.376 Family Law
- 41.377 Elder Law
- 41.378 Comparative European Community Law
- 41.379 The Relationship of Law, Logic, and Ethics
- 41.381 Women and the Law
- 41.382 Business Planning
- 41.383 Alternative Dispute Resolution
- 41.384 State and Local Taxation
- 41.385 Immigration Law
- 41.386 Intellectual Property
- 41.387 Legal Research Methods
- 41.388 Directed Study: Law
- 41.390 Litigation
- 41.391 Federal Income Tax Law
- 41.392 Wills, Trusts and Estates
- 41.395 Bankruptcy Law
The Concentration in Art History

The BLA concentration in Art History includes a comprehensive study of the historical periods, cultural expressions, aesthetic judgments and artistic choices manifested in architecture, painting, sculpture, graphics and related processes, and artifacts from Ancient times to the present. By examining the intellectual and scientific events that have shaped the creation of art and civilization, students are able to assess aesthetically and critically the artistic products of past and present cultures. Art History assists students to develop aesthetic, analytical and critical judgments as well as writing and verbal skills.

Requirements:

Complete two Foundations of Art History courses: The History of Art I and The History of Art II.

Complete 8 - 10 Art History courses, a minimum of four courses must be at the 300-level or above.

Completion of a Directed Study or practical experience.

View the complete Course of Study (pdf)

Please refer to the course catalog for a complete list of Art History courses.

The Concentration in Comparative Arts

The Comparative Arts concentration surveys some of the fundamental aspects of music, literature, culture, and art; such as the nature of aesthetic judgement, the task of art, literature and music criticism, including formalist, representational, and contemporary theories on viewing, analyzing, and interpreting the arts. In addition, with comparative analysis between the modes of visual, literary, and aura representation, different aspects of artistic theories are investigated. The concentration analyzes the principal forms and genres of the visual, literary, and aural elements in various cultural disciplines, providing and understanding for human creativity and expression.

Requirements:

Students must complete 8 courses including:

Four 200-level Comparative Art courses.
At least four 300-level or above Comparative Arts courses.

See the course catalog for a complete description of Comparative Art courses.

The Concentration in Cultural Studies

Cultural Studies is an academic field that explores the ways in which meaning is produced and disseminated through various social practices, beliefs, rituals, institutions, arts and social structures. It examines the daily activities of people in a given cultural, the use they make of particular objects, the meanings they ascribe to or derive from particular images and forms of expression.

Cultural Studies often explores the interrelationship between cultural forms and ideology or cultural forms and political economy; thus, it raises questions about the ways that cultural practices can function as a source of social control. It also explores how individuals and groups within a cultural can resist a dominant ideology by subverting expected practice or meaning.

As an academic field, Cultural Studies draws from work in many areas, including critical theory (literary, political, and social), history and art history, gender studies, film studies, museum studies, media and communication studies, and ethnic studies to frame questions and analyze cultural phenomena.

Requirements:

Complete 8 - 10 courses in the Cultural Studies concentration, at least 4 courses must be at the 300-level or above.

Course List:

Students who choose the Cultural Studies concentration must select from the following courses:

59.105 Comparative Arts
59.111 Foundations in Cultural Studies
59.208 Cultural Studies I
59.209 Cultural Studies II
59.315 Islamic Culture and Contemporary Society
The Concentration in Economics

The BLA Concentration in Economics allows students to emphasize a particular area in Economics like international, quantitative or environmental economics. A series of courses can also be chosen from different areas to strengthen or complement the student's second concentration such as Health Economics, Labor Economics, or International Trade Theory.

Requirements:

Complete a minimum of four 200-level Economics courses.

Complete a minimum of four 300-level Economics courses.

Please refer to the course catalog for a complete list of Economics courses.

The Concentration in Environment and Society

The concentration in Environment and Society allows students who have an interest in environmental issues to explore the ways that these issues can be addressed through a variety of disciplinary perspectives, including political science, history, sociology, legal studies, English, art history, and philosophy.

Courses in these disciplinary areas invite students to consider how attitudes toward nature and the built environment have changed over time; how public policies affect the relationship that people have with the environment and may influence choices about preservation of open space and natural resources; how writers and artists have interpreted and represented the natural world and the built environment, including the tensions that exist between the two; how issues such as health, sustainable development, the history of industrialization, and the expansion of technologies are related to and/or affect the environment.

Requirements:

Complete a minimum 24 and a maximum of 30 credits, 12 of which must be at the 300-level or above, distributed as described below.

As the core of the concentration, students must take three of the following courses:

46.175 Intro to Environmental Studies (Political Science)
48.236 Sociological Approaches to the Environment (Sociology)
31.313 Principles of Environmental Health (Community Health and Sustainability)
41.367 Environmental Law (Legal Studies)
43.316 American Environmental History (History)
46.357 Environmental History and Policy (Political Science)

They may then choose additional 100 and 200 level courses from the following list (usually 4 courses are taken at this level, but students may choose to do more upper level courses in this concentration):

40/42/59.248 Values in American Culture (American Studies/English)
42/59.249 Literature of Technology and Human Values (English)
46.175 Intro to Environmental Studies (Political Science)
47.255 Community Psychology (Psychology)
48.236 Sociological Approaches to the Environment (Sociology)
57.211 Sustainable Development (ESDR)
57.220 Designing the Future World (ESDR)
58.211 Nineteenth Century Art (Cultural Studies – Art History)
59.115 Lowell as Text (Intercollegiate Arts & Sci)

Students are required to take at least 12 credits at the 300 level or above. Depending on which courses students have selected from the required core, they may select additional courses from among the following:
The Concentration in Gender Studies

The BLA Concentration in Gender Studies offers students the opportunity to learn how ideas about gender shape our knowledge of the world and our experience of everyday life. Gender Studies courses explore how research on gender and its intersection with race, class, sexual orientation, age, and culture has transformed our understanding of social institutions, human behavior, cultural expression, and intellectual inquiry.

Requirements:

Complete a minimum of four 300-level or above Gender Studies courses.

Please refer to the course catalog for a complete list of Gender Studies courses.

The Concentration in History

The BLA Concentration in History provides students with an introduction to civilizations of the past and present. Students who select this concentration develop an understanding of the historical process and the complexities that shape the forces of civilization. Students have the opportunity to explore the civilizations of antiquity, Europe, America, and the developing world.

Requirements:

Complete a minimum of four 300-level or above History courses.

Please refer to the course catalog for a complete list of History courses.

The Concentration in Languages

The Language concentration focuses on communication, providing students with the ability to function more effectively in the multicultural world within which we live. The language courses offer students the opportunity to acquire an ability to use second languages and to become aware of the diverse cultures in which they flourish.

Students may choose from French, Italian, and Spanish.

Requirements:

Completion of eight courses in a specific language, four of which are at the 300-level or above.

Please refer to the course catalog for a complete list of Language courses.

The Concentration in Legal Studies

The BLA Concentration in Legal Studies focuses on developing and enhancing skills in critical thinking; issue perception, analysis, and solution; written and oral communication; and electronic legal research. In response to technological innovations, growth of e-commerce
and demands of the regional economy, courses such as the Legal Aspects of Cyberspace, International Law, Family Law, and Women
and the Law, UMass Lowell offers a variety of challenging courses to familiarize students with diverse, domestic, and global legal and
ethical concepts.

Requirements:

Complete a minimum of four 300-level or above Legal Studies courses.

Complete a minimum of four 200-level Legal Studies courses.

Please refer to the course catalog for a complete list of Legal Studies courses.

The Concentration in Literature

The BLA Concentration in Literature allows students to develop skills in literary analysis while exploring genres and periods of literature
that are of particular interest. Students may take courses in genres such as drama, short fiction, poetry, and the novel; time periods that
may be studied range from Great Books of Antiquity to Contemporary Fiction. Special topics courses, such as Children’s Literature, the
Horror Story, Turning Fiction into Film, or Selected Authors may also be taken as part of this concentration.

Requirements:

Complete a minimum of four 300-level or above Literature courses.

Complete a minimum of four 200-level Literature courses. As a foundation for literary study, 42.200 Critical Methods of Library Inquiry is
recommended.

See the course catalog for a complete list of Literature courses.

Bachelor of Liberal Arts Major

The Bachelor of Liberal Arts program is sponsored by the Department of Cultural Studies and offers students in the humanities and
social sciences the opportunity to center their studies on two disciplines in the humanities and social sciences. Resulting in the degree,
Bachelor of Liberal Arts, the program addresses the needs of several sizeable student constituencies. It appeals to students who are
undecided about a major but who know they want a broad-based liberal arts education. Offered only to students in the College of Fine
Arts, Humanities, and Social Sciences, it has become especially attractive to students who plan to attend graduate school in preparation
for teaching at the elementary level, and to those interested in multicultural studies, museum and archival studies, environmental studies,
and positions within nonprofit organizations.

The essential difference between the Bachelor of Liberal Arts program and other programs is the requirement that students take two
disciplinary concentrations of 8 to 10 courses each, and a competency of four courses in an area of skill or cultural interest. Thus, the
degree offers students curricular flexibility and a broad background in the humanities and social sciences. Students must, of course, fulfill
the General Education Requirement and must meet with their BLA advisor for consultation in choosing their courses.

Degree Requirements

The Bachelor of Liberal Arts is a baccalaureate degree program offered only to humanities and social sciences students in the College
of Fine Arts, Humanities, and Social Sciences. The degree consists of the following general requirements:

- A first concentration of 24 to 30 credits is selected according to the student's interests, at least 12 of which must be earned at the
  300 level or above;
- A second concentration of 24 to 30 credits is selected according to the student's interest, at least 12 of which must be earned at
  the 300 level or above;
- A completion of the competency requirement (12 credits);
- An overall GPA of 2.5 is required;
- No minor is permitted, please refer to the BLA concentration;
- The course "Values and Creative Thinking" is not accepted in the BLA program.

In selecting course work for the two concentrations in the Bachelor of Liberal Arts degree program, students are limited to ten courses
from any one disciplinary field. Students should keep this in mind when planning their program of study.

The Competency Requirement:

Students may choose to fulfill either of the following:

a. A foreign language and culture requirement (4 semesters).

b. A practical and technical skills requirement (4 semesters).

c. An intellectual diversity of cultural experience requirement (4 semesters).

View the complete Course of Study (pdf)

For General Education requirements, please visit General Education. For additional information visit Liberal Arts.
Bachelor of Liberal Arts Concentrations

The following Concentrations have been approved for the BLA Program:

- Art History
- Comparative Arts
- Cultural Studies
- Economics
- English/Literature
- Gender Studies
- History
- Languages
- Legal Studies
- Music
- Philosophy
- Political Science
- Psychology
- Sociology
- Theater Arts
- Writing/Journalism

The Concentration in Music

The BLA Concentration in Music affords students who have an interest in music, including those with an interest in performance, the opportunity to deepen their knowledge of music history and music theory. Students may explore the traditions and styles of many musical periods, from Baroque to Contemporary, as well as a variety of genres, including jazz and rock. Students who wish to include performance in their concentration may count up to six credits of ensembles in addition to 24 credits in music theory and music history. Some ensembles on campus may require auditions (please consult the music department for details on ensemble participation).

Requirements:

Complete a minimum of four 300-level or above Music courses.

Complete a minimum of four 200-level Music courses.

For the concentration in Music, students may select from the following courses:

- 71.101 Music Theory 1
- 71.102 Music Theory 2
- 71.110 Basic Music Theory (students may not receive credit for both 71.110 and 71.101 in this concentration
- 74.161 Music of Western Civilization (3)
- 74.261 Music History 1
- 74.262 Music History 2
- 74.301 American Music
- 74.103 Gender Issues in Music
- 74.355 Jazz
- 74.356 American Musical Theatre
- 74.368 History of Rock Music
- 74.463 Music of the Baroque Era
- 74.464 Music of the Classic Era
- 74.465 Music of the Romantic Era
- 74.466 Music of the Twentieth Century

See the course catalog for descriptions of the Music courses.

The Concentration in Philosophy

The BLA Concentration in Philosophy illustrates through courses such as Philosophy and Film, The Goddess in World Religion, and Buddhist and Zen Philosophy how philosophical ideas have influenced other disciplines and how it has been illuminated by the intellectual visions expressed through those disciplines. Serious contact with the discipline of philosophy sharpens critical thinking, clarifies values, and helps to produce articulate, intellectually prepared, and adaptable individuals ready to lead contemporary society in a socially responsible manner.

Requirements:

A minimum of four 300-level or above Philosophy courses.

A minimum of four 200-level Philopsophy courses.

Please refer to the course catalog for a complete list of Philosophy courses.
The Concentration in Political Science

The BLA Concentration in Political Science is designed to provide a knowledge of the nature of politics and government on the local, state, national, and international levels and of the functions and theories of the state. Media and Politics, African Politics, Politics of the Internet, and Legislative Politics are courses that enable the student to develop an understanding of the political process and an ability to analyze political systems, relationships, and problems.

Requirements:

Complete a minimum of four 300-level or above Political Science courses.
Complete a minimum of four 200-level Political Science courses.

Please refer to the course catalog for a complete list of Political Science courses.

The Concentration in Psychology

The BLA Concentration in Psychology acquaints students with scientific methods and studies, and with theoretical foundations in the subfields of psychology (experimental, developmental, community, organizational, social, personality, clinical). Courses in Child and Adolescent Development, Community Psychology, Health Psychology, and Adult Development and Aging emphasize the applications of psychological knowledge and skills in many areas of human functioning.

Requirements:

Completion of a minimum of four 300-level or above Psychology courses.
Completion of a minimum of four 200-level Psychology courses.

Please refer to the course catalog for a complete list of Psychology courses.

The Concentration in Sociology

The BLA Concentration in Sociology offers students the opportunity to understand the nature of social life in our own and other societies, including the relationship of the individual to the social order. Courses encompass such topics as ethnic cultures, the dynamics of social policy, relationships between sexes, the nature of industrial capitalism and the impact of technology on modern society.

Requirements:

Completion of a minimum of four 300-level or above Sociology courses.
Completion of a minimum of four 200-level Sociology courses.

Please refer to the course catalog for a complete list of Sociology courses.

The Concentration in Theater Arts

The BLA Concentration in Theater Arts offers coursework in acting, directing, playwriting, and technical theater, as well as the history of theater and dramatic literature.

Requirements:

Completion of a minimum of four 300-level or above Theater Arts courses.
Completion of a minimum of four 200-level Theater Arts courses.

Please refer to the course catalog for a complete list of Theater Arts courses.

The Concentration in Writing

The BLA Concentration in Writing Students offers courses in journalism and creative writing as well as professional writing. Students take courses in literature and linguistics to create a foundation for their specialized courses in writing such as Writing for Interactive Media, and Newswriting.

Requirements:

Completion of a minimum of four 300-level or above Writing courses.
Completion of a minimum of four 200-level Writing courses. As a foundation for the Writing Concentration, 42.227 or 47.229 Essay Writing for English Majors is required (and is a pre-requisite for upper level writing courses).
Please refer to the course catalog for a complete list of Writing courses.

Bachelor of Liberal Arts

The Bachelor of Liberal Arts (BLA) degree offers students the opportunity to design a personalized program of study in two disciplines based in the College of Fine Arts, Humanities and Social Sciences. The degree appeals to students who value a broad-based liberal arts education, and it is well-suited for students who are considering graduate school or careers in a wide range of fields including education, law, business, journalism, museum sciences, etc.

Students pursuing a BLA degree select 2 concentrations from a list of disciplinary or interdisciplinary concentrations including history, psychology, gender studies, etc., and take a minimum of 8 courses in each concentration. Students must also satisfy a competency requirement by completing 4 courses designated by the student in consultation with the BLA advisor. There is no language requirement for the BLA degree.

The specific degree requirements are:

1. 2 concentrations (48 credits)
   - 8 courses in 2 concentrations for a total of 16 courses
   - At least 4 of the courses (12 credits) in each concentration must be taken at the 300-400 level
2. Competency requirement (12 credits)
   - 4 courses designated by the student in consultation with the BLA advisor
3. A minimum cumulative GPA of 2.20

Students must also fulfill the University's general education requirements.
It is important that students meet regularly with their BLA advisor for consultation in choosing their courses, since each concentration has specific requirements. Each concentration is described in greater detail below.

Approved Concentrations

Humanities Concentrations

- Art History
- History
- Languages
- Literature
- Music
- Philosophy
- Theater Arts
- Writing

Social Sciences Concentrations

- Economics
- Political Science
- Psychology
- Sociology

Interdisciplinary Concentrations

- Asian Studies
- Comparative Arts
- Cultural Studies
- Education
- Environmental Studies
- Gender Studies
- Legal Studies

Competency Requirement

The BLA competency requirement is designed to provide students with the breadth of knowledge and critical thinking skills that define a contemporary liberal arts education. Students must choose 4 courses in consultation with the BLA advisor to fulfill this requirement.

Modern Languages - French Option

The French concentration provides a broad liberal arts education for students interested in developing a proficiency in the French language, a general knowledge of the cultural and literary heritage of French civilization, and a basic insight into the function of verbal symbols in the process of human thought. This concentration provides students with sufficient preparation for a career in language teaching or bilingual education or for business or social-service careers requiring a command of the French language. A student may
combine the French concentration with other supportive studies, thus tailoring an undergraduate program to meet his/her individual career objectives.

The major in Modern Languages - French consists of 36-45 credits (with at least 15 credits at the 300 course level or above) and normally will include a combination of 18 credits in language, 12 in literature courses and three credits in culture courses.

Additional coursework beyond the prescribed courses may be elected from the French offerings to a maximum of 45 credits.

Modern Languages - General

The major in Modern Languages provides varied options for students who are interested in languages, not only from the viewpoint of a possible marketable skill but also as a means of communication with people who speak a language which is different from their own.

A student may combine the Modern Language concentration with other supporting studies, thus tailoring an undergraduate program to meet individual career objectives.

The Modern Language major consists of 36-45 credits above the 100 level (with at least 15 credits at the 300 level or above) and includes a combination of two languages from the list below:

- French
- Spanish and Latin American
- Italian

Students earn 24 credits in one language and 12 credits in the other. They may also elect a program with 18 credits in each language.

Modern Languages - Spanish Option

The Spanish concentration provides a broad liberal arts education for students who are interested in developing a proficiency in the Spanish language, a broad knowledge of the cultural and literary heritage of Spanish and Latin American civilization, and a basic insight into the function of verbal symbols in the process of human thought. This major provides students with sufficient preparation for a career in language teaching and bilingual education and for business and social service careers requiring a command of the Spanish language. Students may combine the Spanish concentration with other supporting studies and may tailor their undergraduate program to meet their individual career objectives.

The major in Modern Languages - Spanish consists of 36-45 credits (with at least 15 credits at the 300 level or above) and normally will include 18 credits in language courses, 15 credits in literature courses, and three credits in cultural courses.

Additional coursework beyond the prescribed courses may be elected from the Spanish offerings to a maximum of 45 credits.

View the [Course of Study](#) (pdf).

Cultural Studies Minors

Modern Language Minors

French

A minor in French consists of 18-24 credits with at least 6 credits at the 300 or 400 level. The four elementary language courses (50.101, 50.102, 50.211 and 50.212) count towards this minor. Typically, French 1 and Culture, French 2 and Culture, French 3 and Culture, French 4 and Culture, plus any two advanced French classes with the 50 prefix (300 level and above) will satisfy the requirements for the French minor.

Spanish

A minor in Spanish consists of 18-24 credits with at least 6 credits at the 300 or 400 level. The four elementary language courses (54.101, 54.102, 54.211 and 54.212) count towards this minor. Typically, Spanish 1 and Culture, Spanish 2 and Culture, Spanish 3 and Culture, Spanish 4 and Culture, plus any two advanced Spanish classes with 54 prefix (300 level and above) will satisfy the requirements for the Spanish minor.

Other Related & Interdisciplinary Minors

For the full list students should refer to the [listing of interdisciplinary minors](#) in the social sciences and humanities.

- Asian Studies (language courses in Cambodian and Chinese available)
- Arabic Studies
- Art History
- Cultural Studies
- Film Studies
- German Studies
- Italian Studies
- Latin American Studies
Modern Languages Major

The Department of Cultural Studies offers an undergraduate major for a Bachelor of Arts in Modern Languages that allows students to choose one of four options: French, Spanish, French/Spanish, or Italian/Spanish. Each option requires specific foundation courses that prepare students for advanced study; students then select specialized courses that complement this core and allow for exploration of individual interests.

The main purpose of the modern language programs is to provide students with the ability to function more effectively in the multicultural world we live in. The courses offer students the opportunity to acquire an ability to use a second language and to become aware of the cultures in which they flourish.

The options focus on the major intellectual concerns, culture and communication. Serving as the paradigmatic model for thinking in the human sciences, language occupies a high rung in the conceptualization of numerous disciplines and sign systems. Language courses offer an understanding of language as a system and a model of communication in its cultural context, in addition to providing skills in a number of languages. The learning of languages facilitates the cultural connection with the various linguistic groups of the region. The specific areas of study include instruction in language, literature, linguistics, civilization and culture.

To graduate, all Modern Language Majors must earn a minimum of 120 credits appropriately distributed:

1. General Education requirements (33-38 credits) which all University students must fulfill;
2. Cultural Studies Department requirements (maximum 45 credits); and
3. Requirements which you must fulfill as a student in the College of Fine Arts, Humanities and Social Sciences. At least 75 credits must be for courses taken outside of the Cultural Studies Department.

Options

View the complete course of study:

- French and Spanish (pdf)
- Italian and Spanish (pdf)
- Spanish (pdf)
- French (pdf)

French and Spanish
The Spanish and French Option consists of 36 to 45 credits comprising a minimum of 15 credits in both languages at the 300 or 400 level. The distribution of the minimum allowed (36 credits) is as follows: for Spanish, 18 credits; for French, 18 credits.

Italian and Spanish
The Spanish and Italian Option consists of 36 to 45 credits comprising a minimum of 15 credits in both languages at the 300 or 400 level. The distribution of the minimum allowed (36 credits) is as follows: for Spanish, 18 credits, including 6 credits in Hispanic (Spanish and Latin-American) Civilization and Culture. For Italian, 18 credits including 6 credits in Italian Civilization and Culture.

Spanish
The Spanish major consists of 36 - 45 credits, with at least 24 credits at the 300 level or above, and normally includes at least 18 credits in language, 12 in literature and 6 in culture courses.

French
The French major consists of 36 - 45 credits, with at least 24 credits at the 300 level or above in French and Francophone literature, civilization and culture courses.

For course descriptions, see the online catalog in iSIS: http://isis.uml.edu. For additional information visit the Department of Cultural Studies or contact us.

Department of Cultural Studies

Degree Programs in Modern Languages

The Department of Cultural Studies offers a Bachelor of Arts in Modern Languages (BA). There are three different options for this Major: Spanish, French/ Spanish and Italian/Spanish. The BA in Modern Languages provides students with the ability to function more effectively in the plurilingual and multicultural world we live in. The courses offer students the opportunity to acquire one or two second language(s) and to become aware of the cultures in which they flourish. Language courses offer an understanding of language as a system and a model of communication in its cultural context, in addition to providing skills in a number of languages. The specific areas of study for this degree include language, literature, civilization and culture. Internships, practicums, as well as many Study Abroad programs are available to help students develop an awareness of cultural diversity.

The Department of Cultural Studies also offers several Minors in languages or in language studies. The extensive list of minors available provide students with significant opportunities to take advantage of the fore mentioned benefits of Modern Languages, while allowing...
students to maintain another degree focus for their major.

Through the College of Fine Arts, Humanities and Social Sciences, students may also pursue an optional interdisciplinary degree, Bachelor of Liberal Arts. While this program is not managed by the Department of Cultural Studies, there are many Bachelor of Liberal Arts concentrations that would provide students with exposure to the department’s course listings. Students are encouraged to research the program for more information.

For more information on test examination options for language credit: College Level Examination Program.

For more information visit Department of Cultural Studies or contact us.

Mission Statement

The UMass Lowell Department of Music strives:

- To create a musical community that values and is rich with cultural, social, and intellectual diversity.
- To give the student an intensive professional education in his or her musical discipline.
- To prepare each student with a strong, integrated foundation in creative musicianship.
- To develop an informed and inquiring mind that enables each graduate to engage the fundamental issues of his or her art and to become an effective cultural leader in their communities.
- To prioritize student success through offering the highest quality music instruction and opportunities for community engagement at an affordable cost.

Music Minor

The following two options are available from the Department of Music toward the satisfaction of a minor in music:

Option #1: Music Theory/Music History & Literature

71.101 Music Theory 1 3 credits
71.102 Music Theory 2 3 credits
Any two (2) of the following: 6 credits
74.368 History of Rock Music (3)
74.463 Music of the Baroque Era (3)
74.464 Music of the Classic Era (3)
74.465 Music of the Romantic Era (3)
74.466 Music of the Twentieth Century (3)
Any one (1) of the following: 3 credits
74.161 Music of Western Civilization (3)
74.261 Music History 1 (3)
74.262 Music History 2 (3)
Any one (1) of the following: 3 credits
74.301 American Music (3)
74.103 Gender Issues in Music (3)
74.355 Jazz (3)
74.356 American Musical Theatre (3)
Total 18 credits

Option #2: Music Theory/Music History & Literature/Performance (Ensembles)

71.110 Basic Music Theory 3 credits
Any two (2) of the following: 6 credits
74.368 History of Rock Music (3)
74.463 Music of the Baroque Era (3)
74.464 Music of the Classic Era (3)
74.465 Music of the Romantic Era (3)
74.466 Music of the Twentieth Century (3)
Any combination of ensembles totaling six (6) credits:
Any one (1) of the following: 3 credits
74.161 Music of Western Civilization (3)
74.261 Music History 1 (3)
74.262 Music History 2 (3)
Total 18 credits
Bachelor of Music Degree

Music majors pursuing the Bachelor of Music degree are preparing for a career in some aspect of the music industry.

The Bachelor of Music degree offers four areas of specialization: Music Performance, Music Business, Sound Recording Technology, and Music Studies (for teacher preparation). Programs combining two areas of specialization, e.g., Sound Recording Technology and Performance, are also possible. A student desiring to pursue such a combined course of study must satisfy the requirements in both areas and should plan to spend extra semesters in residence beyond the normal eight semesters of full-time study required for the successful completion of a program with a single area of specialization.

For additional information visit the Music Department or contact us.

Bachelor of Music requirements:

- General Department Requirements
- Declaration of Major
- Transfer Policies
- Readmission to the Department of Music
- Musicianship Core
- Applied Music
- Panel Evaluations
- Recital Attendance Requirement
- Ensemble Requirements
- Student Recitals

General Department Requirements

In order to qualify for a baccalaureate degree offered in the Department of Music, undergraduates must comply with the University general education requirements, must conform to the requirements of the Department of Music which govern degrees and major studies for such degrees, and must meet the ongoing retention requirements of their major concentrations of specialization. See specific major for curricular requirements and retention information.

Declaration of Major

Music majors are accepted into their intended majors conditionally. They must officially apply to their program of choice. See specific major for requirements and deadlines.

Transfer Policies

A minimum cumulative grade-point average of 2.75 is required for intercollegiate transfer and for transfer from another institution. Additional requirements for admission to specific majors also apply.

Readmission to the Department of Music

Students who have been dismissed from the Department of Music may apply for readmission after one academic year. At that time a minimum grade point average of 3.0 over two semesters of full-time study at another institution or in another major at UMass Lowell is required to demonstrate adequate academic skills have been developed. Should the student’s previous performance also contain difficulties in applied performance studies, sufficient musical achievement must also be demonstrated by a reaudition.

Musicianship Core

All undergraduate music degrees granted at UMass Lowell are Bachelor of Music degrees, which are professional in nature and are accredited by the National Association of Schools of Music. Each program provides a thorough, shared core training as a musician, much of which is concentrated within the first two years of study. This musical training includes courses and experiences in Music History, Ensembles, Applied Instruction (private lessons), Conducting, and Musicianship and Analysis (combines instruction in such areas as theory, arranging, musicological approaches, aural training, keyboard skills, improvisation and composition).

Applied Music

All Bachelor of Music degree students in the Music Studies program must successfully complete eight semesters of applied music (private lessons) on their principal instrument. The performance specialization requires eight semesters of study and a public senior recital. Music Business and Sound Recording Technology students are required to take six semesters of applied music. An evaluation by a faculty panel is required of all full-time undergraduate music students in select semesters (see Panel Evaluations below).

Panel Evaluations
Panel evaluations are periodic departmental exams for Applied Lessons. Every student enrolled in Applied Lessons must take Panel Evaluations during certain designated semesters. Panel Evaluations take place during final exam period.

Every Panel Evaluation will be worth 40% of a student's final grade for the semester. Additionally, students may be required to retake a level of Applied Lessons in the event that they are unable to demonstrate sufficient competence during Panel Evaluations.

Panel Evaluations will be graded by one or more full-time faculty members. The student's applied teacher is encouraged to attend in order to offer invaluable feedback to the student; however, this is not required.

For Music Business and Sound Recording Technology: Students take Panel Evaluations when enrolled in Applied 1, 2, 4 and 6.

For Music Studies: Students take Panel Evaluations when enrolled in Applied 1, 2, 4, 6 and 8.

For Performance: Students take Panel Evaluations when enrolled in Applied 1, and Performance Applied 1, 2, 3, 4, 5 and 6. (A Senior Recital is required in Performance 7 in lieu of a Panel Evaluation.)

**Recital Attendance Requirement**

All undergraduate music majors are required to attend ten concerts and/or recitals each semester from among those listed on the Department of Music Performance Calendar. In addition, attendance at scheduled recital hours on Thursdays is required.

Seven satisfactory semesters of recital attendance are required of each undergraduate student with the following exceptions: 1) students who are in residence fewer than seven semesters and transfer students must fulfill the recital attendance requirement for each semester of residence as full-time matriculated degree students; and 2) part-time students have no requirement.

Failure to complete the total recital attendance requirement will result in denial of graduation.

**Ensemble Requirements**

All Music Studies, Sound Recording Technology and Music Business students must participate a minimum of two credits of ensembles each semester they are full time students. Music Performance majors are required to take two credits of ensembles each semester they are full time lower classmen, and three credits each semester they are full time upper classmen. At least one of these required credits each semester must be taken on the student's major applied instrument. These requirements do not extend beyond eight semesters. For additional information visit the Music Department or contact us.

Participation in some ensembles is by audition only, while others may not require auditions. Auditions for select ensembles are given at the start of the fall semester and select ensemble placement and participation is for the academic year. Auditions for select ensembles may be held during the first week of the spring semester for all new music students, transfers and re-admitted students.

Students entering Fall 2013 or after are required to follow the following outline of specific ensemble credit requirements:

**4 credits from the following Conducted Ensembles:**

1. University Orchestra
2. Wind Ensemble
3. Concert Band
4. Studio Orchestra
5. University Choir
6. Chamber Singers
7. Choral Union

**4 credits from the following Small Ensemble experiences:**

1. Electric Guitar Ensemble
2. Classical Guitar Ensemble
3. Percussion Ensemble
4. Brass Ensemble
5. Piano Ensemble
6. Mixed Chamber Ensemble
7. String Ensemble
8. Small Jazz Ensemble
9. Jazz Lab
10. Opera Workshop

**2 credits from the following ensembles for diversity of experience:**

1. Percussion Ensemble (section designated for non-percussion students)
2. Piano Ensemble (section designated for non-piano students)
3. Guitar Ensemble (section designated for non-guitar students)
4. Contemporary Electronic Ensemble
5. World Music Ensemble
6 credits of free ensemble electives:

These can be chosen from any ensemble offerings, including up to 2 credits of Jazz Rock Big Band and 2 credits of Marching Band. Performance majors are must complete four additional free ensemble credits to fulfill degree requirements.

For additional information on auditions and ensemble requirements, inquire of the course instructor, the ensemble coordinator, visit the Music Department or contact us.

Student Recitals

Students in the performance major are required to present a senior recital while enrolled in Performance Applied 7. Students in other specializations may also present public recitals, but are not required to do so. In all cases, students wishing to present a recital must receive recital permission from the applied music instructor, the appropriate Applied Music Coordinator. A recital permission form may be obtained from the Music office.

Bachelor of Music with Emphasis in Music Business

The Bachelor of Music Business degree program combines extensive training in various aspects of the exciting and ever-changing music industry, with our innovative music performance curriculum. In courses taught by experienced industry professionals, students will focus on a variety of industry sectors such as management, marketing, entrepreneurship, publishing and licensing, record and concert promotion, new media, music products, and arts administration. Our program is designed to prepare students for successful professional careers, whether in long-established pathways, or by developing bold, new ideas and approaches to connecting music to audiences.

Internship

The Internship experience is an important bridge between academic preparation and career development. The student must have completed all required courses and is expected to have acquired the necessary knowledge to be successful in the Music Business Industry. Students undertake an Internship at a professional firm involved in some facet of the Music Industry.

Additional Information

Additional regulations and policies regarding the Internship are available in the Music Business Student Handbook distributed to each student enrolled in the Bachelor of Music with Emphasis in Music Business program.

General Requirements for Retention and Graduation

Minimum grade point requirements must be maintained in order to continue as a Music Business major. At the conclusion of each semester students will input their courses and grade information into the computerized Declaration of Intent to Graduate Form and present the disk and a printed copy along with a transcript to their advisor. Grade point averages and completed course information will be used to select appropriate future courses. The Declaration of Intent to Graduate Form Program will automatically calculate the grade point average for the three areas of concern: Music Courses, Music Business Courses and total Grade Point Average. The minimum grade point requirements are as follows:

- Music Courses - 2.500
- Music Business Courses - 3.000
- Cumulative Grade Point Avg. - 2.500

Students must repeat any Music Business course in which they received a grade less than a C-.

View the complete course of study (pdf)

Bachelor of Music in Performance Requirements

Students wishing to pursue the Bachelor of Music in Performance (Instrumental, Vocal) degree program may apply to the Performance Coordinator and are subject to the following:

Application for Performance Specialization

1. Application is usually made at the end of the first semester;
2. Application forms are available in the Department of Music Office and must be submitted to the Performance Coordinator no later than December 1 for fall auditions, May 1 for spring auditions; and
3. Written recommendations from the applied instructor must also be submitted to the Performance Coordinator by December 1 for fall and May 1 for spring.

Admission Requirements
1. A minimum grade of B is required for each ensemble and applied course;
2. A grade point average of 2.000 must be achieved in all music courses;
3. A minimum of nine music credits are required and must include credit for the following courses:
   1. 72.101 Applied Keyboard 1
   2. 71.108 Musicianship & Analysis 1
   3. 71.103 Aural Skills 1, one semester; and
4. A successful Performance Audition is required.

Retention in Performance Specialization

1. A minimum grade of B is required for each ensemble and performance specialization course;
2. A grade point average of 2.500 must be maintained for all music courses;
3. Continued full-time enrollment in the prescribed curriculum is required;
4. A senior recital is required during the same semester in which the applied music sequence is completed;
5. Performance in the Department of Music recital hour is required during each semester of residency.

Performance Course Tracks

- Instrumental Option (pdf)
- Voice Option (pdf)

Bachelor of Music in Music Studies

Admission Requirements

The Music Studies Program prepares students to enter our Master of Music Education, which qualifies students for Initial Teacher Licensure through the Massachusetts Department of Education. The dual degree program prepares students to enter school teaching professions in music. The two programs require students to specialize in either instrumental or vocal/choral instruction, and both provide general music preparation.

1. Though prospective Music Studies students may take some elective courses for their specialization in the freshman and sophomore years, admission to the program of professional studies requires formal application to the Coordinator of Music Education prior to the junior year but no later than upon completion of 60 credit hours;
2. Prospective music studies students must pass courses in music including Musicianship and Analysis, Conducting, Music History, Applied Music, and Ensembles;
3. Prospective music studies students must pass two semesters of College Writing with a grade of ‘C’ or better; and
4. Prospective music studies students must achieve a cumulative average of 2.750 or better overall and achieve the same cumulative average in the aggregate of music courses.

Retention Requirements

Students must maintain a minimum of 2.750 cumulative averages in all coursework attempted.

Application for Professional Certification

For students seeking teacher certification, a Master of Music Education program that includes music education course work and then student teaching practicum is available at the University. Students may apply to this program immediately following completion of the undergraduate degree program or may seek early admission to the M.M. degree program during their senior year. Completion of the undergraduate program does not automatically lead to acceptance into the Master of Music degree program. Students who perform well in the undergraduate program will, however, be well prepared to meet the standards for admission into the University’s graduate program in Music Education.

Upon completion of the M.M. degree program, students may file an application to the Massachusetts Department of Education for initial certification at the advanced provisional stage. When the application materials are complete, the College of Arts and Sciences recommends the graduate for teaching certification and forwards these materials to the office of the Dean, Graduate School of Education. The School of Education forwards all teacher certification applications to the Massachusetts Department of Education which is solely responsible for granting certification. As of April 1998, candidates for certification will also be required to pass a test of communication and literacy skills and the appropriate subject test (music) before the certificate will be granted. Information on the Massachusetts Educators Certification Tests is available from the Massachusetts Department of Education or from National Evaluation Systems located in Hadley, MA.

Curriculum Options:

- Instrumental Option (pdf)
- Vocal Option (pdf)

Bachelor of Music with Emphasis in Sound Recording Technology

Sound recording technology is one of UMass Lowell's signature programs and is one of the few programs of its kind in the United
States. It provides motivated students with the practical and theoretical background needed for success in the industry. Starting a career in audio recording has traditionally involved training through an informal apprenticeship system. With the rush of new technologies that have revolutionized the recording industry in recent years, and the opportunities that new media are opening up for recording professionals, a higher level of training and education in music, media and technology is now required for any meaningful employment, even at the entry level.

The program’s goal is to produce musically sophisticated and sensitive professionals who have sufficient technical knowledge to excel in today's rapidly changing, technology-based production industry. Successful students’ understanding of the practical and theoretical aspects of the discipline, coupled with comprehensive music training, prepares them for a wide variety of professions. The program combines courses in physics, electrical engineering, computer science and advanced mathematics, with traditional studies in music and at least nine courses in the art and technology of recording.

The program is supported by eight (8) studio/laboratory spaces. Its exceptional recording, editing, critical listening, video, testing, synthesis and multimedia facilities allow the student to become proficient at operating and creatively using a wide variety of equipment and technologies.

The faculty of the SRT program are well-trained educators and active industry professionals, drawn from the wealth of high-technology, broadcasting, recording, and production talent in the greater Boston area, as well as the region's cultural and artistic communities.

The breadth of our SRT major program prepares a musically sophisticated graduate with a broad understanding of the technical aspects of the recording industry. The successful student’s understanding of the practical and theoretical aspects of the discipline, coupled with comprehensive music training, prepares him or her for a wide variety of professions.

Though prospective SRT students enroll in certain specific courses for their specialization in the sophomore year, retention in the program requires an application to the Program Coordinator prior to the junior year. See Sophomore Year Retention below.

View the complete course of study (pdf)

**General Requirements for Retention and Graduation**

1. **Sophomore Year Retention**
   - completion of 71.103, 71.104, & 71.203;
   - a minimum of 2.500 GPA in sound recording technology, mathematics, and physics coursework; and
   - successful completion of Applied 4.
2. **Junior Year Retention**
   - 3.000 GPA in all sound recording technology coursework; and
   - 2.500 GPA in electrical engineering, physics, and mathematics course work.
3. **Graduation Requirements**
   - 2.500 cumulative GPA;
   - 3.000 GPA in all sound recording technology and support courses; and completion of approved senior recording project.

If any of these standards are not met, the student will be suspended from the program and will not be allowed to enroll in courses within the major. SRT students will repeat any Sound Recording Technology course in which they received a grade of D or below; upon receiving a minimum grade of C- or better, the student will be readmitted to the program.

**Sound Recording Technology Internship Policies**

Internships in Sound Recording Technology are governed by the following policies. Specific written authorization of the Coordinator of Sound Recording Technology, given prior to the internship experience, is required for any deviations in these policies.

1. The internship may only be undertaken after the student has successfully completed the courses: 78.410 and 78.411;
2. The student must have a cumulative grade point average of 2.500 or higher and a GPA of 3.000 in Sound Recording Technology and support courses prior to undertaking the internship, to insure that students are academically prepared for the study;
3. Students register for 78.492 Internship Preparation the semester prior to residency, for the purposes of researching and securing the internship;
4. The internship shall be of a period of fifteen weeks. A minimum of twenty hours per week is to be spent at the location of the internship sponsor, working as assigned. It is expected that twenty hours per week will be the norm; additional hours are strongly encouraged, but not required;
5. The student is registered under course 78.493 Internship in Sound Recording Technology for six credit hours. The intern must be registered as a full-time student during the semester of the internship unless by special exemption. If necessary, the student will register for one or two sections of "Directed Studies in SRT" to reach the credit load of a full-time student;
6. The student/intern shall receive no compensation and shall be considered a full-time student undertaking studies with the intern sponsor. The sponsor shall not be held responsible for Workman’s Compensation, Disability Insurance, Unemployment Insurance, and other legal obligations normally assumed for regular employees. The intern shall provide his or her own accident and health insurance;
7. Where circumstances are appropriate, the internship sponsor may arrange to reimburse the intern for housing, board, travel, and incidental expenses, or to pay the intern a stipend; and
8. The student will solicit the internship, and interview with the internship sponsor prior to the beginning of the internship experience. In the event that the SRT program is solicited by a prospective internship sponsor and a student is recommended by the Coordinator of Sound Recording Technology, it remains the student’s responsibility to interview and otherwise arrange for the internship.

**Sound Recording Technology Minor Requirements**
A sound recording technology minor is available for electrical engineering majors in collaboration with the Electrical and Computer Engineering Department.

SRT Minor Curriculum, Electrical Engineering

SRT Minor Curriculum, Computer Science

Music Department

The Department of Music at the University of Massachusetts Lowell offers four undergraduate majors (sound recording technology, music studies (pre-education), performance, and music business) and graduate degrees in music education, music teaching, and sound recording technology. All music majors are professional Bachelor of Music degree programs and require an audition for admission. The Department also offers a five-year dual degree program combining the Bachelor of Music in Music Studies with the Master of Music in Teaching. This program leads to initial teacher licensure.

The Department has 15 full-time faculty and 48 adjunct faculty. Our typical enrollment is approximately 350 undergraduate and 30 graduate students. Durgin Hall, home to the Department, contains a 1200 seat concert hall, a 225 seat Recital Hall, six sound recording technology studios of various types (including world-class tracking and mixing spaces), a music technology laboratory (containing state of the art Apple workstations with MIDI keyboards), two ensemble rehearsal rooms, 30 practice rooms, and numerous classroom spaces.

The Department’s largest program is sound recording technology; it is one of the University’s six “Signature Programs” and a program that has become nationally recognized for the quality of its graduates and faculty. The University was also the first public institution in the United States to offer a music education degree, and continues to be a regional leader in the discipline. Music education/teaching (Music Studies) is the Department’s second largest program.

The Music Business program at the University of Massachusetts Lowell has been in existence since the early 1980’s and was one of the first established in the US. Student enrollment in the program is typically around 70 majors.

Finally, as Lowell is located within easy reach of the culturally-rich Greater Boston area, our Performance program benefits greatly from world class musicians teaching applied music, directing ensembles and teaching seminars, as well as giving master classes and concerts.

For additional information visit the Music Department or contact us.

Philosophy Department

The Philosophy program through its emphasis on critique (its role as a Socratic gadfly) and on the examination of the fundamental issues of human life, meaning and action, links the arts, the sciences, and the humanities. It occupies an integral and essential place in both the College of Arts and Sciences and the University. The Philosophy program illustrates through specific courses how philosophical ideas have influenced other disciplines and how it has been illuminated by the intellectual visions expressed through those disciplines. Serious contact with the discipline of philosophy sharpens critical thinking, clarifies values, and helps to produce articulate, intellectually prepared, and adaptable individuals ready to lead contemporary society in a socially responsible manner.

The Philosophy Department has structured its course offerings so that they appeal to majors and non-majors alike: courses intersect with issues and problems treated in other disciplines, from the natural sciences through engineering to the social sciences and the other humanities. The Department especially emphasizes the interrelationships between different areas of knowledge and also between different areas of existence, both individual and social. It aims to counteract the fragmentation of knowledge that is a mark of modernity. Consequently, the Philosophy courses are designed to appeal to the broadest range of students and to continue philosophy’s traditional role as an indispensable integrator in the University curriculum.

The Department of Philosophy offers a major in Philosophy which leads to the Bachelor of Arts degree. The Department also offers a minor in Philosophy.

Philosophy Major

The Philosophy major is designed to serve the needs of three types of students: 1) those who seek a liberal arts education as a terminal program; 2) those who are preparing for professional graduate schools, e.g., education, law, theology, and medical schools which approve an undergraduate philosophy major; and 3) those who are preparing for graduate work in philosophy. A Philosophy major is of value to all who question the reasons for things as they are, to those who seek a deeper understanding of what they are doing and their purpose for doing it, and to those who recognize the validity of Socrates’ assertion that the “unexamined life is not worth living.” For additional information visit the Philosophy Department or contact us.

Requirements

A major in Philosophy consists of 30-45 credits (with at least 15 credits at the 300 level or above). The Department does not specify particular course work for the major but recommends that the sequence of courses be designed in close consultation with the student’s faculty advisor. Students who plan to go to graduate school are strongly encouraged to take at least two courses in the history of
philosophy. They should also consider a second major in a cognate field, e.g., American Studies, English, French, History, Mathematics, or Political Science.

View the complete course of study (pdf).

**Philosophy & Religious Studies Concentration**

A major in Philosophy with a concentration in Philosophy & Religious Studies requires a minimum of 30 credits and a maximum of 45 credits from courses in the Philosophy Department (of which up to 9 credits may be from the interdisciplinary courses as described below). At least 15 of the credits must be from courses numbered 300 or above. Students must meet the following requirements as well from among their 30-45 credits:

**Required Introductory Courses:**

All students must take 45.296 Introduction to World Religions

And EITHER:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>45.203</td>
<td>Introduction to Ethics</td>
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<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>45.201</td>
<td>Introduction to Philosophy</td>
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</tbody>
</table>

**Philosophy & Religious Studies Electives: Five Courses**

Students must take a minimum of 15 credits from the list of approved Philosophy & Religious Studies courses below, of which up to 9 credits may be from interdisciplinary courses in Philosophy & Religious Studies. Students should choose those courses that are most suitable to their particular interests. Not all of these courses will be offered in a given academic year; students may contact the Chair of Philosophy to determine when a given course will be offered. New courses relevant to Philosophy & Religious Studies may be added to the catalog from time to time; students may contact their advisors to determine whether a new course will count towards the Philosophy & Religious Studies concentration.

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>45.304</td>
<td>God and Philosophy</td>
</tr>
<tr>
<td>45.340</td>
<td>Mysticism: East and West</td>
</tr>
<tr>
<td>45.348</td>
<td>Eastern Philosophy and Religion</td>
</tr>
<tr>
<td>45.350</td>
<td>World Philosophies</td>
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<tr>
<td>45.351</td>
<td>Problem of Evil</td>
</tr>
<tr>
<td>45.357</td>
<td>Science and Religion</td>
</tr>
<tr>
<td>45.371</td>
<td>Buddhist and Zen Philosophy</td>
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<tr>
<td>45.372</td>
<td>Chinese Philosophy</td>
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<tr>
<td>45.373</td>
<td>Arabic and Islamic Philosophy</td>
</tr>
<tr>
<td>45.374</td>
<td>Myth, Ritual and Festival</td>
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</tbody>
</table>

**Interdisciplinary Courses in Philosophy & Religious Studies**

In satisfying the Philosophy & Religious Studies electives requirement, students may also take courses from other departments that are relevant to the Philosophy & Religious Studies concentration. Students may take a maximum of 9 credits from outside philosophy for purposes of credit towards the Philosophy & Religious Studies concentration. Courses currently in the catalog that may count for Philosophy & Religious Studies credit include:

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>48.357</td>
<td>The Sociology of Religion</td>
</tr>
<tr>
<td>42.250</td>
<td>The Bible As Literature</td>
</tr>
<tr>
<td>46.334</td>
<td>Islam and Politics</td>
</tr>
<tr>
<td>46.402</td>
<td>Women In Islam</td>
</tr>
</tbody>
</table>

For courses not on this list that may be relevant, students may consult with the Chair to see if they can count for the Philosophy & Religious Studies concentration.

**Communications and Critical Thinking Option**

The Philosophy Department also offers an interdisciplinary option in "Communications and Critical Thinking" within the Philosophy major, leading to the Bachelor of Arts degree. This program serves students looking to increase their professional options within such fields as publishing, public relations, advertising, sales and marketing, and social services, and who want an interdisciplinary course of study that transcends the confines of traditional programs. The program also provides excellent preparation for further graduate study, above all, in law and business.

Students transferring into the College who wish to major in Philosophy must make individual arrangements with the chairperson of the Department of Philosophy regarding satisfaction of major course requirements.
Philosophy Minor Requirements

A minor area of study consists of 18-24 credits of coursework in Philosophy. At least six credits must be selected from courses which are numbered 300 or above.

Political Science Department

The Political Science Department’s commitment to excellence in undergraduate teaching has yielded an enviable number of graduates successful in law, government, education, communications, and business. The major in Political Science is designed to provide a knowledge of the nature of politics and government on the local, state, national, and international levels and of the functions and theories of the state. The courses enable the student to develop an understanding of the political process and an ability to analyze political systems, relationships, and problems. The major affords excellent preparation for graduate education, law school, public administration, public service, social science teaching and, most importantly, intelligent citizenship.

The Department of Political Science provides a full complement of core courses, and offers its students practica, qualitative and quantitative research methods courses, participation in Model International Organization programs and individualized research opportunities. Opportunities to spend a semester or a summer in Washington, D.C. under the auspices of the Washington Center Internship Program while earning academic credit are also available. Also, arrangements may be made to earn academic credit from universities around the world through study-abroad programs.

The introductory courses for majors strengthen the freshmen experience and create common bonds among students. Core offerings in American Politics and International Relations have been augmented by others on the comparative politics of countries ranging from Europe to Asia to Latin America.

The department also offers specialized courses related to electoral politics, survey research, international political economy, media and political communication, and public policy analysis that are of interest to students in a variety of majors across the university.

In addition to traditional courses in political thought, recent course offerings have included work in feminist political theory, current theoretical conflicts in constitutional interpretation, and Islamic political thought.

Career Opportunities

Many Political Science majors pursue careers in public affairs on the staffs of elected officials, government agencies, public interest groups, or corporate public affairs departments. Journalism, broadcasting, public relations and other communications-related professions have also been of interest to majors. The major also provides good training and skills for other business applications.

As part of the required Practicum, over the years, student majors have pursued internships involving all of these areas. The Department of Political Science receives notice of many significant internship opportunities in governmental and non-governmental settings, often from Department alumni who increasingly hold positions of note and are helpful in facilitating these opportunities. Many majors have also worked on political campaigns and in some instances, have even run for office themselves.

Because many Political Science majors are interested in pursuing careers in the legal field, the Department offers several course opportunities in the legal-political area. In appropriate instances, this may include a practicum course that provides exposure to legal practice. Political Science majors may also elect the interdisciplinary legal studies minor; however, political science courses utilized for the minor may not also be credited to the major, and the number of political science courses taken for the major and minor together may not exceed 45 credits within the minimum 120 credits required for graduation.

Political Science Minor Requirements

Political Science as a minor area of study consists of 18-24 credits of coursework. At least six credits must be taken in coursework at the 300 level or above. Students who desire to make the most effective use of a minor in Political science in pursuing specific career objectives in occupational areas such as law, foreign service, business, management, higher education, and public service should consult with the political science faculty in choosing courses which are most appropriate as preparation for such career objectives.

Political Science Major

Overall credit hour requirement: A major in Political Science consists of at least 36 credits to a maximum of 45 credits. Not counting practicum or 46.301, at least 15 credits must be taken at the 300 course level.

Specific course requirements:

1. 46.101 Intro to American Politics; normally taken fall semester of the freshman year.
2. 46.201 Intro to Political Analysis; this course examines the scope of the discipline and the methods of political analysis, primarily through a study of current policy issues. These include issues of ethical action and diversity, and this course [along with several other Department courses] meets the general education ethics, diversity and information literacy requirements for Political Science Majors. Normally taken spring semester of the freshman year or early in the sophomore year, transfer students should
take it as soon as possible.

3. 46-301 Research Methods in Political Science. This is a course in designing Quantitative Research and Applying Statistics for Political Scientific Research. (46-201 is prerequisite to 46-301.)

4. Practicum Requirement; one 3 credit practicum course which will be graded “satisfactory” or “unsatisfactory”. Take either 46.496 Practicum Experience, or 46.497 Practicum in the Law. The practicum involves 75-100 hours of practical experience in politics, law, government, etc. Normally no student may take more than one practicum as part if the minimum 120 credits required for graduation.

5. Seminar Requirement; Typically students should select a "300" or "400" level "Seminar" course from among several designated Departmental offerings that are of interest, all of which require substantial writing. In the alternative (or in appropriate cases, in addition) the student may select 46-401 Research Seminar in Political Science after prior discussion with a professor willing to work with the student. This course, which is particularly appropriate for "honors" students, requires the writing of a substantial research paper. [This requirement also fulfills the general education "capstone" self-direction and collaboration requirement.]

Distribution Requirements

All students must take at least 2 courses at any level in the 3 following areas:

- American Politics, Government and Policy
- Law, Theory/Thought, and Methods
- Comparative and International Politics.

Appropriate courses may be suitable for attribution to more than one area but any particular course may be counted by the student in one area only.

Focus requirement: In conjunction with a faculty advisor, political science majors are encouraged to formulate a program of study in the major that includes three to five courses that focus in a progressively more advanced manner upon one political science sub-area to assure a depth of knowledge. Sub-areas may be defined flexibly.

General Education Departmental Requirements

Ethics Requirement: Political Analysis or any of several additional courses with the ethics designation

Diversity Requirement: Political Analysis or any of several additional courses with the diversity designation

Information Literacy Requirement: Political Analysis and most other department courses

Self-direction and Collaboration Requirement: Seminar Requirement/Practicum

Waiver of any requirement may be granted only by the Department Chair in unusual circumstances and for very good reasons.

The Department recommends that Political Science majors select supporting coursework from history, sociology, and economics, and encourages students to develop minor areas of study or supporting majors in related social science disciplines.

Students transferring to the college and wishing to major in Political Science must make individual arrangements with their faculty advisor or the Department Chairperson regarding satisfaction of major course requirements.

Disability Studies Minor

People with disabilities (mental retardation, chronic mental illness, chronic physical disabilities resulting from both congenital and acquired injuries and diseases, autistic disorders, etc.) are among the most under-represented and under-served populations in the United States today.

This minor will offer students a unique opportunity to develop a richer understanding of what it means to live with a disability in the context of contemporary American society. The minor is anchored by a foundation of courses in Psychology, English and Sociology, and it also has a number of electives that allow students to see the links between disabilities and other diverse and marginalized groups (e.g., women, minorities) and to incorporate multiple perspectives (historical, political, economic, ethical).

Requirements

The Disability Studies minor is open to all undergraduates and consists of an interdisciplinary program of 18-24 credits of required and elective courses.

Required Course

| 47/59.363 | Introduction to Disability Studies (also available on-line) |

Select three courses from these six choices

| 42.258   | Disability in Literature (AH) |
| 47.362   | Psychology of Developmental Disabilities |
| 48.225   | Sociology of Disability |
Choose between 2-4 elective courses to reach 18-24 credits in the minor:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.579</td>
<td>Disability Outcomes and Interventions</td>
</tr>
<tr>
<td>30.309</td>
<td>Universal Design in Health Promotion</td>
</tr>
<tr>
<td>30.320</td>
<td>Legal Issues in Nursing</td>
</tr>
<tr>
<td>31.201</td>
<td>Community Health &amp; Environment</td>
</tr>
<tr>
<td>34.510</td>
<td>Models and Measurement of Disability</td>
</tr>
<tr>
<td>38.315</td>
<td>Kinesiology (PT majors only)</td>
</tr>
<tr>
<td>44.546</td>
<td>Mental Health &amp; Criminal Justice</td>
</tr>
<tr>
<td>46.218</td>
<td>Introduction to Politics and Sports</td>
</tr>
<tr>
<td>46.237</td>
<td>Civil Liberties Law and Politics</td>
</tr>
<tr>
<td>46.347</td>
<td>Civil Liberties and Civil Rights</td>
</tr>
<tr>
<td>47.272</td>
<td>Abnormal Psychology (SS)</td>
</tr>
<tr>
<td>47.335</td>
<td>Psychology and Women (SSD)</td>
</tr>
<tr>
<td>47.361</td>
<td>Developmental Psychopathology</td>
</tr>
<tr>
<td>47.365</td>
<td>Psychology of Language</td>
</tr>
<tr>
<td>47.561</td>
<td>Introduction to Behavioral Intervention in Autism</td>
</tr>
<tr>
<td>48.234</td>
<td>The Study of Minorities</td>
</tr>
<tr>
<td>48.240</td>
<td>Sociology of Gender</td>
</tr>
<tr>
<td>48.255</td>
<td>Sociology of Deviance (SS)</td>
</tr>
<tr>
<td>48.405</td>
<td>Feminist Methodologies</td>
</tr>
<tr>
<td>49.305</td>
<td>Women, Minorities and Immigrants in the Labor Force</td>
</tr>
<tr>
<td>57.220</td>
<td>Designing the Future World</td>
</tr>
<tr>
<td>57.353</td>
<td>Managing Workforce Diversity</td>
</tr>
</tbody>
</table>

Notes:

1. Any of the core courses can be used as electives instead of core courses as long as the student has at least three of the core courses.
2. Students cannot use more than 9 credits in Psychology courses towards the minor.
3. 500-level courses only by permission of instructor.
4. Directed Study, Community Service Learning, and Independent Study courses may also be considered as electives in consultation with the coordinator of the minor.

Students who seek further information are urged to consult with the Coordinator - Ashleigh Hillier, Ph.D, Health and Social Sciences Building, Room 301.

Specialization in Developmental Disabilities

The Department of Psychology offers students an opportunity to specialize in Developmental Disabilities. Students who specialize in Developmental Disabilities will complete 47.101, General Psychology; 47.260, Child and Adolescent Development; 47.312, Learning and Behavior; 47.362, Psychology of Developmental Disabilities or 47.363 or 59.363, Introduction to Disability Studies; 47.480 or 59.480, Integrative Fieldwork in Developmental Disabilities I; and 47.481 or 59.481, Integrative Fieldwork in Developmental Disabilities II.

The Developmental Disabilities Specialization is available as part of the Psychology Major, the Psychology Concentration for a BLA, and the Psychology Minor.

Students who seek further information about this specialization are urged to consult with the Coordinator - Dr. Ashleigh Hillier
E-mail: Ashleigh_Hillier@uml.edu
Room: Health and Social Sciences Building 301

Course Listing Disability Studies

Psychology Minor

A minor in psychology consists of 18 to 24 credits of psychology courses.

At least six of these credits must be at the 300 level or above.

Learn more about the Disability Studies Minor.
Psychology Major Requirements

1. 47.101 General Psychology (3 credits)
2. One course in each of the following four sub-fields of Psychology (12 credits):
   - Developmental Psychology
     47.260 Child & Adolescent Development
   - Individual Differences
     47.232 Psychology of Personality; or
     47.272 Abnormal Psychology
   - The Social Context
     47.209 Social Psychology; or
     47.255 Community Psychology
   - Basic Processes
     47.273 Brain, Mind & Behavior; or
     47.276 Theories of Learning; or
     47.277 Sensation and Perception; or
     47.278 Cognitive Psychology
3. Each of the following courses (9 credits):
   1. 47.269 Research I: Basics (Must earn grade of C or higher)
   2. 47.369 Research II: Statistics
   3. 47.375 Research III: Laboratory
4. One Advanced Psychology Seminar (3 credits)
   1. 47.472 Seminar: Personality
   2. 47.473 Seminar: Social Psychology
   3. 47.474 Seminar: Developmental Psychology
   4. 47.475 Seminar: Clinical Psychology
   5. 47.476 Seminar: Experimental Psychology
   6. 47.477 Seminar: Contemporary Trends in Psychology
5. One 400-level or above Psychology elective (3 credits)
6. Two 300 or higher level Psychology electives (6 credits)
7. Students have the option of taking three additional Psychology courses (0-9 credits)

View the complete course of study (pdf).

Diversity General Education requirement is met by taking 47.209 or 47.255.
Ethics General Education requirement is met by taking 47.269 and 47.375.

Students in the Psychology major are required to demonstrate intermediate level proficiency in a foreign language.

Psychology cumulative grade point average must be a minimum of 2.20 in order to graduate.

Students transferring to the University and wishing to major in Psychology need to contact the Chair of the Department regarding satisfaction of major requirements. In addition, students wishing to change their major from another college or department at the University of Massachusetts Lowell must have a minimum of 2.20 cumulative average.

For more information visit the Psychology Department or contact us.

Psychology Department

The Psychology Department is one of the largest and most active departments in the College and is an especially popular program for those interested in the social sciences. The faculty represents a blend of clinical, developmental, community, and experimental orientations. There is considerable interest in the application of psychological theory and research to global and community issues. The Department offers a major which leads to the Bachelor of Arts degree and also offers a Psychology Minor, an Interdisciplinary Disability Studies Minor, and a Specialization in Developmental Disabilities.

The Basis for Many Graduate Programs

The Psychology major augments the general liberal arts education and provides the basis for graduate training and careers in mental health, community development, education, research and business and industry. The Psychology curriculum emphasizes the importance of scientific methods and provides students with hands-on experience in designing and conducting their own research. It also acquaints students with the theoretical and empirical foundations of the major subfields of psychology (human development, basic processes, the social context, and individual differences). It also emphasizes the applications of psychological knowledge and skills in many areas of human functioning.
Get Involved, Get Ahead!

Students are encouraged to become involved in University and community programs and in supervised independent research. Each year the Department offers special awards to graduating seniors who have made outstanding achievements in scholarship, research, community service and leadership. In addition, the department is a member of Psi Chi, the International Honor Society in Psychology and holds an annual induction ceremony to honor new members.

The Psychology Department also offers a Master of Arts in Community and Social Psychology and Master of Science in Autism Studies.

Psychology Department Chairperson:
Richard Siegel, Ph.D.
Health and Social Sciences Building (HSS) - Room 301

Sociology Minor Requirements

A minor area of study consists of 18-24 credits of coursework in sociology. At least six credits must be taken in coursework at the 300 level or above.

Sociology Major Requirements

Sociology majors must fulfill the following requirements:

- 48.101 Introduction to Sociology or 48.102 Introduction to Social Anthropology
- 48.321 Social Theory I
- 48.322 Social Theory II
- 48.402 Sociological Research I
- 48.403 Sociological Research II
- 48.4xx One other 400 level course excluding 48.496 Practicum

In addition, majors must complete at least 6 credits (two department courses) at the 300 level or above.

Between 12 and 21 credits (four to seven courses) in sociology may be completed at any level.

The maximum number of directed studies, theses and/or practica is 12 credits.

View the complete course of study (pdf).

Language Requirement

Sociology majors are required to evidence intermediate language proficiency and must satisfy this requirement by conforming to the guidelines outlined in the appropriate section of this document.

Note: Courses taken to satisfy the language requirement cannot be used to fulfill University General Education Requirements.

Unrestricted General Electives

Within the guidelines outlined in the appropriate section of this document, Sociology majors are required to complete their minimum total credit requirements for the degree in sociology (120 credits) by electing courses in other university academic departments.

Thesis Option

This involves advanced reading, research and analysis in selected topics in sociology. Students taking this option are strongly advised to do so in the fall semester of the senior year. No more than six credits can be taken for thesis. There will be two readers for the thesis, one of who will be the thesis advisor. Students will be asked to defend the thesis.

Transfer Students

Students transferring to the College and wishing to major in Sociology must make individual arrangements with the Department Chairperson regarding satisfaction of major course requirements.

For more information visit the Sociology Department or contact us.

Sociology

The Department of Sociology, through excellence in teaching, research, and service, seeks to contribute to a rigorous, scientific understanding of society that will serve as a powerful resource for strengthening citizenship and communities. It is dedicated to providing an environment in which students gain the skills to think critically and to contribute to social justice and community building through their academic and professional work.

The study of sociology focuses on the social institutions that comprise various types of societies and the interaction between these entities. It is a diverse and complex field that spans many relevant contemporary social topics and can prepare students for careers...
The major in sociology offers students the opportunity to understand the nature of social life in our own and other societies. It provides a unique perspective from which to gain a systematic view of material in a large number of fields. Courses encompass such topics as ethnic cultures, the dynamics of social policy, relationships between sexes, the nature of industrial capitalism and the impact of technology on modern society. Students are encouraged to do work in the Lowell area as part of the sociology program.

A prevalent value within the Sociology Department is the search for meaningful social change. Students who are interested in working in human services, personnel management, urban planning, elder services, communications, law, teaching or full-time academic work might consider a major in sociology.

The Department of Sociology offers a major leading to the BA degree and a minor area of studies.

College Facilities

Special Facilities

Special facilities of the UMass Lowell College of Fine Arts, Humanities and Social Sciences include two art galleries, two concert halls, a theater, sound recording technology studios, and graphics design laboratories. The College also houses computer laboratories, music practice rooms, and specialized art studios.

Departmental Facilities

The faculty offices, including those of department chairpersons, are housed in the following locations:

On North Campus:

<table>
<thead>
<tr>
<th>Department</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics</td>
<td>Falmouth Hall</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Olney Hall</td>
</tr>
</tbody>
</table>

On South Campus:

<table>
<thead>
<tr>
<th>Department</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td>McGauvran Hall</td>
</tr>
<tr>
<td>Criminology &amp; Justice Studies</td>
<td>Mahoney Hall</td>
</tr>
<tr>
<td>Cultural Studies</td>
<td>Coburn Hall</td>
</tr>
<tr>
<td>English</td>
<td>O'Leary Library</td>
</tr>
<tr>
<td>History</td>
<td>Coburn Hall</td>
</tr>
<tr>
<td>Music</td>
<td>Durgin Hall</td>
</tr>
<tr>
<td>Political Science</td>
<td>Coburn Hall</td>
</tr>
<tr>
<td>Psychology</td>
<td>Mahoney Hall</td>
</tr>
<tr>
<td>Econ. &amp; Soc. Dev. Regions</td>
<td>O'Leary Library</td>
</tr>
<tr>
<td>Sociology</td>
<td>Coburn Hall</td>
</tr>
</tbody>
</table>

Honor & Professional Societies

Within the College of Fine Arts, Humanities and Social Sciences, several departments host chapters of national honor societies in their disciplines. These honor societies encourage and acknowledge high achievement by students. Departments hosting honor or professional societies include:

- Academy of Criminal Justice Sciences
- Alpha Kappa Delta (Sociology)
- Gamma Kappa Alpha (National Italian Honor Society)
- Phi Alpha Theta (History)
- Pi Kappa Lambda (Music)
- Psi Chi (Psychology)
- Sigma Delta Pi (National Spanish Honor Society)
- Sigma Tau Delta (English)

General Policies

To qualify for University degrees, baccalaureate candidates are required to obtain a 2.00 (C) average in their total course of study (the School of Criminology & Justice Studies requires a 2.2 cumulative average overall and a 2.5 average in criminal justice courses); to complete a minimum of 120 semester credits; to fulfill the minimum residency requirement designated for University day courses and for each major; to satisfy the regulations and academic standards of the colleges that exercise jurisdiction over the degrees for which they are matriculating; to complete all curriculum requirements and minimum averages in majors specified by the college in which they are enrolled and department(s) in which they are majoring; and to complete the University general education requirements.
Options for second majors and minor studies are permitted as specified below:

1. Students may elect a second major that is offered by the College of Fine Arts, Humanities & Social Sciences or, upon approval of the Dean, they may elect a second major that is offered by other colleges of the University. An English major may not declare a second major in American Studies, and an American Studies major may not choose a second major in English, history, political science, or sociology.

2. Students who elect academic majors in more than one college are candidates for one degree only, and they are considered to be degree candidates in the college of their initial major unless they indicate to the contrary at the time they make a declaration of second major by filing for intercollegiate transfer. Accordingly, a student who pursues academic majors in the College of Fine Arts, Humanities & Social Sciences and another college is subject to all degree requirements as specified by the college of his or her initial major and is subject only to major course requirements (including any collateral and prerequisite courses for the major) as specified by the department of his or her second major. For a full discussion of University requirements concerning second majors, students should consult the relevant section of this publication, which appears under the heading Academic Policies.

3. In accordance with the requirements of established minor programs, students who matriculate for degrees in the College of Fine Arts, Humanities & Social Sciences may undertake a minor from those areas cited below that are distinct from the disciplines comprising their majors. The curriculum committee of the College will from time to time review and, when appropriate, approve new minors in addition to those listed below. Students should consult with their advisors concerning additions to the approved listing of minors. Specific options for minor programs will depend on the major field that a student has elected to pursue and the collateral course requirements that have been specified by their major departments. Students are advised that an aggregation of courses that total 18 or more credits does not constitute a minor area and they are referred to University policies, which appear elsewhere in this publication under the heading Academic Policies: Minor Area Requirements for further discussion. Students who wish to elect a minor program in colleges other than the College of Fine Arts, Humanities & Social Sciences should refer to the appropriate section of this publication concerning prerequisites, restrictions, and prescribed sequences of courses.

4. With the approval of their faculty advisors, matriculating students in the College of Fine Arts, Humanities & Social Sciences may develop programs of elective courses for the purpose of providing greater personal and professional relevance to their major fields. Such programs may be developed from among those disciplines that are listed above as areas in which elective courses may be authorized for matriculating students of the College of Fine Arts, Humanities & Social Sciences.

5. Matriculating students in the College of Fine Arts, Humanities & Social Sciences who do not choose to take a second major or a minor must present at least six semester credits in courses that are on or above the “300” level among those elective courses offered in fulfillment of collateral degree requirements. These courses may not be taken on a pass/fail basis.

Declaring and Changing Major

Students who are matriculating for degrees in the College of Fine Arts, Humanities & Social Sciences are required to designate degree majors in the college. Although the College of Fine Arts, Humanities & Social Sciences does not require students pursuing the Bachelor of Arts degree in the humanities and social sciences to declare their major fields until the end of their sophomore year, students who are admitted to Fine Arts programs are advised to declare their major fields during their freshman year and are required to make such declaration at the end of the sophomore year. Students should consult policies listed elsewhere in this publication under the heading Academic Policies: Major Field Requirements for a complete discussion of declaration of major, declaration of second major, and change of major with intercollegiate transfer.

Transfer Policies

Students transferring to the College of Fine Arts, Humanities & Social Sciences from other colleges of the University or from other institutions may expect recognition of previously completed college level courses that are applicable to the degree requirements of the college. Courses of a professional nature that are not relevant to the academic orientation of the student’s major program may not be credited to the minimum degree requirement of 120 credits, and, regardless of any previous recognition by the Office of Admissions or by other colleges of the University, they may not be credited to degree requirements in the College of Fine Arts, Humanities & Social Sciences. Students wishing to transfer to Bachelor of Music programs are required to demonstrate their vocal or instrumental ability during an audition before the music faculty and are required to complete placement testing in music theory.

Courses from Other Institutions
Repetition of Transfer Courses

A student who has been granted transfer credit, and on this basis has been assigned to advanced courses for which the transferred course is a prerequisite, may be advised to repeat such transferred work at the University or to take a more elementary course than that which has been transferred when the competence of the student has been demonstrably inadequate. Permission to repeat the transferred course is granted by filing an academic petition form through the office of the college dean. Since credit may not be granted more than once for the completion of any course, a condition for filing such a petition is the simultaneous filing of a request to revoke recognition of the previously transferred course.

Intercollegiate Transfer to the College of Arts and Sciences

Students wishing to transfer from another college of the University or from baccalaureate continuing education programs of the evening school must file an academic petition, together with a transcript, with the appropriate chairperson and the Dean of Fine Arts, Humanities and Social Sciences by November 1 for spring semester transfer and by April 1 for fall semester transfer. Students are referred to University policies concerning intercollegiate transfers, which appear elsewhere in this publication under the heading Academic Policies: Change of Major with Intercollegiate Transfer for further procedural details. Records of students who are approved for transfer are reviewed by the Office of the Deans of the College of Fine Arts, Humanities & Social Sciences and, irrespective of grades previously received in other college programs, all courses that may not be applied to college or program requirements are deleted from the student’s cumulative grade-point average.

Pre-Professional Training

The curricula for the Bachelor of Arts and the Bachelor of Science degrees do not prescribe patterns of courses for specific vocational goals. The students in these programs receive a broad general education in the liberal arts and sciences that will prepare them for further study in professional fields at the graduate level. Students planning to enter professional fields should seek the advice of faculty advisors in the area in which they are interested, as listed below.

Pre-Law Advising and Programs

Law schools do not require any particular undergraduate degree or program when admitting students. The American Bar Association, in fact, recommends that students prepare for law school by taking a variety of courses in the social sciences and humanities, and even the sciences and mathematics. Students, of course, can take courses in law-related subjects as part of their overall general education, but law schools do not give it any additional weight. Law schools do, however, give weight to students who challenge themselves with difficult curriculum choices. Students interested in law school following graduation from the University should consult with one of the University pre-law advisors. Dr. Francis Talty, Assistant Dean in the College of Fine arts, Humanities and Social Sciences, serves as principal Pre-law Advisor for the University of Massachusetts Lowell (francis_talty@uml.edu). Legal Studies lecturer Walter Toomey, also serves as a pre-law advisor (walter_toomey@uml.edu). A student run Pre-law Society provides an extracurricular activity for students interested in the law. The Pre-law Society conducts information sessions, forums on various aspects of the law and legal occupations as well as sponsoring the UMass Lowell Mock Trial Team which competes in the American Mock Trial Association tournament each winter and a number of other invitational tournaments.

Medical/Dental School Requirements

The Council and Association of American Medical Colleges have established minimum requirements for admission to an approved medical school. These include general and organic chemistry, biology, physics, and mathematics. These are minimums and many medical colleges require course work beyond the minimum. For this reason, it is imperative that a pre-medical student plan his or her college program in close consultation with the faculty advisor for pre-medical students. The advisor for pre-medical students is located in the Department of Biological Sciences, Olsen Hall 604.

Most medical and dental schools prefer a broad, liberal education in addition to specific course requirements. They do not advocate a particular major or majors and the field of concentration is not a determining factor in admission as long as the specified course requirements are met. Many pre-medical students will major in biology or chemistry, but a major in the areas of humanities and social sciences allows sufficient electives to meet the requirements of most schools. Medical and dental schools require an aptitude examination, which is ordinarily taken in the spring semester of the junior year.

Teaching Careers

The Department of Music offers an undergraduate concentration in music studies for teacher preparation and the degree of Master of Music in Teaching, leading to initial licensure for teaching music in the Massachusetts public schools. More information about this program is available from Dr. Gena Greher or Dr. Alex Ruthmann in the Department of Music.
For those students interested in teaching subjects other than music, the Graduate School of Education offers graduate degree programs designed to prepare elementary and secondary school teachers. These programs provide the course work and the apprentice teaching experience required for initial licensure in Massachusetts and in many other states. See the Graduate Catalog, the Graduate School of Education web site, or the Office of the Dean, Graduate School of Education, for programs and the requirements for admission.

**Programs in Fine Arts**

The College of Fine Arts, Humanities, and Social Sciences offers programs in art and music to prepare students for careers as professional artists and musicians as well as to prepare them for graduate studies, including graduate study in music education. Undergraduates may choose one of two professional degrees: the Bachelor of Fine Arts offered by the Art Department, or the Bachelor of Music offered by the Music Department. All degree programs in the fine arts are approved by their national accrediting agencies.

**Bachelor of Fine Arts Degree**

Within the Bachelor of Fine Arts degree program, students may choose one of two program options:

- Fine Arts
- Design

Students seeking the Bachelor of Fine Arts Degree must earn cumulative overall GPA of 2.000 and a cumulative 2.500 for all courses in art and art history.

**Bachelor of Music Degree**

The Bachelor of Music degree program offers four areas of specialization:

- Music Performance
- Music Business
- Music Studies
- Sound Recording Technology

Programs combining two areas of specialization, e.g., music business/performance, are possible. A student desiring to pursue such a combined course of study must satisfy the requirements in both areas.

An entrance audition is required for admittance to all degree programs offered by the Music Department. All students in the Bachelor of Music programs are performing musicians, studying either voice or their chosen instrument.

Students pursuing the specialization in Music Business must earn a cumulative overall GPA of 2.500. Students in Music Studies must maintain a 2.750 GPA for all coursework. Students in Performance must maintain a 2.500 GPA for all music courses and a minimum grade of B is required for each ensemble and performance specialization course. To graduate with a specialization in Sound Recording Technology, a student must have a 2.500 cumulative GPA and a 3.000 GPA in all sound recording technology and support courses.

**Language Proficiency**

Vocal performance majors are required to complete two consecutive semesters of the same foreign language.

**College Requirements for Fine Art Students**

Undergraduates in fine arts programs must comply with the University General Education requirements and must conform to the requirements of the College which govern degrees and major studies for such degrees.

Students who have failed to achieve at least a 2.000 average in their major field or other specific, stated retention standards of their specialization by the end of the junior year and who have not made satisfactory progress toward their degrees may be placed on probationary status in the College or be dismissed from the University for inadequate scholarship.

**Programs in the Humanities and Social Sciences**

The humanities and social sciences departments offer undergraduate programs leading to the degree of Bachelor of Arts, Bachelor of Science, and Bachelor of Liberal Arts.

**Language Proficiency Requirement**

**College Requirements**

**Bachelor of Arts Degree**

Curricula leading to the Bachelor of Arts degree provide a broad, comprehensive education with many options for developing major and minor programs. Bachelor of Arts degree programs require completion of a major within the college and (except as specified by policies concerning second majors) a minimum of 75 credits outside the major field. The
following is a list of major fields in which the Bachelor of Arts degree is offered in the Humanities and Social Sciences.

- American Studies
- Economics
- English
  - Literature
  - Creative Writing
  - Journalism & Professional Writing
  - Theatre Arts
- History
  - Art History
- Modern Languages
- Philosophy
  - Communications and Critical Thinking Option
- Political Science
- Psychology
- Sociology

Language Proficiency Requirement

Students enrolled in Bachelor of Arts programs in the social sciences and humanities (with the exception of Economics) are required to demonstrate intermediate level proficiency in a foreign language. This requirement may be fulfilled by meeting one of the options listed at Academic Policies: Language Requirement. Students with documented learning disabilities may be allowed to fulfill the language requirement through an alternate set of courses. Such students should file appropriate documentation with the office of Disability Services, at which time they will receive information on their alternative requirement.

Students who wish to present official evidence of language proficiency for purposes of employment or application to graduate schools should consult policies noted under the heading Academic Policies: Language Requirement for a listing of avenues by which certification of language proficiency may be pursued.

Bachelor of Science Degree

The Bachelor of Science degree provides students with specialized training. All Bachelor of Science degree programs require completion of a major within the college and a minimum of 60 credits outside the major field. The only major field in which the BS degree is currently offered in the Humanities and Social Sciences is Criminal Justice. In order to receive a degree in criminal justice the department requires that students have a 2.2 cumulative average overall and a 2.5 average in Criminal Justice courses.

Bachelor of Liberal Arts Degree

Students pursuing the Bachelor of Liberal Arts Degree take two disciplinary or interdisciplinary concentrations of 8 to 10 courses each. The degree offers students curricular flexibility and a broad background in the humanities and social sciences. Specific degree requirements are:

1. A total of 48 to 60 credit hours in the Humanities and Social Sciences, distributed as follows: two (2) concentrations of 8 to 10 courses (24-30 credit hours) each, with at least four of the courses in each concentration at or above the 300 level.

2. Students also must choose to fulfill one of the following:
   a. A foreign language and culture requirement (4 courses)
   b. A practical and technical skills requirement (4 courses)
   c. An intellectual diversity and cultural experience requirement (4 courses).

3. Students must earn a cumulative GPA of 2.5

Minors are not permitted in the BLA program.

The following concentrations have been approved for the Bachelor of Liberal Arts Degree:

- Art History
- Comparative Arts
- Cultural Studies
- Economics
- English/Literature
- Gender Studies
- History
- Languages
- Legal Studies
- Music
College Requirements for Humanities and Social Science Students

In order to qualify for a baccalaureate degree offered by the College of Fine Arts, Humanities and Social Sciences, each undergraduate in the social sciences and humanities must comply with the University’s general education requirements, and must conform to the rules of the College that govern degrees and major studies for such degrees.

A student seeking the Bachelor of Arts degree must earn a minimum 2.200 average in his or her major(s) area by the end of the senior year.

A student seeking the Bachelor of Science degree must earn a minimum overall GPA of 2.200 and a minimum of 2.500 in Criminal Justice.

A student seeking the bachelor of Liberal Arts degree must earn an overall minimum GPA of 2.500.

Students who have failed to achieve a 2.000 average in their major(s) by the end of the junior year (typically 27 hours in the major of 89 hours undertaken by the end of the junior year) have not made satisfactory progress toward their degrees, and upon the recommendation of appropriate departmental committees and the concurrence of the Dean, such students may be placed on probationary status within the college or dismissed from the University for inadequate scholarship.

College of Fine Arts, Humanities & Social Sciences

UMass Lowell's College of Fine Arts, Humanities, and Social Sciences (FAHSS), led by Dr. Luis Falcón, presents students with exciting opportunities to explore, discover and grow through research, community engagement, and interaction with dynamic faculty who are experts in their fields. The College of Fine Arts, Humanities and Social Sciences also offers Master of Arts, Master of Science, Master of Music and Doctoral programs.

Art Department

It is the purpose and mission of the Art Department at the University of Massachusetts Lowell to welcome high school and transfer students of emerging and/or promising artistic talent into a rigorous, career-driven, humanities-inspired four-year program of studio art and art-based academic studies. Throughout history as we know it, the finest expression of human culture and scientific knowledge has been made manifest through works of art. It is through art that society not only communicates, but also celebrates its desire for goodness, beauty, and understanding. To this end, a dedicated and long-associated team of professionally practicing art professors, along with their colleagues in computer science, literature, philosophy, music, history and the social sciences, seeks to provide students with the instructional training, academic guidance and professional expertise necessary to lead successful and enlightened lives as visual artists and designers in the career-dominated, visually-oriented, and increasingly competitive global world of the 21st century.
European Summer Program
Art Department Policies

Clinical Science Option

Bachelors of Science in Clinical Laboratory Sciences: Clinical Science Option

By integrating their clinical and non-clinical experiences, graduates of the Clinical Science option are prepared for graduate studies and/or for industrial or government employment as research scientists, technical sales and service representatives, product development personnel, instrument designers and other related fields associated with medical diagnostics. These students pursue a core of courses similar to students electing the medical laboratory science option, but substitute additional didactic, laboratory and/or experiential opportunities. While this option is not structured to prepare graduates for certification as medical laboratory scientists, it does provide them with an opportunity to specialize in subject areas related to clinical laboratory science.

Mission

The curriculum of the Clinical Science option prepares students with life long career skills in the biomedical sciences. Graduates of this program are prepared for careers as biomedical and biotechnical research scientists, clinical trial coordinators, pharmaceutical and forensic scientists as well as positions in the growing biomedical device industry.

Students take a core of laboratory science courses in Clinical Chemistry, Clinical Hematology, Clinical Immunology, Clinical Microbiology and laboratory specialization electives. Through Directed Study and Senior Research courses, students work with department faculty to gain skills in both library and clinical laboratory research.

Students will develop skills and knowledge required for success in advanced degree programs, including critical and independent thinking, research design, normal and pathophysiology, analytical method evaluation and scientific literature assessment.

In-depth experience with laboratory instrumentation is provided. Students can elect to be involved in research projects at various clinical institutions affiliated with the department. Many students have presented their research results at state, regional and national science meetings and have been co-authors of papers published in respected science journals. The academic program includes scientific and clinical knowledge using current methodology, instrumentation and techniques relevant to the biomedical laboratory. Qualified students can elect to enroll in the five-year BS/MS program and take graduate courses in their senior year that will count toward the master's degree.

View the complete course of study (pdf).

Entry Level Competencies

In accordance with NAACLS, after completion of this program, the Clinical Laboratory Scientist/Medical Technologist will be able to:

1. develop and establish procedures for collecting, processing, and analyzing biological specimens and other substances;
2. perform analytical tests of body fluids, cells, and other substances;
3. integrate and relate data generated by the various clinical laboratory departments (hematology, clinical chemistry, immunohematology, microbiology, serology/immunology, coagulation, molecular diagnostics) while making decisions regarding possible discrepancies;
4. confirm abnormal results, verify quality control procedures, execute quality control procedures, and develop solutions to problems concerning the generation of laboratory data;
5. analyze and make decisions concerning the results of quality control and quality assurance measures, and institute proper procedures to maintain accuracy and precision;
6. establish and perform preventive and corrective maintenance of equipment and instruments and identify appropriate sources for repairs;
7. develop, evaluate, and select new techniques, interpretive algorithms, instruments and methods in terms of their usefulness and practicality within the context of a given laboratory's personnel, equipment, space, and budgetary resources;
8. demonstrate professional conduct and interpersonal skills with patients, laboratory personnel, other health care professionals, and the public;
9. establish and maintain continuing education as a function of growth and maintenance of professional competence;
10. exercise and apply principles of management, safety, regulatory compliance, supervision, educational methodology, and current information systems;
11. communicate to enable consultative interactions with members of the healthcare team, external relations, customer
service and patient education;

12. evaluate published studies as an informed consumer; and

13. apply knowledge and skills in financial, operations, marketing and human resource management of the clinical laboratory.

(NAACLS Preamble, Essentials of Accredited Educational Programs for the Clinical Laboratory Scientist/Medical Technologist, 1996, 2001

**Clinical Laboratory & Nutritional Sciences Minors**

**Clinical Sciences Minor**

Students interested in the Clinical Sciences minor offered by the Department of Clinical Laboratory and Nutritional Sciences must first obtain the authorization of the Department and present 18 credits in the minor field with at least six credits at the upper division course level.

The minor requires the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.101</td>
<td>Anatomy and Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>35.103</td>
<td>Anatomy and Physiology I Lab</td>
<td>1</td>
</tr>
<tr>
<td>35.102</td>
<td>Anatomy and Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>35.104</td>
<td>Anatomy and Physiology II Lab</td>
<td>1</td>
</tr>
<tr>
<td>35.252</td>
<td>Physiological Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>35.254</td>
<td>Physiological Chemistry II Lab</td>
<td>1</td>
</tr>
</tbody>
</table>

and 6 credit hours from among the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.435</td>
<td>Medical and Clinical Genetics</td>
<td>3</td>
</tr>
<tr>
<td>36.331</td>
<td>Clinical Immunology</td>
<td>3</td>
</tr>
<tr>
<td>36.350</td>
<td>Human Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Nutrition Minor**

Students expressing an interest in the Nutrition Minor offered by the Department of Clinical Laboratory and Nutritional Sciences must first obtain the authorization of the Department and present no less than 23 semester hours in the minor field with at least 9 semester hours at the upper division course level.

The minor requires the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.101</td>
<td>Anatomy and Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>35.103</td>
<td>Anatomy and Physiology I Lab</td>
<td>1</td>
</tr>
<tr>
<td>35.102</td>
<td>Anatomy and Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>35.104</td>
<td>Anatomy and Physiology II Lab</td>
<td>1</td>
</tr>
<tr>
<td>36.336</td>
<td>Life Cycle Nutrition</td>
<td>3</td>
</tr>
</tbody>
</table>

and 9 credit hours from the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.345</td>
<td>Community Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>36.371</td>
<td>Nutrition &amp; Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>36.372</td>
<td>Obesity and Weight Control</td>
<td>3</td>
</tr>
<tr>
<td>36.406/506</td>
<td>Biochemistry of Lipids</td>
<td>3</td>
</tr>
<tr>
<td>36.463/563</td>
<td>Vitamins and Minerals</td>
<td>3</td>
</tr>
<tr>
<td>36.465</td>
<td>Lab Methods in Nutritional Assessment</td>
<td>3</td>
</tr>
<tr>
<td>36.472</td>
<td>Nutrition and Gene Expression</td>
<td>3</td>
</tr>
<tr>
<td>36.481</td>
<td>Medical Nutrition Therapy I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Medical Laboratory Science Option**

**Bachelors of Science in Clinical Laboratory Sciences: Medical Laboratory Science Option**
The growing complexity and significance of the role of the clinical laboratory in the delivery of health care accentuates the importance to its professionals receiving an education commensurate with the responsibilities of the Medical Laboratory Scientist. Medical laboratory scientists perform tests on various body fluids and tissues to determine the presence or absence of disease, to monitor response to disease, and to aid in health maintenance. They are indispensable laboratory specialists that develop, perform and interpret a wide range of complex diagnostic and therapeutic procedures. In addition, graduates of the program are prepared for graduate studies and/or employment in clinically related government and/or industrial settings.

Graduates of this program are eligible for certification examinations in the Medical Laboratory Scientist category given by the Board of Certification, American Society for Clinical Pathology: MLS(ASCP).

The granting of the degree is not dependent upon students passing any type of external licensure or certification examination.

Mission

The mission of the Medical Laboratory Science option is to provide high quality, theoretical and clinical education to students to develop the skills, knowledge, and commitment to lifelong learning necessary to become leaders in the field of Medical Laboratory Science. The department faculty are dedicated to maintaining NAACLS (National Accrediting Agency for Clinical Laboratory Sciences) accreditation of this program in order to supply the region with certified Medical Laboratory Scientists who possess advanced skills and the abilities to adapt to future changes of the profession.

Students receive an in-depth education in clinical chemistry, clinical hematology, clinical immunohematology, clinical immunology, and clinical microbiology. Lecture and laboratory courses in these areas are taught at the University, followed by clinical internships in each discipline in the clinical laboratories. The academic program includes scientific and clinical knowledge using current methodology, instrumentation and techniques relevant to each area in laboratory medicine. In addition students are exposed to laboratory management, effective communication skills and research design. Qualified students can elect to enroll in the five-year BS/MS program and take courses in their senior year that will count toward the master's degree.

This program is fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N. River Rd. Suite 720, Rosemont, IL 60018-5119, Phone: 847-939-3597 or 773-714-8880, e-mail: info@naacls.org, and the National Accrediting Agency for Clinical Laboratory Sciences website. View the complete course of study (pdf).

Admission to Medical Laboratory Science Option

Admission to the Medical Laboratory Science Program is a two-step process.

- **Step 1** - Students interested in the Medical Laboratory Science program must first be accepted to the Clinical Laboratory Science B.S. degree, Clinical Science option by application to Undergraduate Admissions.
- **Step 2** - Students currently enrolled in the Clinical Laboratory Science degree, Clinical Science option are eligible to apply for the Medical Laboratory Science Option Program. Students submit applications to the Medical Laboratory Science Program Director. Freshman may apply during the second semester of freshman year. Transfer students may apply during their first semester in the Clinical Science option. Applications will be reviewed by the MLS Program Director and a Department Faculty Committee at the end of each semester.

Entry Level Competencies For Medical Laboratory Option Graduates

"Description of Entry Level Competencies of the Medical Laboratory Scientist

At entry level, the medical laboratory scientist will possess the entry level competencies necessary to perform the full range of clinical laboratory tests in areas such as Clinical Chemistry, Hematology/Hemostasis, Immunology, Immunohematology/Transfusion medicine, Microbiology, Urine and Body Fluid Analysis and Laboratory Operations, and other emerging diagnostics, and will play a role in the development and evaluation of test systems and interpretive algorithms.

The medical laboratory scientist will have diverse responsibilities in areas of analysis and clinical decision-making, regulatory compliance with applicable regulations, education, and quality assurance/performance improvement wherever laboratory testing is researched, developed or performed.

At entry level, the medical laboratory scientist will have the following basic knowledge and skills in:

- Application of safety and governmental regulations and standards as applied to clinical laboratory science;
- Principles and practices of professional conduct and the significance of continuing professional development;
- Communications sufficient to serve the needs of patients, the public and members of the health care team;
- Principles and practices of administration and supervision as applied to clinical laboratory science;
- Educational methodologies and terminology sufficient to train/educate users and providers of laboratory services;
- Principles and practices of clinical study design, implementation and dissemination of results” (NAACLS Preamble, Essentials of Accredited Educational Programs for the Medical Laboratory Scientist. 2013)
Health Requirements

Students in the Medical Laboratory Science option must meet the following health requirements:

- Students must provide evidence of a current physical exam indicating satisfactory general health. Proof of immunizations for MMR (2 doses or positive titer) Varicella (2 doses or positive titer) Tdap (1 dose), TB test current (within one year) or chest x-ray if positive, and Hep B (3 vaccines) and Hep B titer, and Colorblind test. Additional requirements may be made by practicum sites (flu shot, two-step mantoux.)

Additional Program Requirements

- Current CPR certification
- A criminal background check (CORI)
- OSHA blood born pathogen and HIPAA training

For additional information please refer to Special School Requirements

Accreditation

The Medical Laboratory Science option of the Department Clinical Laboratory & Nutritional Sciences is fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N. River Rd., Suite 720, Rosemont, IL 60018-5119 (Phone: 773-714-8880), E-mail, Web page)

Program Director: Kristin Palladino, MLS (ASCP) CM

For more information, go to the Department of Clinical Laboratory and Nutritional Sciences.

Nutritional Science

Bachelors of Science in Nutritional Science

Nutritional Scientists apply knowledge from physiology, biochemistry and chemistry to understand digestion of food, absorption and use of nutrients by the body, nutrients requirements at different stages of life, and the effects of nutrient deficiencies and excesses. They also draw on the social sciences to understand the socio-cultural, psychological, economic and political factors influencing choices of food. Nutritional Scientists study the relationship between diet and chronic disease, monitor nutritional content of the American food supply, define and help to alleviate food and nutritional problems throughout the world, and work with other health professionals in promoting health and well-being for people of all ages.

The goals of this program are:

1. To prepare graduates to serve as part of a research and development team in biotechnology, pharmaceutical, biomedical or food industry atmosphere and
2. To prepare graduates to assume responsibility for their own continued personal and professional growth.

The program is not accredited by the American Dietetics Association (ADA) and does not meet the requirements for students to apply for the Registered Dietician (RD) internship or examination after graduation. However, the program does satisfy the educational, but not work experience requirements set forth the state Board of Licensing for students to be eligible for the licensing exam. The theoretical basis of the profession is integrated with psychomotor skills practiced in clinical, research, and/or industrial settings. This fosters a problem solving approach to the practice. The academic program includes scientific and clinical knowledge using current methodology, instrumentation and techniques relevant to the performance of service. These elements are integrated with a body of knowledge from the humanities, social and behavioral sciences.

Through Directed Study and Senior Research courses, students work with the department faculty to gain skills in both library and nutritional laboratory research. The UMass Lowell Nutritional Science major is strongly committed to research. Undergraduates work alongside faculty members and graduate students, who ensure that they master practical laboratory skills and participate fully in the research team. Several students have presented their senior research projects at regional and national science meetings. Students are also encouraged to be co-authors of publications in highly respected peer-reviewed journals.

Career Opportunities

The skills and experience acquired as part of the course of study qualifies graduates for a broad range of careers in biotechnology, pharmaceuticals, biomedical and the food industry. The Nutritional Science major prepares students for a career in the nutritional and biomedical sciences. Some of the career opportunities with a B.S. degree in Nutritional Science include: Working for the food industry in quality assurance laboratories, research, or in food product development. Working in technical services and/or sales for food ingredient suppliers or for food processing equipment manufacturers. Working with food regulation and inspection for state or local agencies, the federal government or international organizations. Working with a research team in pharmaceutical or biotechnology industries, medical centers or universities. Apply to graduate school to earn a M.S. or Ph.D. in nutrition, which can lead to careers in teaching, research, public health or private industry or apply to medical school or other health-related fields.
Mission

The skills and experience acquired as part of the course of study for students in the B.S. degree in Nutritional Science will qualify graduates for a broad range of careers in biotechnology, pharmaceuticals, and the food industry. The B.S. degree in Nutritional Science prepares students for careers in nutritional science, nutrition education, and biomedical sciences. Some of the career opportunities for students graduating from the B.S. degree in Nutritional Science include:

1. Working for the food industry in quality assurance laboratories, research, or in food product development,
2. Working in technical services and/or sales for food ingredient suppliers or for food processing equipment manufacturers,
3. Working with food regulation and inspection for state or local agencies, the federal government or international organizations,
4. Working with a research team in pharmaceutical or biotechnology industries, medical centers or universities, and (5) apply to graduate school to earn a M.S. or Ph.D. in nutrition, which can lead to careers in teaching, research, public health or private industry or apply to medical school or other health-related fields.

Students in the B.S. degree in Nutritional Science will apply knowledge from physiology, biochemistry and chemistry to understand digestion of food, absorption and use of nutrients by the body, nutrients requirements at different stages of life, and the effects of nutrient deficiencies and excesses. They also draw on the social sciences to understand the socio-cultural, psychological, economic and political factors influencing choices of food. Students in the B.S. degree in Nutritional Science also study the relationship between diet and chronic disease, monitor nutritional content of the American food supply, define and help to alleviate food and nutritional problems throughout the world, and work with other health professionals in promoting health and well-being for people of all ages.

View the complete course of study (pdf).

For more information visit Clinical Laboratory & Nutritional Sciences or contact us.

Medical Technology Option

FRESHMAN YEAR
Fall Semester
35-101 Anatomy & Physiology I
35-103 Anatomy & Physiology Lab I
42-101 College Writing
47-101 General Psychology
48-101 Intro. to Sociology
92.121 Precalculus Math

Spring Semester
35-102 Anatomy & Physiology II
35-104 Anatomy & Physiology Lab II
31-201 Community Health
42-102 College Writing & Literature
36-273 Intro. to Clinical Lab Sciences
xx-xxx Arts/Humanities Elective

SOPHOMORE YEAR
Fall Semester
35-211 Basic & Clin Micro & Pathology
35-213 Basic & Clin Micro & Pathology Lab
35-251 Physiological Chemistry I
35-253 Physiological Chemistry Lab I
xx-xxx Arts/Humanities Elective
xx-xxx Social Science Elective

Spring Semester
36-241 Clin Lab Theory
36-243 Clin Lab Techniques
35-252 Physiological Chemistry II
35-254 Physiological Chemistry Lab II
36-341 Organic React. & Struct.
36-343 Organic React. & Struct. Lab
xx-xxx Arts/Humanities Elective

JUNIOR YEAR
Fall Semester
36-321 Clinical Hematology
36-323 Clinical Hematology Lab
36-350 Human Biochemistry
36-361 Clinical Lab Instrumentation
36-363 Clinical Lab Instrumentation Lab
36-373 Clinical Lab Sciences Seminar

Spring Semester
36-311 Medical Bacteriology
36-313 Medical Bacteriology Lab
36-331 Clinical Immunology
36-351 Clinical Chemistry I
36-353 Clinical Chemistry I Lab
36-420 Clin. Hematology Practicum

SENIOR YEAR
Fall Semester
36.410 Clinical Micro. Practicum
36.411 Med Mycology & Parasitology
36.413 Med Mycology & Parasitology lab
36.431 Clinical Immunohematology
36.433 Clinical Immunohematology Lab
36.452 Clinical Chemistry II
36.454 Clinical Chemistry Lab II
36.453 Adv. Topics in Hemostasis
36.451 Clinical Urinalysis Practicum

Spring Semester
36.415 Clin Virology/Serology Lab
36.430 Clinical Immunohem Pract.
36.450 Clinical Chemistry Pract.
36.453 Lab Management and Ethics
36.474 Clinical Lab Science. Seminar
35-435 Medical & Clinical Genetics
36.416 Molecular Diagnostics Lab

All students must come for PREREGISTRATION ADVISING every semester
All students must have TRANSPORTATION for off campus practicum during junior and senior year
All students must have current CPR CERTIFICATION AND IMMUNIZATION documentation report on file with department prior to beginning of junior year

(Revised 9/04)

UNIVERSITY OF MASSACHUSETTS LOWELL
SCHOOL OF HEALTH AND ENVIRONMENT
3 Solomont Way, Suite 4
LOWELL, MA 01854-5125

Department of Clinical Laboratory and Nutritional Sciences
Tel: 978-934-4510 Fax: 978-934-3006

CLINICAL LABORATORY SCIENCES

MEDICAL TECHNOLOGY MAJOR

The Medical Technology major:
• Prepares students for a career in Laboratory Medicine
• Provides in-depth training in Clinical Hematology, Clinical Microbiology, Clinical Chemistry, Clinical Immunology, and Clinical Immunohematology (Transfusion Medicine)
• Does this through lecture and laboratory courses taught here at the University and clinical internships at area hospital laboratories
• Prepares and qualifies students to sit for the national Medical Technologist certification examination offered by the American Society of Clinical Pathology (ASCP) and the national Clinical Laboratory Scientist examination offered by the National Certification Agency(NCA)

Graduates of this option have been successfully employed (100%) in jobs such as:
• Hospital laboratories (Massachusetts General Hospital, Brigham and Women’s Hospital, Lahey Medical Center and many of our local hospitals)
• Tufts Veterinary Hospital Laboratories, Quest Diagnostics Laboratories, Mayo Medical Laboratory of New England, and the American Red Cross
• Researchers in laboratories at various university and medical schools in the Greater Boston area and beyond
• Commonwealth of Massachusetts State Forensics Laboratory
• Sales representatives, clinical research associates, technical field representatives, and quality control personnel in various
biomedical, biotechnical, and pharmaceutical institutions (i.e. Wyeth Pharmaceutical, Andover, MA, Bristol-Myers Squibb, Billerica, MA and Bayer Diagnostics, Walpole, MA)

Graduates of our Medical Technology program have been accepted to:
• Graduate school for Masters and PhD degrees in various science disciplines (Biology, Biotechnology, Microbiology, Biochemistry, Nutrition, Physical Therapy and Clinical Laboratory Sciences)
• Medical school, Physician Assistant and Pathology Assistant programs
• Advanced degrees in Business Administration, Health Administration, and Education

Contact: Dr. Kay Doyle MT (ASCP), Chairperson
Kathleen_Doyle@uml.edu

Revised 10/05

Major Requirements

Course Requirements for the Clinical Laboratory Sciences and Nutritional Science Degree Programs

Core Science Course Requirements

The courses listed below are required for all students in the Clinical Laboratory Sciences and the Nutritional Science degree programs.

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.101</td>
<td>Anatomy and Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>35.103</td>
<td>Anatomy and Physiology I Lab</td>
<td>1</td>
</tr>
<tr>
<td>35.102</td>
<td>Anatomy and Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>35.104</td>
<td>Anatomy and Physiology II Lab</td>
<td>1</td>
</tr>
<tr>
<td>35.211</td>
<td>Basic Clinical Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>35.213</td>
<td>Basic Clinical Microbiology Lab</td>
<td>1</td>
</tr>
<tr>
<td>35.251</td>
<td>Physiological Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>35.252</td>
<td>Physiological Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>35.254</td>
<td>Physiological Chemistry II Lab</td>
<td>1</td>
</tr>
<tr>
<td>36.341</td>
<td>Organic Reaction and Structure</td>
<td>3</td>
</tr>
<tr>
<td>36.243</td>
<td>Organic Reaction and Structure Lab</td>
<td>1</td>
</tr>
<tr>
<td>36.350</td>
<td>Human Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>36.361</td>
<td>Clinical Lab Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>36.363</td>
<td>Clinical Lab Instrumentation Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.351</td>
<td>Clinical Chemistry I</td>
<td>3</td>
</tr>
</tbody>
</table>

General Education Requirements

Students in the Clinical Laboratory Sciences and the Nutritional Science degree programs are required to take the following to conform to the General Education guidelines outlined elsewhere in the Undergraduate Catalog.

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.101</td>
<td>College Writing I</td>
<td>3</td>
</tr>
<tr>
<td>42.102</td>
<td>College Writing II</td>
<td>3</td>
</tr>
<tr>
<td>47.101</td>
<td>General Psychology</td>
<td>3</td>
</tr>
<tr>
<td>48.101</td>
<td>Intro to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>XX.XXX</td>
<td>1 course from approved list of Gen Ed SS courses</td>
<td>3</td>
</tr>
<tr>
<td>XX.XXX</td>
<td>3 Art and Humanities courses from approved list, no more than 2 from any one department.</td>
<td>9</td>
</tr>
<tr>
<td>92.283</td>
<td>Intro to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>92.121</td>
<td>Management Pre-Calculus</td>
<td>3</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>92.131</td>
<td>Calculus I</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Course Requirements

Clinical Laboratory Sciences Degree - Medical Laboratory Science Option

In addition to the courses listed above in Core Science Courses and the General Education courses, students in the Clinical Laboratory Sciences Degree-Medical Laboratory Science option must complete the following courses:
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.273</td>
<td>Intro to Clinical Lab Sciences</td>
<td>2</td>
</tr>
<tr>
<td>36.241</td>
<td>Clinical Laboratory Theory</td>
<td>3</td>
</tr>
<tr>
<td>36.243</td>
<td>Clinical Laboratory Theory Lab</td>
<td>1</td>
</tr>
<tr>
<td>36.321</td>
<td>Clinical Hematology</td>
<td>3</td>
</tr>
<tr>
<td>36.323</td>
<td>Clinical Hematology Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.373</td>
<td>Clinical Lab Science Seminar</td>
<td>1</td>
</tr>
<tr>
<td>36.434</td>
<td>Advanced Topics in Hemostasis</td>
<td>1</td>
</tr>
<tr>
<td>36.311</td>
<td>Medical Bacteriology</td>
<td>3</td>
</tr>
<tr>
<td>36.313</td>
<td>Medical Bacteriology Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.331</td>
<td>Clinical Immunology</td>
<td>3</td>
</tr>
<tr>
<td>36.353</td>
<td>Clinical Chemistry I Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.420</td>
<td>Clinical Hematology Practicum</td>
<td>2</td>
</tr>
<tr>
<td>36.410</td>
<td>Clinical Microbiology Practicum</td>
<td>2</td>
</tr>
<tr>
<td>36.411</td>
<td>Medical Mycology &amp; Parasitology</td>
<td>3</td>
</tr>
<tr>
<td>36.413</td>
<td>Medical Mycology &amp; Parasitology Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.431</td>
<td>Clinical Immunohematology</td>
<td>3</td>
</tr>
<tr>
<td>36.433</td>
<td>Clinical Immunohematology Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.451</td>
<td>Clinical Urinalysis Practicum</td>
<td>0</td>
</tr>
<tr>
<td>36.452</td>
<td>Clinical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>36.454</td>
<td>Clinical Chemistry II Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.415</td>
<td>Clinical Virology/Serology Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.416</td>
<td>Molecular Diagnostics Lab</td>
<td>1</td>
</tr>
<tr>
<td>36.430</td>
<td>Clinical Immunohematology Practicum</td>
<td>2</td>
</tr>
<tr>
<td>36.450</td>
<td>Clinical Chemistry Practicum</td>
<td>2</td>
</tr>
<tr>
<td>36.453</td>
<td>Lab Management and Ethics</td>
<td>2</td>
</tr>
<tr>
<td>36.474</td>
<td>Clinical Lab Science Seminar</td>
<td>1</td>
</tr>
<tr>
<td>35.435</td>
<td>Medical &amp; Clinical Genetics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Clinical Laboratory Sciences Degree – Clinical Science Option**

In addition to the courses listed above in Core Science Courses and the General Education courses, students in the Clinical Laboratory Sciences Degree-Clinical Science option must complete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.273</td>
<td>Intro to Clinical Lab Sciences</td>
<td>2</td>
</tr>
<tr>
<td>36.241</td>
<td>Clinical Laboratory Theory</td>
<td>3</td>
</tr>
<tr>
<td>36.243</td>
<td>Clinical Laboratory Theory Lab</td>
<td>1</td>
</tr>
<tr>
<td>36.321</td>
<td>Clinical Hematology</td>
<td>3</td>
</tr>
<tr>
<td>36.311</td>
<td>Medical Bacteriology</td>
<td>3</td>
</tr>
<tr>
<td>36.331</td>
<td>Clinical Immunology</td>
<td>3</td>
</tr>
<tr>
<td>36.353</td>
<td>Clinical Chemistry I Lab</td>
<td>2</td>
</tr>
<tr>
<td>36.452</td>
<td>Clinical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>35.435</td>
<td>Medical &amp; Clinical Genetics</td>
<td>3</td>
</tr>
<tr>
<td>36.493</td>
<td>CL Directed Studies</td>
<td>3</td>
</tr>
<tr>
<td>36.483</td>
<td>Senior Research I</td>
<td>2</td>
</tr>
<tr>
<td>XX.XXX</td>
<td>Clinical Science Specialization Courses</td>
<td>11</td>
</tr>
<tr>
<td>XX.XXX</td>
<td>Free Electives</td>
<td>16</td>
</tr>
</tbody>
</table>

**Nutritional Science Degree**

In addition to the courses listed above in Science Core Courses and the General Education courses, students in the Nutritional Science degree must complete the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.201</td>
<td>Community Health and Environment</td>
<td>3</td>
</tr>
<tr>
<td>35.205</td>
<td>Intro to Nutritional Science</td>
<td>3</td>
</tr>
<tr>
<td>35.206</td>
<td>Human Nutrition</td>
<td>3</td>
</tr>
</tbody>
</table>

View the complete Course of Study.
Department of Clinical Laboratory & Nutritional Sciences

The Department of Clinical Laboratory and Nutritional Sciences offers two majors, Clinical Laboratory Sciences and Nutritional Science, which lead to a Bachelor of Science degree. For additional information visit the Department of Clinical Laboratory & Nutritional Sciences or contact us.

Mission

The mission of Clinical Laboratory and Nutritional Sciences is to promote health by fostering critical and scientific thinking through teaching Clinical Laboratory and Nutritional Sciences theory and practice in the classroom and in applied education settings; and promoting scholarship in Clinical Laboratory and Nutritional Sciences in the discovery, application and dissemination of knowledge.

Goals

1. To prepare graduates to serve as part of a health care or industrial team.
2. To prepare graduates to assume responsibility for their own continued personal and professional growth.
3. To educate professional practitioners who will be able to provide evaluative services which will assist individuals in maintaining a better quality of life.

Objectives

The objectives of the program are to prepare entry-level Clinical Laboratory and Nutritional Scientists to:

1. select and provide analytical and evaluative services based on scientific theory
2. effectively assess and correlate the results of their efforts
3. demonstrate leadership skills of accountability, delegation, education and supervision.

Community Health Major

Students in the Department of Community Health and Sustainability can earn degrees in the following programs of study:

Bachelor of Science Degrees in:
- Community Health curriculum checksheet (pdf)
- Environmental Health curriculum checksheet (pdf)

Master of Science in Health Informatics and Management with distinct concentrations in:
- Health Management
- Health Informatics
- Health Policy

Graduate Certificates in Health Informatics and Management:
- Health Management
- Health Informatics
Health Policy
See a full list of College of Health Sciences curriculum checksheets.

For additional information visit Community Health & Sustainability.

Department of Community Health & Sustainability

The Department of Community Health & Sustainability (http://www.uml.edu/Health-Sciences/CHS/) offers science-based programs that prepare individuals to become public health professionals, health care managers, and researchers working to create a sustainable future. Our programs provide the foundation for the design, implementation, and evaluation of health policies and programs.

Our degree programs include BS in Community Health, BS in Environmental Health, MS in Health Informatics and Management, with distinct concentrations in Health Informatics and Health Management.

Community Health Internships

Students in the Community Health and Environmental Health programs participate in a required practicum experience in the final semester of their senior year. For Community Health students the practicum is 10 credits, and for the Environmental Health students it is a 7-credit internship. The link below will bring you to our practicum website. You will find an abbreviated list of current and past participating Organizations. Some of this website is password-protected for faculty and current preceptors in order to provide a secure location for academic assessment of students in their practicum internships. Much of the website is publicly accessible, however providing information about the program and the practicum experiences of our students.

Visit the Community Health Practicum website (http://health.uml.edu/31410/default.htm).

College of Health Sciences Academic Advising

Students in the College of Health Sciences are assigned an academic advisor from their major upon admission. Students may verify their advisor’s name on their student ISIS account. Advisors are available during scheduled office hours each week to meet with students to provide advice and counsel about course selection, academic progress, student concerns and availability of University resources for students. Students are responsible for making an appointment with their advisors during registration periods in Fall and Spring semesters. Students who fail to avail themselves of this opportunity and who register for incorrect courses, or who withdraw from courses in the schedule that they have developed with their advisor, may find it necessary to extend their period of study and may be ineligible to continue in their major. All seniors are required to consult with their advisors prior to the University established deadline for filing DIG Forms (Declaration of Intent to Graduate) with the Office of the Dean. DIG Forms summarize senior-level status with respect to requirements of the curriculum, grade point averages and documents that all stated requirements for graduation are satisfied.

Declaration of Program and Change of Program in College of Health Sciences

Students entering the College of Health Sciences are required to declare a major at the time of admission. Transfers into any major in the College of Health Sciences are granted on a space available basis only to students who have met departmental requirements. Specific cumulative G.P.A. , science G.P.A. and other requirements are posted on individual department websites.

Appeals Procedure for Reinstatement in College of Health Sciences

Students who have been dismissed from their major for academic or non-academic reasons will receive a notification letter from their department. Students who are eligible to appeal for reinstatement, must submit a written appeal to the appropriate Departmental Professional Review Committee for re-evaluation of their status. This appeal must be received no later than the date specified in the letter and should explain those factors which led to unsatisfactory academic performance and identify the student’s plan to address these factors in order to attain academic success.

The Department Professional Review Committee will review the student’s appeal and vote to grant the appeal with probation, grant the appeal without probation or deny the appeal. If a student is placed on probation, specific terms of probation will be explained in a letter to the student. If the appeal is denied, the student must transfer to another major.

Students who are dismissed a second time may not appeal any further to their department. Students may submit a written appeal to the Dean of the College of Health Sciences. After consideration of the available information, the Dean will either return the appeal to the Department Professional Review Committee for further reconsideration or uphold the dismissal.

Requirements for Succession in College of Health Sciences Programs

Irrespective of the classification policies of the University, students shall not be admitted to professional courses of the College of Health Sciences unless they have satisfactorily completed all courses which are specified in their programs of
study for the first two semesters and have achieved a cumulative grade-point average of 2.50 or better (Nursing 2.70 or better) for all such courses. Students enrolled in exercise physiology, medical technology, and nursing also are required to achieve at this time a cumulative grade-point average of 2.50 or better (Nursing 2.70 or better) in their required science courses.

To qualify for continued matriculation in programs of the College of Health Sciences, all students must maintain on-going cumulative averages of 2.50 (2.70 for Nursing) or better by achieving the following averages the end of the freshman year and at the end of each semester thereafter:

1. a semester average of 2.50 (2.70 for Nursing) or better,
2. not less than a grade "C" in any professional major course and
3. a semester average of 2.50 (2.70 for Nursing) or better for professional courses attempted in the major.

Students enrolled in exercise physiology, medical technology, and nursing must maintain a cumulative grade point average of 2.50 (2.70 for Nursing) or better in their required science courses. Students who fail to satisfy these academic requirements will be dismissed from their respective programs. Such students may seek reinstatement to programs by filing a petition with the professional review committee of their respective departments. Students who are granted a one-time probationary period must maintain all College criteria for remainder of time in their major. Failure to do so will result in dismissal from the program. Students whose petitions for reinstatement are denied may seek transfer to another major within the University if they qualify under University policies as students with satisfactory academic standing. Students who do not qualify for such standing may be dismissed from the University at the time they are dismissed from the College of Health Sciences and are ineligible for readmission as probationary students in the College.

All students in the College of Health Sciences must demonstrate a level of professionalism and a state of emotional and physical health which will enable them to provide safe competent practice in their chosen professional field. In special cases, at the request of the professional review committee of the student’s major department, an individual may be required to present statements of physical and/or mental health from appropriate physicians or psychiatrists who are fully licensed by the Commonwealth of Massachusetts. On the basis of a review of such statements, the professional review committee may recommend to the chairperson of the student’s major department that the individual be denied admission to or continuance in the major program. Students must demonstrate professional behavior in all practicum/pre-practicum courses. Students must successfully meet the course objectives of the practicum/pre-practicum courses. Failure to meet course objectives or standards of practice in clinical or practicum/pre-practicum courses, will result in course failure regardless of academic grades in non-practicum courses.

College of Health Sciences Transfer Policies

Qualified students may transfer from other colleges in the University into specified degree programs in the College of Health Sciences, on a space available basis, provided they meet the departmental requirements. Students who wish to transfer to one of the majors in the College of Health Sciences are advised that admission to these majors is competitive and transfer students must meet department specific cumulative grade point averages and science grade point averages. Students are advised to review transfer admission requirements on each department’s website.

Transfer from Other Institutions
Transfer Policies for Certified Laboratory Technicians
Repetition of Transfer Courses
Intercollegiate Transfer to the College of Health Sciences

Transfer from Other Institutions

Courses transferred from other institutions are initially evaluated by the Office of Admissions in terms of general university requirements. When students are admitted to the University, they are also evaluated by the professional department in terms of School and program requirements. Courses transferred to the University which are not equivalent to those of the College of Health Sciences or are determined to be unrestricted elective courses will be listed on students’ transcripts but may not apply to the minimum degree requirements. All previously completed courses, including transferred courses from the compact institution, will be re-evaluated in terms of their applicability to degree requirements of the College of Health Sciences. Decisions regarding admission to the department are made by the Chairperson of the department and is on a space available basis for qualified students. All students must satisfy all general education, prerequisite and co-requisite requirements, plus all courses in the major to be eligible for the Bachelor of Science degree from the College of Health Sciences.

The applicability of grades earned in transferred courses for the determination of the grade-point average of students’ majors at the University is determined by policies of each of the colleges. The policy of the College of Health Sciences is to count such grades for required science courses for the purpose of determining the students’ science grade-point average in their professional majors. These course grades will not be counted in overall grade point average. Students who retake required science courses to improve science cumulative average will have the highest grade earned considered when that cumulative average is calculated.

Transfer Policies for Certified Laboratory Technicians
Current practitioners in the field including associate degree graduates with MLT (ASCP) certification may seek entry to the Department of Clinical Laboratory & Nutritional Sciences through transfer of credits acceptable to the University. Comparable didactic courses are available for challenge in the clinical practice and upper division courses.

Repetition of Transferred Courses

Students who have been granted transfer credit, and, on this basis, have been assigned to advanced courses for which the transferred course is a prerequisite, may be advised to repeat such transferred work at the University or to take a more elementary course than that which has been transferred when the competence of the student has been demonstrably inadequate. Permission to repeat a transferred course is granted by filing an academic petition form through the Office of the Dean. Since credit may not be granted more than once for the completion of any course, a condition for filing such a petition is the simultaneous filing of a request to revoke recognition of the previously transferred course.

Intercollegiate Transfer to the College of Health Sciences

Students wishing to transfer from another college of the University, or from baccalaureate continuing education programs of the University, must file a petition, together with a current transcript, with the appropriate chairperson and the Dean of the College of Health Sciences. Students should refer to University policies concerning intercollegiate transfer Academic Policies: Change of Major with Intercollegiate Transfer for further procedural details.

Baccalaureate Degree Programs in the College of Health Sciences

The College of Health Sciences offers undergraduate programs leading to the degree of Bachelor of Science with majors in Clinical Laboratory Sciences (with options in Clinical Science and Medical Laboratory Science, formally Medical Technology option), Nutritional Sciences, Community Health Education (with an Option in Environmental Health), Environmental Health, Exercise Physiology and Nursing. All departments in the College also offer graduate degrees (for further information see the Graduate School Catalog - http://www.uml.edu/catalog/graduate). The Department of Work Environment offers graduate degrees exclusively, however, graduate courses that introduce the work environment disciplines to School undergraduates are also described in the department descriptions below.

The course requirements for undergraduate programs of the college have been determined by specific professional objectives and are subject to the recommendations of the various professional accrediting associations. Each course of study provides a basic general education in the sciences, the psycho-social areas, and the humanities; a comprehensive introduction to the health professions; upper division professional courses; and clinical or teaching experiences in one or more community health agencies or schools. Candidates for the Bachelor of Science degree in the College of Health Sciences must comply with the University general education requirements and with the rules and regulations of the College. The University general education requirements are described under Academic Policies (http://www.uml.edu/catalog/undergraduate/policies/academic-policies.aspx).

Candidates for degrees in the College of Health Sciences may be permitted to elect a second academic major or a minor in another college provided that all curriculum requirements of the College can still be satisfied. Election of a second major or minor may require an extension of the normal four-year period of undergraduate study.

Programs:
- Clinical Laboratory & Nutritional Sciences
- Community Health & Sustainability
- Nursing
- Physical Therapy
- Department of Work and Environment (graduate only)

Mission of the School of Health & Environment

The mission of the School of Health and Environment is to promote human health and development to allow healthy individuals and families to live in safe and productive communities and environmentally sustainable economies. This mission requires of us and our students a vision of just, secure and sustainable social, economic and environmental systems, and is expected to undergo continual evaluation and revision to achieve our vision.

We recognize that achieving this mission requires:
- improving our understanding of health, disease and disability and their social context,
- increasing citizens' understanding of health problems and their environmental, social, and economic causes,
- expanding community and workplace opportunities for promoting good health,
- developing environmentally sound systems of production and consumption,
- exploring the fullest understanding of our region defined by common political, social, ethnic, economic and cultural boundaries
- addressing the determinants of social and economic disparities in our region,
- maintaining a health care system that is effective and compassionate, and promoting innovative government policies to support human health and development.
College of Health Sciences Organization and Governance

The College of Health Sciences is organized into five departments and is administered by a dean who is assisted by an executive committee. Each department is responsible for developing programs of study and course offerings. Although the faculty of the College has overall responsibility for all academic policies of the School, the academic standards committee is responsible for enforcing the academic standards of the School and also serves as a review body for suspended students seeking readmission with probationary status. In addition, each department has its own professional review committee that evaluates appeals from students who have not met the criteria for retention in their specific programs. Such appeals to professional review committees may be submitted only once, and all decisions of the faculty are final.

Leadership Committee

Shortie McKinney, Dean
Susan Houde, Associate Dean
Pauline Ladebauche, Assistant Dean
Eugene Rogers, Chairperson, Clinical Laboratory and Nutritional Sciences
Nicole Champagne, Chairperson, Community Health & Sustainability
Karen Devereaux Melillo, Interim Dean, Nursing
Lisa Abdallah, Chairperson, Nursing
Deirdra Murphy, Chairperson, Physical Therapy
Bryan Buchholz, Chairperson, Work Environment

Withdrawal from Nursing

Students who wish to withdraw from any nursing course are advised that such withdrawal may result in termination of enrollment in the nursing program.

Such students who wish to apply for readmission to the nursing program as members of subsequent graduation classes are advised that consideration for readmission is determined not only by academic eligibility requirements in effect for the class to which admission is sought but also by enrollment quotas. Accordingly, students are advised to confer with the Chairperson of the School of Nursing prior to applying for readmission in order to ascertain if program vacancies exist.

Transfer Policies for Registered Nurses

The School of Nursing is committed to encouraging registered nurses who possess a diploma or an associate degree to return for further study leading to a baccalaureate degree with a major in nursing.

Application for admission to the full-time day program of the University is made through the Admissions Office. Acceptance of credit for transfer courses is determined by the Chairperson of the Department, once official transcripts have been received. Several articulation agreements have been signed with associate degree programs in nursing. Course descriptions may be requested by the appropriate department chairperson to determine if courses meet specific curriculum requirements. Completed transfer of credit forms become a part of the students' transcripts.

Part time study is available to registered nurses through the day school and summer school. Faculty are available to advise prospective students upon request.

Registered nurses entering the Department through transfer admissions must meet the same requirements as other students, namely a 2.7 overall cumulative average and a 2.7 science cumulative average. A photocopy of current nursing license, current CPR certification and insurance coverage must be submitted to the Department, and a record of continuous coverage for both documents must be provided according to expiration dates.

Registered nurses are encouraged to utilize the opportunity to gain credit for previous learning through CLEP or equivalency examinations. All students must take 33.307 Concepts for Baccalaureate Nursing.

Registered Nurses who are graduates of diploma and associate nursing programs may be awarded advanced standing through a combination of transcript evaluation, course equivalency procedures, examinations, and/or articulation agreements for the following courses:

- 42.101 College Writing I
- 42.102 College Writing II
- 35.251 Physiological Chemistry I*
- 35.252 Physiological Chemistry II*
- 35.253 Physiological Chemistry Lab I*
- 35.254 Physiological Chemistry Lab II*

OR

- 84.121 General Chemistry I*
- 84.122 General Chemistry II*
- 84.123 General Chemistry Lab I*
Students must achieve a minimum cumulative grade point average of 2.7 in the combination of science courses identified.

Nursing Retention, Continuance, Grading Policies, and Appeals Procedure

Academic Progression Policy

To qualify for continued matriculation in the nursing program, all students must maintain ongoing cumulative averages of 2.70 or better by achieving the following averages at the end of each semester:

1. a semester average of 2.70 or better,
2. not less than a grade C in any professional major course and
3. a semester average of 2.70 or better for professional courses attempted in the major. Students enrolled in nursing also must maintain a cumulative grade point average of 2.70 or better in required science courses. Students who fail to satisfy these academic requirements will be dismissed from the nursing program.

Appeal Process for Program Dismissal

Students who are dismissed from the Baccalaureate Nursing Program may appeal the decision regarding their continuation in the program by submitting a letter of appeal to the Chair of the School of Nursing by the listed due date in their dismissal letter, so it can be forwarded to the Professional Review Committee. The appeal letter should address what happened, how it happened, what options you would like the committee to consider, and what resources you will use to be successful in the nursing program should you be allowed to continue. You may either bring your letter of appeal to the School of Nursing in O'Leary 540 or send it as an attachment to Maureen_Martin@uml.edu, Administrative Assistant. After carefully deliberating all the data available, the Committee will make their recommendations and a decision will be sent prior to the beginning of the semester to your University of Massachusetts Lowell email address.

Students must meet the conditions for continuation in the School of Nursing as described in their detailed probation conditions correspondence and per the Undergraduate Course Catalog on Retention and Continuance in the College of Health Sciences and its Programs; this is a one-time probationary period. Failure to maintain all School and Department academic requirements subsequent to that, as outlined in the catalogue “will result in dismissal from the program” with no further appeal to the School of Nursing.

Consequently, students may submit a written appeal to the Dean of the College of Health Sciences by the listed due date. After deliberation on the available data, the Dean will either request a second appraisal by the Professional Review Committee or uphold the dismissal.

Students who cannot continue in the Nursing Program must withdraw from all enrolled nursing courses and change their major. Students who are registered for the spring term will take a HESI Exit Exam while enrolled in 33.413 Role Transition. Those students who do not achieve the passing score of 90% on the first examination will be required to take a second HESI Exit Exam. If students who pass the first exam wish to take the second exam they will be

HESI Policy

All pre-licensure nursing students will be required to take nationally normed tests throughout the curriculum. The specialty tests, which become part of the course grade, will be given in the following courses: Nursing Fundamentals, Pathophysiology, Health Promotion and Risk Reduction of Families I and II, and Pharmacology. In the final semester of the nursing program, students will be required to take a nationally normed comprehensive examination and this test score becomes part of the course grade.

All pre-licensure senior level-nursing students who are registered for the spring term will take a HESI Exit Exam while enrolled in 33.413 Role Transition. Those students who do not achieve the passing score of 90% on the first examination will be required to take a second HESI Exit Exam. If students who pass the first exam wish to take the second exam they will be
able to do so. The HESI Exit Exam will be part of the final course grade in the 33.413 Role Transition theory course. If two exams are taken, the highest grade will be utilized. (Registered Nurse students are exempt).

Senior nursing students who do not achieve a HESI score of 800 or higher on the first HESI exit (comprehensive) exam must register for an approved review course and provide a copy of the course certificate prior to taking the second HESI exit exam.

**Basic Math Competency Policy**

All freshman and transfer students who are entering the nursing program, including those students who are on the waiting list for their junior year, must take and pass a basic math competency exam with a score of 90% or better. Students who do not achieve a successful score of 90% on the basic math competency exam will be required to take and pass a math enrichment course with a grade of 3.3 or higher. Students who do not achieve a score of 3.3 or higher will not be allowed to continue in the nursing program, and have no right to appeal this determination. (Registered Nurse students are exempt).

**Medication Calculation Examination Policy**

All pre-licensure nursing students must take and pass three medication calculation exams with a score of 90% or higher. An exam will be given in each semester of the junior year and in the fall semester of the senior year. In each of these semesters, students who do not achieve a successful score of 90% or higher on the first examination will be given a second opportunity to take an examination. Those students who do not pass the retake medication calculation examination at 90% will fail that clinical practicum. All second opportunity medication calculation exams will be given prior to entering the next clinical course. Students who fail this second exam will be unable to continue on the nursing program. (Registered Nurse students are exempt).

**Bachelor’s Program**

- Course of Study
- Technical Standards
- Expected Abilities
  - Critical Thinking
  - Communication
  - Technical Abilities
- Clinical Laboratory Placements

**Course of Study (pdfs)**

- Nursing
- Nursing (OCE)

**Technical Standards**

The following guidelines have been developed to specify the essential functions students must demonstrate in order to fulfill the requirements of the nursing curricula. Functions listed are required for the learning and practice of critical thinking, communication, and technical skills taught in the curricula. These functions may be required in clinical, classroom, and laboratory environments.

**Expected Abilities**

**Critical Thinking**

The student will be able to:

1. thoroughly, efficiently, and reliably:
   a. recall, interpret, synthesize, evaluate and then apply information from written, verbal and illustrated materials.
   b. implement the nursing process through recall, application of measurement, interpretation, calculation, reassessment, analysis, judgment and synthesis.

2. identify and communicate the limits of their knowledge to others when appropriate.

3. incorporate new information from clients, peers, teachers and relevant literature.

**Communication**

The student will be able to:
A. Behavioral and Social

1. communicate in English effectively and sensitively with faculty, staff, allied health personnel, peers and clients,
2. be aware of and appropriately react to one’s own immediate emotional response.
3. accept appropriate feedback and if, necessary, respond by modification of behavior.
4. develop professional relationships, providing comfort and reassurance when appropriate, while protecting confidentiality.
5. possess ability to function effectively under stress.

B. Receptive and Expressive Abilities

1. recognize and interpret verbal and non-verbal cues.
2. complete reading assignments and search and evaluate the literature.
3. complete written records.
4. demonstrate the use of therapeutic communication, such as attending, clarifying, coaching, facilitating and touching.

Technical Abilities

The student will be able to:

- **A. Sensory Observation**
  1. observe demonstrations and participate in laboratory experiences.
  2. obtain appropriate health history directly from the client.
  3. observe a client at a distance and close at hand, noting non-verbal as well as verbal signs.
  4. detect and identify subtle changes in colors of fluid, skin and dipstick tests.
  5. use instruments such as stethoscopes, otoscopes, sphygmomanometers, microscopes and syringes.

- **B. Motor Skills**
  1. have sufficient sensory and motor function to perform a physical examination.
  2. provide general care and emergency treatment to clients including, but not limited to, CPR.
  3. respond promptly to urgencies related to client care and not hinder the ability of co-workers to provide prompt care.
  4. manipulate dials, knobs, electrodes, syringes, intravenous therapy materials, and other small or larger pieces of equipment with dexterity.
  5. demonstrate sufficient manual dexterity and visual acuity to perform nursing functions including, but not limited to, the safe administration of medications and fluids via variety of routes.
  6. demonstrate abilities to safely move a client or assist a client in ambulation, transportation, positioning and transferring.
  7. have the capacity to work effectively in the student clinical role for 8-10 hours in a variety of settings (hospitals, clinics, homes, etc.).

The University of Massachusetts Lowell, School of Nursing will consider for admission to its Programs any applicant who demonstrates the ability to perform or learn to perform the functions listed in this document with or without reasonable accommodations or academic adjustments consistent with ADA. Applicants with disabilities are not required to disclose the existence or nature of their disability during the admissions process; however, any applicant with questions about these technical requirements is strongly encouraged to discuss the issue with a Departmental representative. If appropriate, and upon the request of the applicant/student, academic adjustments and/or reasonable accommodations may be provided.

Clinical Laboratory Placements

Courses in the nursing major are offered within the School of Nursing and are under the direct control and supervision of the nursing faculty. The clinical aspects of the nursing program are developed, coordinated, and supervised by the nursing faculty and are provided in collaboration with members of the utilized community agencies. Placements include: Beth Israel Deaconess Medical Center, Edith Nourse Rogers Memorial Veterans Hospital, Greater Lawrence Family Health Service, Holy Family Hospital, Lawrence General Hospital, Lowell General Hospital, schools and day care centers, University of Massachusetts Medical Center, VNA of Greater Lowell, Massachusetts General Hospital, Boston Children’s Hospital, Massachusetts Eye and Ear Infirmary, Tewksbury Hospital, Homecare Inc. of Andover, Saints Memorial Medical Center, Winchester Hospital, rehabilitation centers and nursing homes, and other community based health care providers.

Additional agencies are utilized when necessary to enhance student learning. Clinical placement of students is at the discretion of the supervising faculty. Students are expected to provide transportation to clinical experiences.

For more information visit Nursing or contact us.

Fast Track MS Program for Licensed RN Baccalaureate Students
This program is offered to outstanding students enrolled in the University of Massachusetts Lowell undergraduate RN to BS program enabling them to earn two degrees in five years. While a baccalaureate student, several designated courses (6 credits) can be taken in the master’s program. When the B.S. degree is awarded, students can enter the master’s degree program if they have a minimum 3.0 cumulative grade point average.

The Graduate Record Exam (GRE) is not required for current UMass Lowell Nursing Undergraduates applying to this program.

Admissions and Graduation Requirements

Admission requirements include:

- Graduate of an associate or diploma school of nursing and admitted to University of Massachusetts Lowell RN Degree Completion
- Must be licensed as a Registered Nurse
- Declare intent to apply to master’s program at the end of the junior year
- Must have a 3.0 cumulative GPA at the time of declaration, maintain the cum of 3.0 and graduate with a 3.0 before admission to the graduate program
- Must receive a B.S. degree and be admitted to the master’s program before taking specialty courses in the M.S. program
- Must have 30 credits of undergraduate work at UMass Lowell toward B.S. degree
- Allowed to take up to 6 graduate credits (500 level or above) while completing senior year and these credits count for both degrees
- Must follow University admission criteria to M.S. programs

Bachelor’s/Master’s Program Information

School of Nursing

The UMass Lowell Nursing Program prepares a professional nurse who is a competent, beginning practitioner and has a foundation for graduate study. The goal of the undergraduate program in nursing at the University of Massachusetts Lowell is to prepare professional nurses who have the abilities to apply professional standards in a variety of settings serving diverse populations; to demonstrate knowledge of health promotion, advocacy, and health policy; and to participate as members of the nursing profession.

Graduates of the nursing program are prepared to function in a variety of health care settings such as hospitals, long term care facilities and nursing homes, schools and day care centers, visiting nurse associations, clients' homes, community and mental health agencies, and work environments. Graduates are eligible to sit for the Board of Registration in Nursing’s NCLEX examination for licensure as a registered nurse.

The nursing program is approved by the Massachusetts Board of Registration in Nursing and is fully accredited by the Commission on Collegiate Nursing Education, One Dupont Circle NW, Suite 530, Washington, DC 20036-1120.

The School of Nursing’s mission is to educate students, advance knowledge, and provide public service according to professional nursing standards. Health promotion needs are addressed and the potential of the region is advanced through excellence in the discovery, application, integration, and dissemination of nursing knowledge and creative insights.

Upon successful completion of the University of Massachusetts Lowell undergraduate program in nursing, graduates are prepared as a generalist for beginning professional nursing roles. Specifically, the graduates are prepared to:

1. develop therapeutic relationships with individuals, families, and groups;
2. utilize critical thinking and ethical principles in the implementation of standards of practice;
3. collaborate with clients and professionals in the delivery of care;
4. utilize research findings in practice;
5. demonstrate practice of health promotion activities;
6. participate in efforts to influence health care policy;
7. assume responsibility for life-long learning and professional career development.

Good Moral Character

The University of Massachusetts Lowell School of Nursing encourages all prospective Nursing students to familiarize themselves with the good moral character requirements for licensure in the Commonwealth prior to applying for admission to the Nursing program. The Board of Registration in Nursing publishes an information sheet on “good moral character.” Copies are available in the University of Massachusetts Lowell, School of Nursing office or from the Commonwealth of Massachusetts Board of Registration in Nursing, 239 Causeway Street, Boston, MA 02114 and on www.mass.gov/dph/boards/RN. Prospective applicants to the Nursing program who intend to apply for licensure in states other than Massachusetts are encouraged to contact the appropriate authority in those states to ensure that they will meet the requirements for licensure application in those states.

Required Uniforms

To participate in the practicum portion of the curriculum, students are required to purchase an official uniform with insignia,
appropriate shoes, a student name pin, stethoscope, and a watch with a second hand. Students not meeting the uniform policies as stated at the beginning of the clinical experience will be asked to leave the clinical agency and will have to make up lost time. Student uniform does not include extra jewelry, ankle socks, bright colored sweaters, sneakers or clogs. The official uniform and extra school insignias are obtained from McGill’s, Inc., Manchester, NH. A company representative comes to campus and orders are taken during the spring semester of the sophomore year for availability for clinical experiences in the fall of the junior year. Registered nurse students may wear their own uniforms but must attach a University of Massachusetts Lowell insignia to this uniform and wear a student name pin while in the clinical area for student experiences. Students must present themselves in a professional manner in any clinical setting and in accordance with the agency policies where they are assigned.

Accrediting Agency

Commission on Collegiate Nursing Education

One Dupont Circle NW, Suite 530

Washington, DC 20036-1120

Transfer Admission Requirements

Transfer Admission Requirements

Students may apply to transfer into Exercise Physiology (EP) through two routes; either as external transfers from other schools or as internal transfers from other majors within UMass Lowell. Admissions are competitive and on a space available basis; overall and science GPAs of 2.7 are required for acceptance, as well as successful completion of one year long science sequence (Anatomy and Physiology I and II, Physiological Chemistry or General Chemistry I and II, and General Physics I and II). It is strongly recommended that transfer students complete college level pre-calculus or calculus prior to transfer.

Pathways into EP for external transfer students:

1. Transfer students can apply to the EP program after completing two semesters with the required overall and science GPA of 2.7 and appropriate science courses. Students must have successfully completed at least one of the year long prerequisite science sequences: Anatomy & Physiology I & II with labs; General Physics I & II with labs; or Physiological Chemistry I and II with labs (or General Chemistry I & II with labs) prior to applying.
2. For admission after three semesters with the required overall and science GPA of 2.7, students must have successfully completed at least one of the year-long prerequisite science sequences: Anatomy & Physiology I & II with labs; General Physics I & II with labs; or Physiological Chemistry I and II with labs (or General Chemistry I & II with labs) and be on track to complete all prerequisite science course sequences before the end of their fourth semester.
3. For admission after four semesters, students must have the required overall and science GPA of 2.7 and have successfully completed all science prerequisites (Anatomy & Physiology I & II with labs; General Physics I & II with labs; or Physiological Chemistry I and II with labs (or General Chemistry I & II with labs). External transfer students applying to the program should contact the Transfer Admissions Office.

Pathways into EP for internal UMass Lowell transfer students

1. UMass Lowell transfer students can apply to the EP program after completing two semesters with the required overall and science GPA of 2.7 and appropriate science courses. Students must have successfully completed at least one of the year long prerequisite science sequences: Anatomy & Physiology I & II with labs; General Physics I & II with labs; or Physiological Chemistry I and II with labs (or General Chemistry I & II with labs) prior to applying.
2. For admission after three semesters with the required overall and science GPA of 2.7, students must have successfully completed at least one of the year-long prerequisite science sequences: Anatomy & Physiology I & II with labs; General Physics I & II with labs; or Physiological Chemistry I and II with labs (or General Chemistry I & II with labs) and be on track to complete all prerequisite science course sequences before the end of their fourth semester.
3. For admission after four semesters, students must have the required overall and science GPA of 2.7 and have successfully completed all science prerequisites (Anatomy & Physiology I & II with labs; General Physics I & II with labs; or Physiological Chemistry I and II with labs (or General Chemistry I & II with labs). Students must have also successfully completed Intro to EP with a minimum grade of 2.7.

Internal transfer students applying to the program should send an email to the Exercise Physiology Program Director, Dr. Ferrara (Cynthia_Ferrara@uml.edu).

Upon acceptance into the EP program

Once accepted all students are expected to take all remaining science courses at UMass Lowell. Per UMass Lowell policy, taking a course required of the degree at another college or university requires permission of the Program Director prior to taking the course. Such permission will only be given for extenuating circumstances.
Exercise Physiology Major Requirements

Program Requirements

Academic Progression Policy

Technical Standards

Health Requirements

Additional Program Requirements

Course of Study - Class of 2013+ (pdf)

For additional information visit the Department of Physical Therapy or contact us.

Program Requirements

Completion of the Exercise Physiology program will prepare well-educated and competent practitioners. All students are expected to demonstrate the essential abilities and skills necessary to work accurately and safely with peers and patients/clients in a variety of settings, including classroom, laboratory, and practice settings. Students are expected to assume responsibility for life-long learning and professional career development.

Academic Progression Policy

To qualify for continued matriculation in the Exercise Physiology program, all students must meet specific academic criteria. These include maintaining a minimum overall GPA of 2.5, a minimum science GPA of 2.5, a minimum 2.5 GPA in all courses in the EP major, and no grade less than C in major courses. The courses that are included in the science GPA include Anatomy and Physiology I and II, Physiological Chemistry or General Chemistry I and II, and General Physics I and II, including all of the respective laboratory courses. Students who fail to meet these academic requirements will be dismissed from the program with the right to appeal. A student with a successful appeal will be allowed back into the program on probation. A student is permitted only one probationary period in his/her undergraduate career in the EP program.

Students are expected to adhere to the Honor Code and to maintain the highest ethical behavior both in and out of the classroom. A copy of the department honor code can be found in the Exercise Physiology manual. Cheating or plagiarism is strictly prohibited. Should students witness either behavior, they are required by the Code to report infractions. Students found in violation of the Honor Code will be dismissed from the program. Students in the College of Health Sciences are also expected to adhere to the university’s policy on academic integrity and the college’s social media policy.

Technical Standards

The following guidelines have been developed to specify the essential functions students must demonstrate in order to fulfill the requirements of the Exercise Physiology curricula. Functions listed are required for the learning and practice of critical thinking, communication, and technical skills taught in the curricula. These functions may be required in practicum, classroom, and laboratory environments.

Students in Exercise Physiology must demonstrate certain minimum skills, including:

1. Observational and Examination Skills:

- obtain an appropriate health/fitness/medical history from the patient/client.
- accurately examine body systems and determine vision, hearing, speech and non-verbal communication, cognition, strength, flexibility, and functional capacities of patients/clients in the context of exercise physiology.
- accurately examine cardiovascular fitness, including vital signs, blood pressure, breathing patterns, and exercise endurance.
- observe demonstrations and participate in classroom and laboratory experiences.
- reliably read all equipment monitors and dials.

2. Communication Skills:

- communicate (verbal, nonverbal and written) with others in a respectful, polite and confident manner
- maintain accurate and timely documentation in all written assignments in classroom and practicum settings
- translate complex information simply and clearly.
- maintain confidentiality of information/records in all settings.
- demonstrate understanding of English, including speaking, reading, and writing using correct grammar, accurate spelling, and expression.
- use communication technology timely and effectively, i.e. telephone, computer, UMass Lowell student email, ISIS and other classroom technologies.

3. Motor Skills:

A. Mobility

- Attend lecture and laboratory classes and access laboratories, classrooms and work stations.
- Attend internships in assigned locations.
- Accomplish required physical tasks for assessment, demonstration, leadership, and assistance in academic, laboratory, and internship settings.
 ■ Perform emergency procedures such as first aid or CPR in laboratory and internship setting.

B. Strength tasks

 ■ Safely and effectively administer exercise and training techniques which require demonstration, facilitation, spotting, or resistance.
 ■ Manually adjust exercise and training equipment.
 ■ Safely assist and guard patients/clients during exercise testing and training.

C. Fine motor and coordination skills

 ■ Use palpation and touch to accurately assess pulse, locate and prep sites for electrode placement, and skinfold measurement.
 ■ Accurately set equipment dials and switches, calipers, use stethoscopes and sphygmomanometers, and tape measures.
 ■ Accurately assess blood pressure.

4. Critical Thinking Skills:

 ■ demonstrate the ability to recall knowledge, comprehend and interpret, apply, analyze, synthesize, and evaluate information obtained during didactic, laboratory, and/or practice setting experiences.
 ■ demonstrate problem-solving skills necessary for identifying/prioritizing problems, and developing appropriate solutions and treatment plans for patient/client problems as well as evaluating those solutions for efficacy.
 ■ demonstrate the ability evaluate and integrate scientific research.

5. Behavioral and Social Skills:

 ■ demonstrate appropriate interpersonal skills evidenced by mature, sensitive, and effective professional interactions
 ■ demonstrate a positive attitude (motivation) toward learning
 ■ demonstrate attributes of honesty, integrity, enthusiasm, compassion, empathy, and continuous regard for others
 ■ demonstrate emotional well-being necessary for exercising sound judgment
 ■ demonstrate appropriate time management, dependability, and punctuality
 ■ demonstrate ability to critique own performance, accept responsibility for one’s own actions, and follow through on commitments and assignments
 ■ actively seek help when necessary and appropriately utilize constructive feedback
 ■ demonstrate organizational skills, completing all professional responsibilities and assignments in a timely manner
 ■ adapt to ever-changing environments, demonstrating flexibility, and learning in the face of the uncertainties and stresses inherent in the educational and practice settings
 ■ delegate responsibility appropriately, and function as a member of a team
 ■ demonstrate respect of personal space.
 ■ maintain appropriate personal hygiene and adhere to appropriate professional attire mandated by the department and practicum setting.
 ■ display tolerance for individual, social, gender, and cultural differences in fellow students, colleagues, faculty, patients/clients and community members.

The University of Massachusetts Lowell Exercise Physiology Program will consider for admission any applicant who demonstrates the ability to perform or learn to perform the functions listed in this document with or without reasonable accommodations or academic adjustments consistent with ADA. Applicants with disabilities are not required to disclose the existence or nature of their disability during the admissions process; however, any applicant with questions about these technical requirements is strongly encouraged to discuss the issue with a Department representative. If appropriate, and upon the request of the applicant/student, academic adjustments and/or reasonable accommodations may be provided.

Health Requirements

All students in the Exercise Physiology program must meet the following health requirements:

1. Prior to entry into the Practicum in the senior year, students must provide evidence of a current physical exam indicating satisfactory general health as mandated by the state (Proof of immunizations for MMR (2 doses) Varicella (2 doses) Tdap (1 dose current TB test, and Hep B (3 vaccines)). Additional requirements may be made by practicum sites (flu shot, color blind test, etc.)
2. Any other pertinent health information/needs must be communicated to the department faculty in a timely manner.

Additional Program Requirements

1. Students must meet with their advisor each semester for pre-registration advising.
2. Students must provide evidence of current CPR Certification (infant through adult with AED) prior to entry into the senior year.
3. Students are expected to demonstrate an understanding of Standard Precautions and current HIPAA regulations and adhere to those standards in the laboratory and practice setting when necessary.
4. A criminal background check (CORI check) is required before starting the Practicum in the senior year.

Admission Requirements

Freshman Entry EP Program
1. A high school diploma
2. High school grades of B (3.0) or better
3. Completion of high school program that is specifically college prep courses which includes English, mathematics, biology, chemistry and physics. It is strongly recommended that incoming freshman take math through pre-calculus or calculus.
4. Combined SAT scores totaling at least 1,000 (mathematics and verbal)
5. Evidence of good health through a physical exam that demonstrates the ability of the student to actively participate in all phases of laboratory work.

Freshman Entry DPT/EP program

Students who meet the following qualifications are invited into the DPT/EP program during the admissions process.
Students completing the BS in EP program (4 Years) with an overall and science GPA minimum of 3.4 will continue into the professional (graduate) phase of the DPT program.
1. A high school diploma.
2. High school grades of B+ (3.25) or better.
3. Completion of high school program that is specifically college prep courses which includes English, mathematics, biology, chemistry and physics. It is strongly recommended that incoming freshman take math through pre-calculus or calculus and complete high school physics.
4. Combined SAT scores totaling at least 1,200 (mathematics and verbal).
5. Evidence of good health through a physical exam that demonstrates the ability of the student to actively participate in all phases of laboratory work.

Department of Physical Therapy

The goal of the Department of Physical Therapy is to prepare entry-level practitioners in exercise physiology and in physical therapy. Exercise physiology is the study of acute and chronic physiological responses and adaptations resulting from exercise and physical activity. The undergraduate curriculum is broad based and includes courses in liberal arts, basic sciences (biology, anatomy & physiology, chemistry, physics, biochemistry) and professional courses (exercise physiology, kinesiology, exercise prescription/program planning). The EP curriculum is sequential, comprehensive, and cumulative and prepares students for the capstone practicum in the senior year. Students are assigned to either a cardiac or pulmonary rehabilitation setting, fitness setting or research setting for a semester. While working in the practicum setting, students attend a weekly seminar to discuss issues which arise on practicums.

Why choose the Exercise Physiology program at UMass Lowell?

- Highly qualified and caring faculty
- Dedicated students
- Graduates are competent, polished beginning professionals
- Career pathway into many graduate programs, including the Doctor of Physical Therapy program at the University of Massachusetts Lowell

Career Opportunities

There are numerous career opportunities for graduates of the exercise physiology program. Graduates can work as exercise practitioners (group exercise instructor, personal trainer, strength and conditioning coach) in private or corporate fitness settings or with sport teams. The focus is on improving or maintaining health, fitness, or performance. Graduates can work in sports medicine (the field of medicine dealing with injuries sustained in athletic endeavors and/or illnesses impacting sport performance). Practice settings may include sports medicine clinics or sports training facilities. Graduates can also work as clinical exercise physiologists in cardiopulmonary rehabilitation settings, including hospitals, outpatient clinics, and medically supervised fitness centers. Patients/clients present with cardiac and pulmonary conditions, and may be recovering from surgery or acute hospitalization.

There are no national professional licensing requirements at the present time. Some states do have licensing for exercise physiologists. There is a certification process for health/fitness instructors by the American College of Sports Medicine (ACSM) and a separate certification in exercise and conditioning by the National Strength and Conditioning Association (NSCA).

Graduates can pursue graduate study in Exercise Physiology. Advanced degrees in EP (Master’s, Doctorate) prepare individuals for positions as exercise specialists (ACSM certification, NSCA certification) or exercise program directors. Graduate degrees in EP also prepare individuals for research or teaching positions. A Ph.D. is typically required for teaching or research positions in higher education.

Graduates of the exercise physiology program meet all the necessary requirements for application to the University of Massachusetts Lowell Doctor of Physical Therapy Program (DPT). The DPT program is a fully accredited, three-year program designed to prepare entry-level practitioners in physical therapy. It includes 94-96 credits of coursework depending on Pharmacology coursework and 35 weeks of clinical education experience. Students are also well-qualified to enter graduate programs in other health professions including medicine, physician assistant, nursing, occupational therapy, sports nutrition, etc.

Applications to the DPT program at University of Massachusetts Lowell are competitive. Requirements for admission to the graduate program in physical therapy include a Bachelor’s degree from an accredited university or college, an
undergraduate grade point average (GPA) of 3.0 or better, a GPA in science courses of 3.0 or better, Graduate Record Examination (GRE), documented personal experience in a physical therapy setting and three letters of recommendation.

College of Health Sciences Special Requirements

Professionalism

Students are expected to adhere to the policies and procedures of the University and the College of Health Sciences. Failure to stay informed of the policies and procedures is not an acceptable excuse for non-compliance. All students are expected to adhere to the Professional Competencies, Technical Skills and Essential Functions in both clinical and classroom settings. Students are advised to review these competencies, skills and functions on their departmental websites.

Students in the College of Health Sciences are expected to act with honesty, integrity, and respect for the privacy rights of others. Students are advised to review the College of Health Sciences Social Media Policy. Failure to adhere to this policy may result in probation, suspension or dismissal from the College of Health Sciences.

College of Health Sciences students are required to be aware of their rights and responsibilities under the Massachusetts Right to Know Law regarding chemical hazards in the workplace.

Liability Insurance

The University maintains a Comprehensive General Liability Policy that provides coverage for professional liability of non-licensed students, while they are serving in a supervised internship program in satisfaction of course requirements, or while acting at the direction of, or performing services for, or on behalf of the University. Nursing, Exercise Physiology, Physical Therapy, Nutrition, Clinical Laboratory Science, Medical Laboratory Science and Community Health Education non-licensed students who perform services as part of their education program are covered under this policy. Registered Nurse students must provide their own professional liability insurance.

Health and CPR

Health Requirements mandated by the University for all students are listed in the Undergraduate Admissions section of this catalog. Additional specific requirements for students in the College of Health Sciences are listed on departmental websites. Documentation of health requirements is required by individual departments and by Student Health Services. These requirements are mandated by State Law and contractual agreements with our clinical sites and other affiliations. Students are advised to review Health Requirements posted on UMass Lowell Health Services website. Failure to comply with Health and CPR requirements may jeopardize continued matriculation and enrollment in clinical courses.

Uniforms/Attire

Students are expected to present a professional appearance in all clinical activities. Students are advised to review Uniform Policy and Dress Codes on departmental websites.

Clinical Placements and Transportation

Final decisions regarding clinical placements are the responsibility of the faculty of each respective department. All students must provide their own transportation to clinical placements. Car pools are often arranged among students.

College of Health Sciences Criminal Background Check

By law, certain agencies have the right to require a criminal record check on any student affiliating at their institutions. College of Health Sciences students are advised that any student whose course-work, placement, community service, voluntary activity or service learning related to the University that requires direct and unmonitored access to children, elderly, patients, disabled people or other at risk populations may be required to undergo a national CORI (Criminal Offender Record Information) and/or SORI (Sex Offender Record Information). Depending on the individual agency’s policy, students may be expected to pay for the cost of the CORI or SORI check. Students who refuse to consent to a CORI and/or SORI will be deemed ineligible for placement and continued matriculation in their program may be jeopardized. Personnel who are authorized to request, access and review CORI and/or SORI reports are identified in the UMass. Lowell CORI Policy for Students available on the UML Human Resource website. Failure to pass a CORI and/or SORI check may also jeopardize a student’s continued matriculation, clinical placements, and state licensure. The process and standard of review for determining a student’s eligibility for engagement in covered activity based on the CORI and/or SORI report, including whether any criminal offenses may disqualify an individual, is also available on the UML Human Resource website.

If a College of Health Sciences student is cleared for a clinical practicum experience but SHE subsequently discovers a violation on the student’s CORI (from any state) or a violation of any criminal background check required by an agency, the student will immediately be removed from their clinical practicum experience pending further investigation, which may include a delay in a return to the practicum experience or possible academic probation or academic dismissal from the program or from the College of Health Sciences.

College of Health Sciences students who receive a new violation on their record while in a clinical practicum experience but do not notify the Assistant Dean of the College of Health Sciences within 5 business days of the violation may be subject to additional disciplinary actions. These may include, but are not limited to, academic probation or academic dismissal from...
the program of from the College of Health Sciences.

The purpose of the CORI check is to ensure public safety and to avoid unacceptable risk to vulnerable populations. As most agencies sponsoring a clinical/practicum experience require CORI, SORI or other background checks prior to offering a practicum experience to students, the College of Health Sciences cannot guarantee a practicum experience to a student if a sponsoring agency refuses to accept the results of any CORI/SORI or other criminal background check required by the sponsoring agency. Students found to have criminal convictions or pending actions which represent unacceptable risk to vulnerable populations will be presumed ineligible for practicum experiences.

Clinical Affiliate Random Drug Screening

Students enrolled in College of Health Sciences programs may also be required to undergo and pass a drug screening analysis in order to be eligible for placement in an off campus learning experience. Per the University’s contractual obligations with certain external agencies, students assigned to clinical educational experiences at some facilities may be required to undergo and pass random drug screening analysis in order to remain at that clinical facility. Test results obtained during testing will be held in confidence and treated as medical information. If a student tests positive and further action is required, only those personnel with a need to know will be provided access to test results. Depending on the individual agency’s policy, students may be expected to pay for the cost of drug screening. Students who do not have a negative drug screen or refuse to consent to a drug screen analysis will be deemed ineligible for clinical placement which may affect their ability to progress in the program.

College of Health Sciences Social Media Policy

The College of Health Sciences recognizes that all involved in health care have a moral, ethical and legal responsibility to maintain individual’s rights to privacy. HIPPA protects patient privacy by law and includes individually identifiable patient information in oral or recorded form where the information could identify an individual by name, medical condition, demographic data or other means. Students in the College of Health Sciences are expected to act with honesty, integrity and respect the privacy rights of others. All students in the College of Health Sciences are expected to meet their professional responsibilities when using social media and other electronic networks including but not limited to blogs, instant messaging, social networking sites, email, public media sites and photographs. This policy prohibits posting written material or photographs that identify patients, health care agencies, educational institutions or other students in clinical sites or patient related activities. This policy applies whether using University devices and computers or personal equipment. In addition, all College of Health Sciences students are required to abide by clinical policies related to the use of social media and technological resources. Failure to adhere to this policy may result in probation, suspension or dismissal from the College of Health Sciences and/or legal prosecution under the requirements of HIPPA.

Academic Requirements for College of Health Sciences

Candidates for the baccalaureate degree in the College of Health Sciences must satisfy the general University requirements for graduation, complete all courses and credits as required by the specific program of study, and meet the academic requirements of the School as specified.

Grading Policies for Undergraduate Catalog, effective September 1, 2005

All students must maintain ongoing cumulative grade point averages, semester grade point averages, science grade point averages and professional course grade point averages as identified on specific department websites.

Graduate Program in Occupational Ergonomics

The Department of Work Environment offers a graduate program in Occupational Ergonomics. Ergonomics provides the scientific basis for optimized design of the work environment compatible with the capabilities and limitations of the working population.

Graduate Program in Industrial Hygiene

The Department of Work Environment offers a graduate program in Industrial Hygiene. Industrial Hygiene is concerned with the protection of worker health through the prevention of occupations illness.

Graduate Program in Occupational Epidemiology

The Department of Work Environment offers a graduate program in Occupational Epidemiology. Epidemiology is the study of the distribution and determinants of disease in human populations.

Graduate Program in Clean Production/Pollution Prevention

The Department of Work Environment offers a graduate program in Clean Production/Pollution Prevention. Pollution Prevention (the preferred term in the US) is the conceptual and procedural approach to production that demands that all of the life-cycle of a product should be addressed with the objective of prevention or minimization of short- and long-term risks to humans and the environment.
Graduate Program in Work Environment Policy

The Department of Work Environment offers a graduate program in Work Environment Policy. Work environment Policy is concerned with the study of the forces that determine the production, recognition, and control of health and safety hazards in industry.

College of Health Sciences

Led by Dean Shortie McKinney, Ph.D., the College of Health Sciences is a unique and exciting combination of health professionals, community health educators and public health advocates - all committed to finding ways to advance the health of our region, nation and the world. Learn more about the College of Health Sciences on our website.

- Policy
- Programs

Undergraduate Minor in Education

The Graduate School of Education offers a minor especially designed for those students who are considering a career as an elementary teacher. We also offer a minor for students who are generally interested in education or who might consider entering middle or high school teaching. A fast track into teaching is available with the minor for students considering middle or high school teaching; contact Dr. Ossen at the beginning of your senior year.

- Both minors in education consists of 18 credits.
- All course pre-requisites must be satisfied.
- Freshmen are not eligible to begin the minor.
- Students will be required to complete a CORI (Criminal Offender Record Information) background check in order to visit or work in classrooms.

For information contact Dr. John Brown
510 O'Leary Library
978-934-4604
E-mail: John_Brown@uml.edu

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<th>Elementary Education Minor (18 credits)</th>
<th>12 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
</tr>
<tr>
<td>92.107 Elementary Math for Teaching: Numbers and Operations</td>
<td>3 credits</td>
</tr>
<tr>
<td>92.227 Elementary Math for Teaching: Geometry and Measurement</td>
<td>3 credits</td>
</tr>
<tr>
<td>02.401 Exploring Teaching</td>
<td>3 credits</td>
</tr>
<tr>
<td>01.384 Language, Literacy and Culture</td>
<td>3 credits</td>
</tr>
<tr>
<td>Electives Choose from:</td>
<td>6 credits only</td>
</tr>
<tr>
<td>01.373 Teaching and Learning with Technology</td>
<td>3 credits</td>
</tr>
<tr>
<td>01.371 Educational Psychology</td>
<td>3 credits</td>
</tr>
<tr>
<td>01.391 Understanding Education</td>
<td>3 credits</td>
</tr>
<tr>
<td>02.301 JUMPSTART - both courses must be taken</td>
<td>6 credits</td>
</tr>
<tr>
<td>02.302 Early Literacy Community Experience I</td>
<td></td>
</tr>
<tr>
<td>02.302 Early Literacy Community Experience II</td>
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</table>

<table>
<thead>
<tr>
<th>Education Minor (18 credits)</th>
<th>15 credits</th>
</tr>
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<tbody>
<tr>
<td>Required Courses</td>
<td></td>
</tr>
<tr>
<td>01.384 Language, Literacy and Culture</td>
<td>3 credits</td>
</tr>
<tr>
<td>01.373 Teaching and Learning with Technology</td>
<td>3 credits</td>
</tr>
<tr>
<td>01.371 Educational Psychology</td>
<td>3 credits</td>
</tr>
<tr>
<td>01.391 Understanding Education</td>
<td>3 credits</td>
</tr>
<tr>
<td>02.401 Exploring Teaching</td>
<td>3 credits</td>
</tr>
<tr>
<td>Electives</td>
<td>3 credits only</td>
</tr>
<tr>
<td>One three credit course chosen with approval of Dr. Brown.</td>
<td></td>
</tr>
</tbody>
</table>

Electives for seniors accepted into the middle/secondary fast track to teaching (apply during the fall semester of your senior year after discussion with Dr. Brown) Choose from:

| 01.501 Teaching Diverse Populations | 3 credits |
| 01.502 Adolescent Development and Learning | 3 credits |
Intercollegiate and Interdisciplinary Programs

Interdisciplinary programs provide students with opportunities to learn and apply modes of inquiry essential to multiple interrelated disciplines. Special emphases are placed on writing fluency, an essential skill for success not only in college work but throughout life; on diversity and the study of foreign cultures, so that students gain an appreciation of the uniqueness of each such culture as reflected in its language and history as well as the many traditions that make up our multicultural heritage; and on an understanding of the forces, figures and events that shape our country and our world.

Interrelating sciences, mathematics and analytical processes trains students to reason logically and think critically in both quantitative and qualitative modes. Moreover, direct experience in science for non-scientists through experience both in lecture hall and in laboratory is an essential part of the preparation of informed citizens, who will be called on increasingly in the future to understand the complex issues of science and technology relative to the risks and benefits of its applications.

Some programs involve philosophical inquiry and awareness regarding issues of fundamental human importance. Some grasp of the nature of humankind, of the criteria for knowledge and for making moral decisions fosters the essential lifetime skills of clear thinking, rational evaluation and critical self-reflection. Interdisciplinary programs in the Social Sciences provide opportunities for inquiry into human behavior and its possibilities and limitations. Comparative studies in art history, literature, music history, and the humanities deepen understanding and appreciation of aesthetic, cultural, and ethical values both to our own culture and of others.

- FAHSS list of Interdisciplinary programs and minors
- Business Administration Minor for Engineers
- Undergraduate Minor in Education
- UTeach - STEM Teaching Minor
- Joint Military Studies Minor
- Robotics

Department of Accounting

Accounting Concentration

Bachelor of Science in Business Administration

The accounting concentration provides students with the opportunity to obtain the quantitative, analytical skills necessary for developing and analyzing financial information for all types of institutions. Data accumulation, analysis, and interpretation, together with communication of results, are fundamental activities of professional accountants. The accounting courses contain numerous general ledger and spreadsheet projects, reinforcing computer literacy and project orientation.

View the Course of Study (pdf).

Minor in Business Administration

The Manning School of Business offers a Business Administration minor for students not majoring in the School. Students must file a Declaration of Minor form with the School before registering for 300 level courses. In order to earn a minor, students must file an academic petition approved by the Manning School of Business with the Office of Enrollment Services. This petition should be filed immediately after registering for the final courses completing the minor.

Bachelor's Degree Programs

Bachelor of Science in Business Administration

The Bachelor of Science in Business Administration degree provides students with a foundation in the liberal arts and sciences, as well as analytical skills and specialized professional courses, which enable them to function as effective professional managers. Course work in the first two years focuses on the liberal arts, mathematics, sciences and introductory professional skills courses. These subjects provide the foundation on which the advanced courses are built. Liberal arts and sciences courses emphasize written English, behavioral and social sciences, and mathematics. Professional skills courses include accounting, economics, and statistics.

As juniors and seniors, students concentrate in professional programs offered by the Manning School of Business. The School curriculum offers concentrations in five areas of management: Accounting, Finance, Management, Marketing, and Management Information Systems (MIS). The upper-level curriculum starts with introductory management courses covering the functional areas found in organizations. Through the junior and senior years students will complete a course of study in at least one concentration. Given the increasing importance of global competition and its impact on both public and private sectors in the U.S., the School also includes an international component in all curricula. Regardless of concentration, students have sufficient electives to permit them to tailor programs to their special interests.

Note - The Bachelor of Science in Industrial Management program was closed for new admissions in 2002.

Curriculum Checksheets
The main link below shows university requirements for a BS in business administration. The secondary links show specific requirements for concentrations within the major. Following are downloadable degree plans for students entering the Manning School of Business in or after Fall 2005 (checksheets are in PDF format, Adobe Acrobat Reader is required for viewing):

**BS in Business Administration**

- Concentration in Accounting
- Concentration in Corporate Finance
- Concentration in Entrepreneurship
- Concentration in Financial Markets
- Concentration in General Finance
- Concentration in International Business
- Concentration in Marketing
- Concentration in Management
- Concentration in Management Information Systems
- Concentration in Supply Chain/Operations Management

**Operations and Information Systems Department**

**Bachelor of Science in Business Administration**

Operations and Information Systems concentration (OIS) focuses on the application of information technology in organizations. Students study the design, development, and deployment of computer-based information systems in the firm.

In addition to the COM core and required courses, students electing to major in OIS are required to take five courses. Of the five, four are required (63.300, 63.307, 63.403 and 63.404) and at least one from the following list: 63.406, 63.407, 63.408 and 63.409.

The following is a suggested sequence of courses:

1. Junior year: In addition to 63.301, students should enroll in 63.307 as this course is a prerequisite for 63.407. Other OIS courses such as 63.300, 63.403, and 63.404 can be taken based on individual choice.
2. Senior year: Enroll in remaining OIS courses and the OIS elective (e.g. 63.406 or 63.407 or 63.408). The required MIS elective must be a 63.xxx course. PS: Generally only one of the elective is offered every semester.

**Manning School of Business Organization & Governance**

The Manning School of Business is organized into three departments: Accounting, Management (which houses Finance, Management, Manufacturing and Marketing) and Operations and Information Systems. The faculty of the School has overall responsibility for academic policies of the School.

**General School Requirements**

Candidates for undergraduate degrees must satisfy the general University requirements for graduation and must complete all requirements as specified by one of the established curricula within the School.

Students may elect a second concentration in the Manning School of Business provided they complete all requirements specified by the concentration. Students who matriculate in other colleges of the University may minor in Business Administration.

For more information:

- Declaration of Major
- Policies for Undergraduate Programs

**Declaration of Program**

Students enrolled in the Manning School of Business are required to specify their degree program upon enrollment. Students pursuing the Bachelor of Science in Business Administration degree follow a core program for the first two years and after completing specific filter courses must apply to be admitted to the upper division and to declare a concentration. During the first semester of their senior year, students are required to file a Declaration of Intention to Graduate (DIG) form with their advisor or the department's designated DIG officer.

**Mission**

The mission of the Manning School of Business is to support regional business development. We do this by engaging our students in affordable, internationally accredited management education programs, innovating in course delivery, conducting research that emphasizes the practical application of knowledge, and serving a dynamic community through outreach activities.
Objectives of the Manning School of Business

The faculty of the Manning School of Business has developed curricula intended to provide an education at the leading edge of the theory and practice of management. Students are educated to function successfully as professionals in business and non-business organizations. The School’s faculty actively engages in research and outreach activities which support high quality business education. The School places a high value on classroom instruction. A variety of teaching methods are utilized.

The School also participates in efforts to support the region’s economy. The resources and experience of the School faculty and students are available to assist in the solution of problems faced by business and governmental units in the state, region, and beyond.

Policies and Programs

The Manning School of Business, led by Dean Katheryn Carter, Ph.D., is fully accredited at the undergraduate and graduate levels by AACSB International - The Association to Advance Collegiate Schools of Business. The School offers an undergraduate program of study leading to the Bachelor of Science in Business Administration (BSBA) with concentrations in the five areas of management. Refer to the Graduate Catalog for information about graduate programs in the School. Following the AACSB philosophy, the School endeavors to create the intellectual climate required to offer a dynamic, high quality undergraduate education in business through a challenging, relevant curriculum. To enhance the quality of the management program, the faculty of the School is actively engaged in teaching, research, outreach, and other scholarly activities designed to support a major focus on institutional excellence.

The Manning School of Business promotes economic development by offering high quality educational programs, internships, and by conducting both applied and theoretical research that support sustainable regional economic development. These activities provide students with the knowledge, skills, and sound ethical foundations to function effectively in a rapidly changing global environment.

Programs are designed to develop broad integrative skills, using leading edge business technology, and a problem solving orientation that can be applied to all functional areas of management. In addition to program content, the primary learning objectives include critical thinking, teamwork, diversity, ethics, and communications. For more information visit the Manning School of Business or contact us.

Policy

- Declaration of Program
- Mission & Objectives
- Organization & Governance
- Policies for Undergraduate Programs

Bachelor’s Degree Programs

- All Bachelor's Degree Programs (BS in Business Administration)
- Accounting
- Operations and Information Systems (Management Information Systems, Supply Chain & Operations Management)
- Business Administration Minor
- Management (Entrepreneurship, Finance, International Business, Management, Marketing)

Entrepreneurship Concentration

The entrepreneurship concentration prepares students to be an “outside of the box” thinker and innovator in today’s complex global economy. Using an interdisciplinary focus, students who complete the concentration will:

- Develop the management skills required to identify and launch new business ventures around innovative products, services and technologies
- Develop an understanding of the concepts and activities associated with entrepreneurship and innovation
- Understand the financial aspects of an entrepreneurial venture from start-up to “harvest”
- Discover their individual “entrepreneurial spirit” through experiential learning in interdisciplinary classes and the College’s Venture Lab

As a capstone experience in the entrepreneurship concentration students will develop the essential components of a new venture/new opportunity business plan.

The required courses within the Entrepreneurship concentration consist of:

- 64.361 - Starting a New Venture
- 64.362 - Corporate Entrepreneurship
- 64.463 - Managing Innovation
- 64.464 - Finance for Emerging Business Enterprises
**Recommended Course Sequence**

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Sophomores</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Writing I</td>
<td>Financial Accounting</td>
</tr>
<tr>
<td>Management Pre-calculus</td>
<td>Statistics</td>
</tr>
<tr>
<td>College Writing II</td>
<td>Macro Economics</td>
</tr>
<tr>
<td>Management Calculus</td>
<td>Professional Communication</td>
</tr>
<tr>
<td>General Education Courses</td>
<td>Micro Economics</td>
</tr>
<tr>
<td></td>
<td>Managerial Accounting</td>
</tr>
<tr>
<td></td>
<td>Marketing Principles</td>
</tr>
<tr>
<td></td>
<td>Operations Analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Juniors</th>
<th>Seniors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Management</td>
<td>Managing Innovation</td>
</tr>
<tr>
<td>Business Finance</td>
<td>Finance for Emerging Business Enterprises</td>
</tr>
<tr>
<td>Starting a New Venture</td>
<td>COM/Non-COM Electives</td>
</tr>
<tr>
<td>Corporate Entrepreneurship</td>
<td>Strategic Management</td>
</tr>
<tr>
<td>Operations Management</td>
<td></td>
</tr>
<tr>
<td>Management Information Systems</td>
<td></td>
</tr>
<tr>
<td>Organizational Behavior</td>
<td></td>
</tr>
<tr>
<td>General Education Courses</td>
<td></td>
</tr>
</tbody>
</table>

*Please consult the College of Management curriculum work sheet for a detailed list of specific course requirements in the Bachelor of Science in Business Administration program.

**Finance Concentration**

**Bachelor of Science in Business Administration**

The Finance concentration is designed to provide students with a strong background in the fundamental concepts of finance, as well as intensive application of financial problem solving and decision making techniques to a broad spectrum of private and public enterprises operating in domestic and multinational environments. The objective of the finance program is to prepare students for a wide variety of positions in financial management, banking, and the securities field. Courses for the General Finance track follow. Tracks in Corporate Finance and Financial Markets are also available.

The Corporate Finance track requires a course in Intermediate Accounting I (60.301), Accounting Information Systems (60.303), Federal Income Taxes (60.431), and Microeconomic Theory (49.303). The Financial Markets track requires a course in Macroeconomic Theory (49.304), Banking and Monetary Policies (49.318), and an Economics elective (49.xxx). The additional courses required in each of these tracks replace COM electives found in the General Finance track.

**Management Concentration**

**Bachelor of Science in Business Administration**

American management in the 21st century will continue to face significant change in the internal and external business environment. Rapid technological innovation, increasing international competitiveness, a more diverse labor force, and employees who increasingly expect a high quality work life represent only some of those changes that directly affect organizational success and the health and vitality of our economy.

The purpose of the management concentration is to produce skilled managers able to perform effectively under these conditions and contribute to economic development. The program’s goal is to develop creative leaders for management positions who have strong behavioral skills and an integrated, problem-centered approach to decision-making, applicable in any functional area of business.

The curriculum emphasizes the critical competencies required of successful managers in contemporary organizations. These include a wide range of complex human resource skills that address the diverse needs and characteristics of employees in the modern workplace; negotiation skills that facilitate influence when dealing with parties both inside and outside the firm; skills in leadership that enhance employee commitment, and facilitate positive innovation and change; and the ability to plan for, and manage, one’s own career in ways that are congruent with the more dynamic, competitive, and entrepreneurial economy that managers are facing today.

**Marketing Concentration**

**Bachelor of Science in Business Administration**
Marketing is the process whereby organizations anticipate and adapt to environmental change. Accordingly, successful management of the marketing process requires an appreciation for and understanding of buyer behavior, marketing research, product development, distribution and promotional strategies, and pricing policy. Students graduating in marketing often go on to careers in general management, as well as advertising, sales and sales management, retailing, wholesaling, marketing research, physical distribution, purchasing, and marketing management.

Marketing Electives include Business Marketing (62.403), Purchasing & Materials Management (62.406), Services Marketing (62.410), and Buyer Behavior (62.402).

Department of Management

The Department of Management offers the following concentrations within the Bachelor of Science in Business Administration. Click on the concentration for information and course listing. All courses of study are in pdf format (download Adobe Acrobat Reader).

- Entrepreneurship, Course of Study
- Finance, Course of Study
- International Business, Course of Study
- Management, Course of Study
- Marketing, Course of Study

Honors Program in Biological Sciences

Students admitted to the Honors College, as well as those whose academic performance is consistently at a high level, are invited to enroll in special sections of required and elective courses. These sections promise an enhanced learning experience and/or an amplification of the subject matter presented in the regular sections. Modes of examination and course requirements may differ as well. The Department of Biological Sciences provides several Honors courses. Exceptional students may also avail themselves of “Honors Supplements” to many of the other departmental offerings. Honors students explore a subject in greater depth and/or breadth than in the standard course. Additional meetings with the instructor, augmented course assignments, an independent project, or a combination of these is usually required. Successful completion of such courses will earn honors credit and will be so designated on the University transcript.

Biotechnology Option

This option offers biology majors a set of advanced courses designed to provide the conceptual background and practical training needed for an exciting and lucrative career in genetic engineering, bioinformatics, industrial microbiology, cell culture technology, and the manufacture and purification of diagnostics and other biologically relevant materials.

Many students in Biological Sciences take advantage of the unique resources of Research Centers affiliated with the Department of Biological Sciences. The Centers for Neurobiology and Bioprocess Development, offer courses and/or research opportunities to qualified undergraduates.

Option Requirements (in addition to the core requirements)

Required Courses – 21 to 23 credits

Complete a minimum of five (5) of the following lecture courses, three (3) with the corresponding lab component. In addition, complete one additional Biology course selected from any 300 or 400 level course in the Biological Sciences (*81* prefix).

<table>
<thead>
<tr>
<th>COURSES with LECTURE ONLY</th>
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<tbody>
<tr>
<td>81.428 Molecular Biotechnology: Recombinant Protein Production</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.442 Cell Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.465 Stem Cell Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.467 Molecular Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.472 Virology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.482 Cancer Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.488 Structural Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.490 Human Neurobiology</td>
<td>3 cr</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>COURSES with SEPARATE LECTURES &amp; LABS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>81.432 Genomics</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.434 Genomics Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.493 Immunology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.495 Immunology Lab</td>
<td>2 cr</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COURSES that are LECTURE/LAB COMBINED</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>81.429 Recombinant Protein Production Techniques</td>
<td>4 cr</td>
</tr>
<tr>
<td>81.469 Molecular Biology Lab</td>
<td>4 cr</td>
</tr>
</tbody>
</table>
View the complete Biotechnology Option Curriculum Checksheet (pdf).

Post-Graduate Programs

The following is a summary of post-graduate training available in the Department of Biological Sciences. For more detailed information, please consult the Graduate Catalog or request specific information from the Department Office.

Graduate Certificate in Biotechnology and Bioprocessing

This certificate, offered jointly by the Departments of Biological Sciences and Chemical Engineering, will be of special interest for those seeking employment in the biotechnology industry. These multidisciplinary courses in fermentation, cell cultivation and protein purification bridge the gap between research and manufacturing, and add breadth to the students' background, preparing them for leadership roles in biopharmaceutical project teams. Three of the four courses required for certification are offered by the Massachusetts Bioprocess Development Center. The fourth may be any of several approved biotechnology electives available within both departments. With careful planning, a student receiving the Bachelor's degree in Biology or Chemical Engineering may complete requirements for the Graduate Certificate on a full or part time basis during the summer and fall semesters following graduation. Note that credits earned for the certificate can be applied toward the total credits (30) needed to satisfy requirements for the MS degree in Biological Sciences.

Graduate Certificate Molecular and Cellular Biotechnology

The Graduate Certificate in Molecular and Cellular Biotechnology draws entirely on existing strengths at University of Massachusetts Lowell and the Department of Biological Sciences to provide students with training in this growing field. Over the years we have witnessed an ever-increasing demand for manipulation of DNA and analysis in cultured cells in most aspects of funded research; this need is reflected in the job market. The Biological Sciences Department has all the necessary resources for this Graduate Certificate, which will place our existing students in the forefront of the job market, and also attract additional graduate students. Note that credits earned for the certificate can be applied toward the total credits (30) needed to satisfy requirements for the M.S. degree in Biological Sciences.

Graduate Certificate in Environmental Biotechnology

Environmental biotechnology refers to the application of biological technologies to monitor, understand, and remediate environmental problems. Recent advances in biotechnology are providing new avenues for investigating biologically-mediated environmental processes, many of which were inaccessible using traditional approaches. As environmental resources are increasingly strained and new biological technologies with the potential to improve our environment become available, the demand for professionals with training in environmental biotechnology will continue to increase. The certificate in Environmental Biotechnology addresses this demand by combining courses that explore the ecological impact of anthropogenic environmental change with courses that provide training in current biological technologies that can be brought to bear on environmental problems. The proposed Certificate consists of two core courses that focus on environmental problems and processes and two electives that focus on technologies to monitor and/or remediate the environment. Note that credits earned for the certificate can be applied toward the total credits (30) needed to satisfy requirements for the M.S. degree in Biological Sciences.

Five Year BS/MS Program

An accelerated five-year course of study leading to the BS and MS degrees in Biological Sciences is available to full-time students who have a grade-point average of 3.0 or above at the end of their junior year. Interested students, after evaluation and acceptance by the Department's graduate selection committee, meet with the graduate coordinator to design a plan for completion of requirements for both degrees within a five-year time frame. Up to 6 credits of graduate courses (500 level or higher) may be used by a student in the BS/MS program for both graduate and undergraduate degrees. Graduate Record Exam scores are not required.

The objective of these programs is to foster critical thinking and to develop skills needed for independent laboratory study. This is accomplished, in part, by offering advanced lecture, seminar and laboratory courses. While it is possible to complete MS requirements without thesis or project option it is this latter activity that most distinguishes graduate from undergraduate students. All full-time M.S. degree students are, therefore, strongly urged to elect thesis or project options. The Department of Biological Sciences also collaborates with the Department of Chemistry in offering the Ph.D. Option in Biochemistry. Laboratory thesis research is a required component of this program.

Research in the Department of Biological Sciences

Eligible undergraduate and graduate students interested in research are encouraged to meet with research faculty as early in their program as possible in order to identify topic areas of interest. The principal areas of research in this department are in molecular and cell biology, biotechnology, biochemistry and environmental biology. In addition to research programs within
the Department, there are interesting projects on-going in the Massachusetts Bioprocess Development Center. Since there
is a limit to the number of students who can be accommodated by any professor, it is a good idea to select a number of
projects so that, if one laboratory is filled, there are alternatives. There is no guarantee that all students seeking laboratory
research experience will be accommodated.

Other Programs

In addition to meeting the needs of students majoring in Biological Sciences, the Department offers courses to others who
have elected the Biology focus or who are pursuing a degree in biomedical aspects of Radiological Sciences. Specialized
upper level courses are also available to qualified students majoring in other science, health, and engineering programs
throughout the University.

Bioinformatics Option

The rapidly expanding field of bioinformatics, which concerns the acquisition and analysis of biological data on a massive scale, requires biologists who are
also well versed in computer science. Towards training these future multidisciplinary scientists, the Bioinformatics option offers a rigorous core of basic
Biology and Computer Science courses, along with advanced courses in Bioinformatics and Biology electives. Computing I, II, and III are added to the
Biology core required courses along with Genomics and Discrete Mathematics; Calculus for Life Sciences I is replaced by Calculus I and Calculus II.
Students in the Bioinformatics Option will receive hands-on training in both the development and use of computational tools for analysis of diverse datasets,
including genomic sequences, microarray comparisons, and protein structure/function interaction. The Option is ideally suited for students interested in
future professional or academic careers in bioinformatics, comparative genomics, and biological database analysis and management.

Option Requirements (in addition to the core requirements)

Required Courses - 30 credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.432</td>
<td>Genomics</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.434</td>
<td>Genomics Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>91.101</td>
<td>Computing I</td>
<td>4 cr</td>
</tr>
<tr>
<td>91.102</td>
<td>Computing II</td>
<td>4 cr</td>
</tr>
<tr>
<td>91.201</td>
<td>Computing III</td>
<td>4 cr</td>
</tr>
<tr>
<td>92.131</td>
<td>Calculus I (in place of 92.138)</td>
<td>4 cr</td>
</tr>
<tr>
<td>92.132</td>
<td>Calculus II</td>
<td>4 cr</td>
</tr>
<tr>
<td>92.321</td>
<td>Discrete Structures I</td>
<td>3 cr</td>
</tr>
<tr>
<td>45.401</td>
<td>Bioethics &amp; Genetics Research (AHE)*</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

*45.401 fulfills 1 GenEd Arts & Humanities as well as the Ethics requirement

Bioinformatics Computing Elective - 3 or 4 credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.204</td>
<td>Computing IV</td>
<td>4 cr</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91.309</td>
<td>Databases I</td>
<td>3 cr</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91.404</td>
<td>Analysis of Algorithms</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

Bioinformatics Biology Electives – 10 to 11 credits

Complete three (3) 300 to 400 level biology lecture courses ("81" prefix), at least one (1) with the corresponding lab. Although any course within the Biological Sciences may be selected, the following courses are considered most appropriate to this option:

<table>
<thead>
<tr>
<th>COURSES with LECTURE ONLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.426</td>
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<tr>
<td>81.428</td>
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<tr>
<td>81.442</td>
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<td>81.465</td>
</tr>
<tr>
<td>81.467</td>
</tr>
<tr>
<td>81.472</td>
</tr>
</tbody>
</table>
Biology Minor

A minor in Biological Sciences consists of the following:

1. Two semesters of college-level introductory biology with a laboratory component. This requirement may be satisfied by selecting the lecture and laboratory sections in either the Principles of Biology or Life Science courses.
2. Four additional three- or four-credit courses with an “81” prefix offered by the Department of Biological Sciences. Two of these courses must have a laboratory component. At least six credits must be at the 300 level or above.

Biological Sciences Major

Students majoring in Biological Sciences prepare for a variety of careers which contribute to our understanding of basic life processes and the solution of problems related to health and the environment. Many students graduating with Bachelors degrees are employed by institutions involved in bio-medical research or environmental field studies, while others become science educators. Degree recipients often choose to continue their education in professional (medical, veterinary, dental) schools or by matriculating into masters and doctoral programs. Since their training in science is integrated with an education in humanities and social sciences, graduates are not only prepared to excel in expanding the base of knowledge in their field of expertise, but are able to understand and respond to social and ethical issues arising from these advances. The undergraduate program insures a strong foundation in supporting science and mathematics and provides the essential background needed for a career in modern biology. A variety of upper-level electives is available, and the curriculum is sufficiently flexible so that students may tailor it to meet their specific career goals and entrance requirements of professional schools and postgraduate programs. Although it is not required, qualified seniors are encouraged to conduct original research as a capstone to their undergraduate experience. Enrolling in Senior Research provides graduation credits, but more importantly, many of these projects have resulted in a student’s first publication in a professional journal or have been presented at scientific meetings.

For more information visit Biological Sciences or contact us.

- Bioinformatics Option
- Biotechnology Option
- Ecology Option
- General Biology Option

Core Degree Requirements for all Biology Options

General Education Guidelines - 24 credits

Students must conform to the General Education (GenEd) guidelines as outlined elsewhere in the Undergraduate Catalog. These include: College Writing I & II; 3 approved Arts & Humanities courses and 3 approved Social Science courses (one designated as ethics and one as diversity), and Science and Math requirements (which are met by courses required within the major).

- College Writing I & II (42.101/42.102)
- Art and Humanities – minimum 3 courses from approved list, no more than 2 from any one department.
- Social Sciences - minimum 3 courses from approved list, no more than 2 from any one department.
- Mathematics – minimum of 1 course (met by required courses for the College of Sciences).
- Science and Technology – minimum of 3 courses two of which must contain an experimental learning component, no more than 2 from any one department (met by required courses for the Biology major).

Biology Core Courses - 29 credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.482</td>
<td>Cancer Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.488</td>
<td>Structural Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.490</td>
<td>Human Neurobiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.493</td>
<td>Immunology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.495</td>
<td>Immunology Lab</td>
<td>2 cr</td>
</tr>
<tr>
<td>81.429</td>
<td>Recombinant Protein Production Techniques</td>
<td>4 cr</td>
</tr>
<tr>
<td>81.469</td>
<td>Molecular Biology Lab</td>
<td>4 cr</td>
</tr>
<tr>
<td>81.476</td>
<td>Cell Culture</td>
<td>4 cr</td>
</tr>
<tr>
<td>81.489</td>
<td>Practical Protein Crystallography</td>
<td>4 cr</td>
</tr>
</tbody>
</table>

View the complete Bioinformatics Option Curriculum Checksheet (pdf).
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.116</td>
<td>Freshmen Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.111</td>
<td>Principles of Biology I</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.117</td>
<td>Experimental Biology I</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.112</td>
<td>Principles of Biology II</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.118</td>
<td>Experimental Biology II</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.220</td>
<td>Principles of Cell and Molecular Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.233</td>
<td>Experimental Methods in Biology</td>
<td>2 cr</td>
</tr>
<tr>
<td>81.235</td>
<td>Genetics</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.237</td>
<td>Problems in Genetics</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.240</td>
<td>Evolution, Ecology and Conservation</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.242</td>
<td>Problems in Evolution, Ecology and Conservation</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.419</td>
<td>Biochemistry I</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.421</td>
<td>Techniques in Biochemistry</td>
<td>2 cr</td>
</tr>
<tr>
<td>81.451</td>
<td>Senior Seminar</td>
<td>2 cr</td>
</tr>
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</table>

**Supporting Sciences & Mathematics - 31 credits**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>84.121</td>
<td>Chemistry I</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.123</td>
<td>Chemistry I Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>84.122</td>
<td>Chemistry II</td>
<td>1 cr</td>
</tr>
<tr>
<td>84.124</td>
<td>Chemistry II Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>84.221</td>
<td>Organic Chemistry IA</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.229</td>
<td>Organic Chemistry Lab IA</td>
<td>1 cr</td>
</tr>
<tr>
<td>84.222</td>
<td>Organic Chemistry IIA</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.230</td>
<td>Organic Chemistry Lab IIA</td>
<td>1 cr</td>
</tr>
<tr>
<td>92.138</td>
<td>Calculus for Life Sciences I</td>
<td>4 cr</td>
</tr>
<tr>
<td>92.385</td>
<td>Applied Statistics</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.103</td>
<td>General Physics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>96.103</td>
<td>General Physics Lab I</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.104</td>
<td>General Physics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>96.104</td>
<td>General Physics Lab II</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

**Free Electives - to 120 credits total**

All options require a minimum of 120 credits to complete. Any UML course xx.101 and above will fulfill the Free Elective requirement (exception Math courses must be above Calculus for Life Sciences I). Additional Biology lecture and laboratory courses (with an "81" prefix) may be taken to fulfill the Free Elective requirement. However, Biology courses with an "83" prefix cannot be used nor counted towards the 120 credits.

**Requirements by Option with Links to Curriculum Checksheets**

View the complete Course of Study (pdf).

**Fast Track to Teaching**

Contact: Dr. Vera Ossen (Graduate School of Education)

Olsen Upham Hall, 102, Phone: 934-4604

E-mail: Vera.Ossen@uml.edu

The flexibility of the curriculum in Biological Science allows students who are interested in secondary school teaching to participate in a five-year program leading to the master of education and Massachusetts teacher certification. Students achieve competency in all required subject areas during the four years that lead to the BS in Biological Science, and then continue their studies in the College of Education for an additional year. A candidate successfully completing the program earns the graduate degree as well as the credentials to accept an appointment as a secondary school science teacher. For more details about the 'Fast Track To Education' please refer to the Bachelor's/Master's Program in Education section of the Graduate Catalog.
Ecology Option

The Ecology option offers students a strong foundation in the basic sciences of biology, chemistry, and physics, as well as advanced courses in Ecology, Evolutionary Biology and Environmental Biology. Principles of Ecology, Evolutionary Biology, and Climate Change: Science, Communication and Solutions are added to the core requirements in Biological Sciences. Students may choose from advanced courses in biology, including Botany, Invertebrate Zoology, Biology of Global Change, Wetlands Ecology, Limnology, and Genomics.

Electives are also available in several interdisciplinary fields, including Environmental Chemistry, Analytical Chemistry, Environmental Economics, Environmental Law, Geographic Information Systems, Hydrogeology, and Environmental Geochemistry.

This option provides students with the theoretical background and hands-on training needed for careers or graduate study in diverse fields such as environmental biotechnology, conservation biology, public health, toxicology, bioremediation, and biological assessment of environmental quality.

Option Requirements (in addition to the core requirements)

Required Courses - 11 credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.315</td>
<td>Principles of Ecology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.317</td>
<td>Principles of Ecology Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.416</td>
<td>Climate Change, Sci. Comm.</td>
<td>4 cr</td>
</tr>
<tr>
<td>81.426</td>
<td>Evolutionary Biology</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

Designated Ecology electives – 14 to 15 credits

Four (4) courses, at least one (1) with the corresponding lab selected from the following list. No more than 9 credits outside of the Department of Biological Sciences.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.562</td>
<td>Physical &amp; Chemical Hydrology Geology</td>
<td>3 cr</td>
</tr>
<tr>
<td>14.576</td>
<td>GIS Applications in Civil &amp; Environmental Engineering</td>
<td>3 cr</td>
</tr>
<tr>
<td>14.568</td>
<td>Environmental Fate &amp; Transport</td>
<td>3 cr</td>
</tr>
<tr>
<td>14.572</td>
<td>Marine Coastal Processes*</td>
<td>3 cr</td>
</tr>
<tr>
<td>18.501</td>
<td>Wetlands Ecology*</td>
<td>3 cr</td>
</tr>
<tr>
<td>18.502</td>
<td>Limnology*</td>
<td>3 cr</td>
</tr>
<tr>
<td>18.581</td>
<td>Understanding the MA Contingency Plan*</td>
<td>3 cr</td>
</tr>
<tr>
<td>41.367</td>
<td>Environmental Law</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.301</td>
<td>Microbiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.303</td>
<td>Microbiology Laboratory</td>
<td>2 cr</td>
</tr>
<tr>
<td>81.306</td>
<td>Invertebrate Zoology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.308</td>
<td>Invertebrate Zoology Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.320</td>
<td>Botany</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.322</td>
<td>Botany Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.404</td>
<td>Environmental Microbiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.409</td>
<td>Photobiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.413</td>
<td>Invertebrate Zoology II</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.415</td>
<td>Invertebrate Zoology II Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.423</td>
<td>Biology of Global Change</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.432</td>
<td>Genomics</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.434</td>
<td>Genomics Laboratory</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.437</td>
<td>Biology and Evolution of Arthropoda</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.439</td>
<td>Biology and Evolution of Arthropoda Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.457</td>
<td>Advanced Invertebrate Zoology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.459</td>
<td>Advanced Invertebrate Zoology Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>81.467</td>
<td>Molecular Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>81.469</td>
<td>Molecular Biology Lab</td>
<td>4 cr</td>
</tr>
<tr>
<td>84.313</td>
<td>Analytical Chemistry I</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.314</td>
<td>Analytical Chemistry II</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.315</td>
<td>Analytical Chemistry I Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>84.316</td>
<td>Analytical Chemistry II Lab</td>
<td>1 cr</td>
</tr>
<tr>
<td>84.653</td>
<td>Chemical Oceanography</td>
<td>3 cr</td>
</tr>
</tbody>
</table>
### Department of Biological Sciences

#### Mission

The Department of Biological Sciences delivers an intensive, balanced, and well-rounded learning experience in general biology, biotechnology, ecology, and bioinformatics. The Department educates students for employment in the regional biotechnology and environmental industries, provides the foundation for students to succeed in post-graduate education, and prepares students for admission to professional schools such as medicine, dentistry, veterinary medicine, and pharmacy. These goals are accomplished through rigorous hands-on learning and opportunities for original research. The department strives to integrate teaching, research, and community service, and to that end, we offer undergraduate and graduate students laboratory-based research opportunities as well as industry cooperative experiences.

#### Overview/Description

Students majoring in Biological Sciences prepare for a variety of careers, which contribute to our understanding of basic life processes and the solution of problems related to health and the environment. Many of those who have earned their Bachelor’s degree are employed by institutions involved in biomedical research or environmental field studies, while others become science educators. Degree recipients often choose to continue their education in professional (medical, veterinary, dental) schools or by matriculating into master’s and doctoral programs. Since their training in science is integrated with an education in humanities and social sciences, graduates are not only prepared to excel in expanding the base of knowledge in their field of expertise, but are able to understand and respond to social and ethical issues arising from these advances.

The undergraduate program insures a strong foundation in supporting science and mathematics and provides the essential background needed for a career in modern biology. A variety of upper-level electives are available, and the curriculum is sufficiently flexible so that students may tailor it to meet their specific career goals and entrance requirements of professional schools and postgraduate programs. Although it is not required, qualified seniors are encouraged to conduct original research as a capstone to their undergraduate experience. Enrolling in Senior Research provides graduation credits, but more importantly, many of these projects have resulted in a student’s first publication in a professional journal or have been presented at scientific meetings.

#### Pre-Medical and other Pre-Professional Programs

Every year, the curriculum in the Department of Biological Sciences prepares many of our students for entry to prominent schools of medicine, dentistry, veterinary medicine, osteopathic medicine, optometry, podiatry, and chiropractic. Students interested in health-related professional careers should meet at their earliest convenience with the University Pre-Health Professions Advisor, who along with a university wide committee, will assist them with course selection and guide them through the application process for admission to the professional school of their choice.

#### Admissions Requirements for Majors

Students must meet all established University admissions standards as described in the online undergraduate catalog.

#### Additional Information:

- Biotechnology Option
- Ecology Option
- Bioinformatics Option
- General Biology Option
- Honors Program
- Other Programs Supported by Biological Sciences
- Post-Graduate Programs in Biological Sciences
- Fast-Track to Teaching
Chemistry Minor

A minor in chemistry consists of 18-24 credits in chemistry. All course prerequisites must be satisfied. The course requirements for the chemistry minor are as follows:

1. freshman level course (84.121, 84.123, and 84.122, 84.124) or the equivalent must be included;
2. four additional courses, of which not more than two may be from the same chemistry area;
3. at least two courses must carry a laboratory component exclusive of 84.121, 84.123 and 84.122, 84.124;
4. a lecture course with a corequisite laboratory course will be considered as one course of the additional course requirements; and
5. at least eight semester hours must be taken at or above the 300 course level, and of these courses, at least three credits must be in a course not required by the curriculum of the student’s department.

Chemistry Major

The Bachelor of Science Degree in Chemistry is both a professional and a pre-graduate school degree. Completion of the chemistry curriculum provides a preparation for all areas of the chemical profession, as well as for graduate study in chemistry, dentistry, medicine, patent law, and teaching. The UMass Lowell Bachelor of Science degree in chemistry is approved by the Committee on Professional Training of the American Chemical Society.

The Chemistry Department also offers a B.S. Degree in Chemistry with a Forensics Option.

The major typically includes 56-60 credits in chemistry courses, and 26-30 credits in supporting science and mathematics courses. In addition, university/college guidelines for core curriculum/distribution requirements must be fulfilled. For more information visit the Chemistry Department or contact us.

Information on the requirements for the major in chemistry is available below:

Core Chemistry Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>84.105</td>
<td>Introduction to the Discipline of Chemistry</td>
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<tr>
<td>84.121</td>
<td>Chemistry I</td>
</tr>
<tr>
<td>84.123</td>
<td>Chemistry I Lab</td>
</tr>
<tr>
<td>84.122</td>
<td>Chemistry II</td>
</tr>
<tr>
<td>84.124</td>
<td>Chemistry II Lab</td>
</tr>
<tr>
<td>84.221</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>84.227</td>
<td>Organic Chemistry I Lab</td>
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<tr>
<td>84.222</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>84.228</td>
<td>Organic Chemistry II Lab</td>
</tr>
<tr>
<td>84.260</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>84.313</td>
<td>Analytical Chemistry I</td>
</tr>
<tr>
<td>84.315</td>
<td>Analytical Chemistry I Lab</td>
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<td>84.314</td>
<td>Analytical Chemistry II</td>
</tr>
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<td>84.316</td>
<td>Analytical Chemistry II Lab</td>
</tr>
<tr>
<td>84.344</td>
<td>Physical Chemistry I</td>
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<td>84.346</td>
<td>Physical Chemistry I Lab</td>
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<td>Physical Chemistry II</td>
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<td>84.350</td>
<td>Physical Bioinorganic Lab</td>
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<tr>
<td>84.360</td>
<td>The Responsible Chemist</td>
</tr>
<tr>
<td>84.443</td>
<td>Advanced Inorganic Chemistry</td>
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<tr>
<td>84.445</td>
<td>Descriptive Inorganic Chemistry</td>
</tr>
<tr>
<td>84.450</td>
<td>Biochemistry I</td>
</tr>
</tbody>
</table>

Chemistry Electives

With the consent of a chemistry faculty member, students may choose to perform undergraduate thesis research (2 semesters required).

Alternatively, two advanced courses, one which has a corresponding laboratory must be chosen. At the discretion of the student’s advisor, the student may take a course with a laboratory from another department that fits ACS criteria for advanced courses in Chemistry. An Advisor’s letter must delineate how that course fits the ACS criteria.

Research Option

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>84.407</td>
<td>Undergraduate Thesis I</td>
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Required Mathematics Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>92.131</td>
<td>Calculus I</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>92.127</td>
<td>Calculus IA</td>
</tr>
<tr>
<td>AND</td>
<td></td>
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<tr>
<td>92.128</td>
<td>Calculus IB</td>
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<td>92.132</td>
<td>Calculus II</td>
</tr>
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<td>92.231</td>
<td>Calculus III</td>
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<tr>
<td>92.234</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>Differential Equations</td>
</tr>
<tr>
<td>92.236</td>
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</table>

*NOTE: Only 4 of the 8 credits for 92.127 and 92.128 can be used to satisfy the 120 credits needed for graduation.

Required Physics Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>95.141</td>
<td>Physics I</td>
</tr>
<tr>
<td>96.141</td>
<td>Experimental Physics I</td>
</tr>
<tr>
<td>95.144</td>
<td>Physics II</td>
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<td>Experimental Physics II</td>
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General Education Requirements

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>42.101</td>
<td>College Writing I</td>
</tr>
<tr>
<td>42.102</td>
<td>College Writing II</td>
</tr>
</tbody>
</table>

Arts & Humanities (AH, AHD, AHE, AHDE) 9 Credits
Social Sciences (SS, SSD, SSE, SSDE) 9 Credits
Diversity & Ethics* 3 Credits

*Note that the Diversity and Ethics requirement may also be fulfilled by an AHDE or SSDE designated course.

View the complete Course of Study (pdf).

Forensic Science Option

The Forensic Option for of the Bachelor of Science Degree in Chemistry combines the application of the physical sciences to criminal investigations and offers students the opportunity for close collaboration between the University and the Community by providing needed expertise and resources while obtaining real world experiences.

Graduates of this program will receive an American Chemical Society certified degree in chemistry, enhancing their opportunities for gainful employment after graduation.

Freshman Year/Fall

84.105 Intro to the Discipline of Chemistry
84.121 Chemistry I
84.123 Chemistry I Lab
Gen Ed 1
92.131 Calculus I
42.101 College Writing I

Freshman Year/Spring

84.122 Chemistry I
84.124 Chemistry II Lab
44.101 The Criminal Justice System
92.132 Calculus II
42.102 College Writing II

Sophomore Year/Fall
84.221 Organic Chemistry IA
84.227 Organic Chemistry IA Lab
44.243 Criminalistics I
95.141 Physics I
96.141 Physics I Lab
92.231 Calculus III

**Sophomore Year/Spring**

84.222 Organic Chemistry II A
84.229 Organic Chemistry II A Lab
44.244 Criminalistics II
95.144 Physics II
96.144 Physics II Lab
84.260 Information Retrieval
92.234 Differential Equations

**Junior Year/Fall**

84.313 Analytical Chemistry I
84.315 Analytical Chemistry I Lab
84.xxx Forensic Chemistry I
84.xxx Forensic Chemistry I Lab
Gen Ed 2
84.xxx Chemistry Elective

**Junior Year/Spring**

84.314 Analytical Chemistry II
84.316 Analytical Chemistry II Lab
84.360 The Responsible Chemist
84.xxx Forensic Chemistry II
84.xxx Forensic Chemistry II Lab
Gen Ed 3
Gen Ed 4

**Senior Year/Fall**

84.344 Physical Chemistry I
84.346 Physical Chemistry I Lab
84.450 Biochemistry
81.111 Principles of Biology I
81.113 Intro to Experimental Biology I
84.443 Adv. Inorganic Chemistry

**Senior Year/Spring**

92.283 Introduction to Statistics
84.345 Physical Chemistry II
84.xxx Chemistry Elective
Gen Ed 5
Gen Ed 6 Ethics

View the complete [Course of Study](#) (pdf).

For additional information visit the [Chemistry Department](#) or [contact us](#).

**Cheminformatics Option**

Cheminformatics students at the University of Massachusetts Lowell complete a challenging interdisciplinary undergraduate education including courses in both life sciences and computer science.

Cheminformatics is the study of information contained within biological or chemical systems. Although originally associated with the analysis of genetic data produced by the sequencing of the human genome, the field of bio/cheminformatics has now widely expanded to include applications in medicine; public health; biotechnology; pharmaceutical research and development; and basic science.

Students major in biology, chemistry, computer science or mathematics and complement this background with courses form the three remaining areas. A Bachelor of Science degree in any of these four disciplines with an option in bio/cheminformatics can be earned in four years.
Master's and Doctorate programs are also available.

To find out more about this program visit our website.

**Chemistry Department**

Undergraduate offerings of the Chemistry Department solidly prepare students for continuing work in chemistry, as well as provide students a general background in the understanding of the natures of materials, both natural and man made that are common to the modern world. The Chemistry Department offers both a traditional Bachelor of Science Degree in Chemistry and a Forensic Science Option. Both are American Chemical Society approved degrees.

Career opportunities in chemistry are many and varied, including, for example, applied and basic research, quality control, product analysis, manufacturing, and marketing. The BS degree in Chemistry is both a professional and a pre-graduate school degree. Completion of the chemistry curriculum provides preparation for all areas of the chemical profession, as well as for graduate study in chemistry, dentistry, medicine, patent law, and teaching. Students completing the B.S. requirements graduate with a degree certified as being in a program approved by the Committee on Professional Training of the American Chemical Society.

**Cooperative Education Program**

The Chemistry Department has established guidelines for a cooperative program designed to combine chemistry-oriented work experience in industrial or related laboratories with opportunities to earn an income. A student may enter this program after completing four semesters of academic work, which must include the successful completion of one year of organic chemistry. Up to six academic credits will be allowed for the program, which will include one summer and two academic terms of co-op work. A student applies for the program by signing a contract outlining the proposed co-op experience and requirements.

**Department Policies**

The Chemistry Department does not allow students to “test out” of courses. It does, however, recognize Advanced Placement (AP) exam scores in Chemistry of a 4 or 5. Either of these scores will be accepted for college credit for Chemistry I (84.121), Chemistry II (84.122) and their associated laboratories (84.123 and 84.124). A score of 3 is not accepted.

**Financial Support and Awards**

The Chemistry Department has a number of scholarships available. The Allen Scattergood Scholarships are awarded for superior academic achievement, requiring a minimum academic cumulative average of 3.500. Other scholarships are available based on financial need and academic record. Information regarding these can be obtained at the chemistry office or from the faculty member serving as Chairperson of the Scholarship and Awards Committee. The Department also has a number of annual awards for academic achievement, determined by the faculty and announced each spring.

**Computer Science Minor**

The Computer Science Minor is primarily designed for students majoring in a science or engineering department or any other department where a substantial amount of quantitative knowledge is required. The minor is designed to provide such students with a fairly deep background in computer science to complement their major beyond the requirements of their major department. Completion of the minor allows the student to receive recognition of this accomplishment on his degree.

To receive a minor in computer science, students must complete a minimum of six courses with the following stipulations:

- four of the courses must be:
  - 91.101 Computing I (4 credits)
  - 91.102 Computing II (4 credits)
  - 91.201 Computing III (4 credits)
  - 91.203 Computer Organization and Assembly Language (4 credits)
- the remaining two courses must be at the 300 or 400 level and must be acceptable as either required or elective CS courses for CS majors
- courses transferred from other educational institutions can be applied to the CS Minor, but at least three of the courses applied to the minor must be taken in the UMass Lowell CS Dept
- all courses applied to the CS minor must total at least 18 credits
- only courses in which a student earns a grade of C or better can be applied to the CS Minor

Some CS courses numbered 91.301 or higher require 92.321 Discrete Structures I and 92.322 Discrete Structures II as prerequisites. To make things easier for non-CS majors, the department allows 92.221 Linear Algebra to substitute for 92.321 Discrete Structures I. This allows CS minors to use a potentially required course for their own major to satisfy part of this CS prerequisite.
Students interested in the CS Minor should meet with the CS Undergraduate Coordinator to plan a program that will best meet the student’s goals. To declare the minor, use a Declaration of Major/Minor/Second Major or Change of Major form (pdf), which must be signed by the CS Undergraduate Coordinator.

BS/MS Degree Program

The Computer Science Department offers a five-year combined BS/MS Program, in which students earn both Bachelor and Master of Science degrees.

Two major advantages of the program are:

1) the ability in some cases to count computer science courses for both your undergraduate and your graduate degrees and

2) being accepted into the master's program without taking the Graduate Record Examination.

CS majors who want to take advantage of this program should consider taking one or two qualifying graduate courses during their senior years. Foundations of Computer Science (91.502) and Algorithms (91.503) are good choices. Either of these can count as an undergraduate CS elective and as a master's degree course. Only credits beyond the 120 required for the BS can be double-counted.

The rules governing double-counting of courses are as follows:

- Any graduate course allowed for graduate CS credit may be taken as an undergraduate course and double-counted.
- With the permission of the Undergraduate Coordinator, certain project-oriented pairs of graduate courses may be taken for the undergraduate project sequence, and may be double-counted.
- The double-counting of 400-level courses requires case-by-case Graduate Committee approval.

As always, students must satisfy prerequisites before they enroll in courses.

Please note that some graduate courses offered by the CS Department do not carry credit even for our own graduate students. For example, you cannot receive credit for 91.500.

To be accepted into this program, you must have good grades and apply in your junior year. There are many rules governing eligibility. Please see the Graduate Catalog.

There are advantages and disadvantages to pursuing your master’s degree at the university as your bachelor's. Please discuss this with your academic advisor or other faculty member.

This program is managed by the CS Graduate Coordinator, not the Undergraduate Coordinator.

Computer Science Major

For additional information visit the Computer Science Department or contact us.

University Core/General Education Requirements

Major Requirements

- Computer Science Courses
- Computer Science Project Sequence
- Computer Science Electives
- Supporting Courses in Science and Mathematics
- Additional Writing Requirement
- Technical Electives
- Natural Science Requirements
- Ethics Requirement
- General Elective Courses
- Credits Required for the Degree
- Academic Standing

BS/MS Program

Course Descriptions

General Education Requirements

For a general description of the current General Education ("GenEd") requirements, please see the General Education website.

For a list of courses that currently satisfy the General Education requirements, please see the General Education website.

Computer science majors typically satisfy the new GenEd 2000 requirements by taking

- College Writing I and College Writing II,
Major Requirements

Computer Science Courses

- 91.101 Computing I for 4 credits
- 91.102 Computing II for 4 credits
- 91.201 Computing III for 4 credits
- 91.203 Computer Organization & Assembly Language for 4 credits
- 91.204 Computing IV for 3 credits
- 91.301 Organization of Programming Languages for 3 credits
- 91.304 Foundations of Computer Science for 3 credits
- 91.305 Computer Architecture for 3 credits
- 91.308 Introduction to Operating Systems for 3 credits
- 91.404 Analysis of Algorithms for 3 credits
- Computer Science Project Sequence for 6 credits
- Computer Science Elective for 6 credits

View the complete Course of Study (pdf).

Computer Science Project Sequence

All Computer Science majors must take a one- or two-semester project course from the approved department list. Students who take an approved one-semester project course such as Compiler Writing must take two additional Computer Science electives; otherwise, only one is required. Students may not take more than 6 credits from any combination of the following: 91.401, 91.402, 91.460, and 91.490. Current project course sequences include:

- 91.309 Database I and 91.310 Database II
- 91.401 Software Project Lab I and 91.402 Software Project Lab II
- 91.406 Introduction to Compiler Writing and Computer Science Elective
- 91.411 Software Engineering I and 91.412 Software Engineering II
- 91.413 Data Communications I and 91.414 Data Communications II
- 91.414 Data Communications I and 91.581 Computer Security I
- 91.420 Artificial Intelligence and 91.421 Machine Learning and Data Mining
- 91.427 Graphics I and 91.428 Graphics II
- 91.450 Robotics I and 91.451 Robotics II
- 91.491 GUI Programming I and GUI Programming II or 91.427 Graphics I
- 91.561 Computer Security and 91.562 Computer Security II

This list is subject to revision. Students should check with their advisors for the latest information.

Some project sequences are not offered every year. Thus, you should take the second course of a project sequence in the semester immediately following the one in which you took the first course of that sequence.

Computer Science Electives

In addition to undergraduate courses with 91.3xx and 91.4xx numbers, most 500-level computer science courses may also be used as computer science electives. For example, undergraduate computer science majors are often qualified to take 91.502, 91.515, 91.521, 91.522, 91.538, 91.539, 91.540, 91.541, 91.543, or 91.546.

Supporting Courses in Science and Mathematics

- 92.131 Calculus I for 4 credits
- 92.132 Calculus II for 4 credits
- 92.321 Discrete Structures I for 3 credits
- 92.322 Discrete Structures II for 3 credits
- 92.386 Probability and Statistics I for 3 credits
- 16.265 Logic Design for 3 credits

Additional Writing Requirement

In addition to 42.101 and 42.102, College Writing I and II, all CS majors are required to take 42.220, Oral and Written Communication for Computer Science.

Technical Electives
CS students must complete 6 credits of courses offered by the College of Arts & Sciences, Science Division (this is our college) or the College of Engineering. Courses that fulfill this requirement must be classified as required or elective courses for the majors in those departments. In general, 90.xxx courses may not be used to fulfill this requirement.

**Natural Science Requirements**

Student must pass at least 12 credits of approved natural science courses and companion lab courses (see below for details on approved courses). Among these, at least one natural science course and a complementary lab section have to be taken. However, that the Computer Science faculty recommends that students always take the complementary lab for any natural science course when a lab is available, so that three natural science courses and companion labs satisfy the requirements. When one natural science course and a companion lab are taken, three additional natural science courses without companion labs satisfy the requirements.

Natural science electives must come from one of the four natural science departments in the College of Sciences. These are:

- Biological Sciences
- Chemistry
- Environmental, Earth, and Atmospheric Sciences
- Physics and Applied Physics

The courses in these departments that fulfill the CS natural science elective requirement are those that are classified as either required or elective courses for the majors in the respective departments. In general, courses that satisfy GenEd technical elective requirements for non-science majors do not satisfy the CS natural science elective requirement. Such unallowed courses are ones whose University catalog descriptions contain the statement: "This course satisfies the GenEd science requirement, but not specific science requirements for majors in the Division of Science."

**Ethics Requirement**

The Computer Science Department requires its majors to take an Ethics course. Courses currently approved as satisfying this requirement are

- 57.211 Sustainable Development
- 59.395 Computers in Society
- 45.335 Ethical Issues in Technology
- 45.341 Science, Ethics, and Society
- 45.334 Engineering and Ethics
- 45.401 Bioethics and Genetic Research

When a course satisfies the Ethics Requirement and a General Education Requirement, CS Majors can use it to satisfy both requirements.

**General Elective Courses**

With certain exceptions, CS students may take any three or four credit course from any academic department within the University as a general elective.

At least one general elective must be in a non-technical area, i.e., not in computer science, the sciences, mathematics, engineering, or similar disciplines. It is safe to choose a course in the humanities or social sciences that does not have a computation or other technical focus.

For all the general electives, CS students must avoid:

- courses in areas required by the CS curriculum (mathematics and physics) unless they are at a level higher than the courses required by the CS curriculum
- non-CS courses having a significant computing component or a significant overlap in content with courses required by the CS curriculum
- CS courses for non-majors

The determination of the acceptability of any proposed general elective course will be made by the CS Department Undergraduate Coordinator.

Examples of courses that may NOT be used as general electives are

- programming language courses offered by other departments (all computer science courses have 91.xxx course numbers; 90.xxx and 92.xxx courses are offered by the Mathematics Department)
- MIS or IT courses
- mathematics courses below the level of the science and engineering calculus sequence
- CS courses for non-majors
- many certificate courses (including some Computer Science Department courses) offered through Continuing Education
You may take courses that do not qualify as general electives. Such courses appear on your transcript and are part of your overall GPA. However, these courses do not count toward your BS degree in Computer Science.

Students who have taken courses in the above categories before they came to UMass Lowell are usually allowed to use them as general electives.

**Total Credits Required for the Degree**

Students must take or transfer an appropriate course for each slot in the curriculum grid. Each course can fill only one slot. The University requires at least 120 credits to graduate.

**Academic Standing**

Beginning with the first semester of the sophomore year, and every semester thereafter, CS majors must maintain

- a cumulative grade point average of 2.5 or better in all CS courses (91.xxx) taken at UMass Lowell.
- a cumulative grade point average of 2.3 or better in all courses taken at UMass Lowell.

Students who fail to satisfy these requirements will not be allowed to graduate. Thus, students should review their cumulative grade point averages regularly with their advisors.

**Computer Science Department**

The Computer Science Department offers programs leading to the BS, MS, and PhD degrees. Our programs contain a rich blend of both the applied and the theoretical aspect of computation.

- Bachelor of Science
- Computer Science Certificates
- Master of Science
- Doctor of Philosophy

Graduates of the Department of Computer Science are well trained in systems software design and implementation and have found ready employment in local companies. The Department's courses and programs continue to respond to changing requirements for professional employment in computer science.

Visit the [Department of Computer Science website](#) for more information.

**Atmospheric Science Option**

The Atmospheric Science option focuses on meteorology, but also includes components dealing with atmospheric physics and chemistry, solar-terrestrial and ocean-atmosphere interactions, air pollution and air pollution control, and global climate change due to man-made emissions. The goal of the program is to provide students with the knowledge of the fundamental principles and techniques of physics and mathematics which are necessary for understanding atmospheric behavior and for solving practical problems concerning weather, climate and air pollution. Because atmospheric science is primarily the application of the principles and techniques of physical sciences to the study of the atmosphere, the curriculum specifies a substantial core of supporting science and mathematics courses.

Historically, meteorology has been the primary employment field for graduates of this option. The meteorologist studies the physical causes of weather and climate and applies this knowledge to the solution of practical problems, ranging from the forecasting of weather to the analysis of the influence of weather and climate on public health, agriculture, engineering, industry and commerce, and national defense. The more broadly trained atmospheric scientist will also find opportunities in the fields of air pollution research and control. Meteorologists and Atmospheric Scientists are employed by agencies of the federal government, the National Oceanic and Atmospheric Administration, the National Weather Service, and the Department of Defense, as well as by agencies of state and local governments, and by commercial aviation companies and private consulting firms.

A significant number of students who graduate from this option continue their education by attending graduate school. Atmospheric Science majors who wish to continue their studies at the graduate level are advised to develop competencies in science and mathematics, especially in computer science, beyond the required science and mathematics core.

View the complete [Course of Study](#) (pdf)

For additional information visit the [Department of Environmental, Earth & Atmospheric Sciences website](#) or contact us.

**Environmental Studies Option**

The field of environmental science is interdisciplinary in nature. The Environmental Studies Option blends a science core with a non-science focus selected from Management or the humanities/social sciences leading to a program of study that is compatible with the student's strengths and goals. This option is an excellent choice for a student who has broad interests
and would like to work at the interface between science and society. The science core of the program is essentially identical to that for the Environmental Geoscience option giving the student a strong science background. The non-science foci are designed to add value to the basic science degree in that the student is prepared for broader employment opportunities. Students who take this option may elect to take the STEM Teaching Minor in place of the non-science focus and thus prepare for a career in earth science teaching.

This option prepares the student for employment in the private and government sector, where knowledge is required in management and protection of the environment, environmental laws and regulations, natural resources, and environmental economics. Graduates of this option can have a variety of career experiences. Several are environmental lawyers. Some are teachers. Others work as environmental analysts, planners, water treatment operators, hydrological consultants, noise and air pollution specialists, and as managers in private industry and government. This option will also prepare the student for graduate work in environmental science.

General Education courses (24 credits)

Basic Science and Mathematics courses (31 credits):

Calculus IA and Calculus IB or Calculus I (4 cr), Math elective (3 cr)
Chemistry I + Lab (4 cr), Chemistry II + Lab (4 cr)
General Physics I + Lab (4 cr), General Physics II + Lab (4 cr)
Principles of Biology I + Experimental Biology I (4 cr), Principles of Biology II + Experimental Biology II (4 cr)

Science Core courses (41 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>87.101</td>
<td>Environmental Science Seminar</td>
<td>1</td>
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<tr>
<td>87.102</td>
<td>Environmental Problems Seminar</td>
<td>1</td>
</tr>
<tr>
<td>87.201</td>
<td>Principles of Earth &amp; Environmental Systems I</td>
<td>3</td>
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<tr>
<td>87.203</td>
<td>Principles of Earth &amp; Environmental Systems I Lab</td>
<td>1</td>
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<tr>
<td>87.202</td>
<td>Principles of Earth &amp; Environmental Systems II</td>
<td>3</td>
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<tr>
<td>87.204</td>
<td>Principles of Earth &amp; Environmental Systems II Lab</td>
<td>1</td>
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<tr>
<td>89.314</td>
<td>Hydrogeology</td>
<td>3</td>
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<tr>
<td>89.315</td>
<td>Environmental Geochemistry</td>
<td>4</td>
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<tr>
<td>89.315</td>
<td>Principles of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>89.317</td>
<td>Principles of Ecology Lab</td>
<td>2</td>
</tr>
<tr>
<td>87.301</td>
<td>GIS in Earth and Environmental Sciences</td>
<td>3</td>
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<tr>
<td>89.307</td>
<td>Earth Materials I</td>
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<tr>
<td>89.309</td>
<td>Earth Materials I Lab</td>
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<td>89.308</td>
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<tr>
<td>89.310</td>
<td>Earth Materials II Lab</td>
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<tr>
<td>89.319</td>
<td>Surface Processes</td>
<td>3</td>
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<tr>
<td>89.321</td>
<td>Surface Processes Lab</td>
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<tr>
<td>89.331</td>
<td>Earth History</td>
<td>3</td>
</tr>
<tr>
<td>89.333</td>
<td>Earth History Lab</td>
<td>1</td>
</tr>
</tbody>
</table>

Management (18 credits) or Humanities/Social Sciences (18 credits):

Each focus is designed to achieve a specific set of goals as described below. For a list of specific courses for each focus consult the complete Course of Study (pdf)

Economics Focus:

The Economics focus provides students with the training and background necessary to understand the economic fundamentals which motivate public and environmental policy. Students will learn the practical and theoretical foundations concerning the scope and purpose of policy. When, and under what circumstances, might government intervention improve wellbeing? What types of policies might the government impose and how do these impact environmental outcomes? Students will be prepared for employment in government agencies or industries involved in environmental policy.

English Focus:

The English focus prepares students for careers in public relations, public policy, government agencies, the non-profit sector, and scientific communications. Students who pursue this focus will develop an understanding of the strategies of oral and written communication and the skills necessary to be effective in each. The three required courses provide a foundation in communication skills and their practical applications. The elective courses allow students to build on this foundation while focusing on specific areas of interest, such as journalism, digital media, and technical communication. This focus provides substantial practice in writing for specific audiences and in crafting arguments, skills beneficial to students contemplating graduate work in law, public policy, or environmental studies.
**Legal Studies Focus:**

The Legal Studies focus prepares students for employment in industry, public policy, and government agencies by providing a basic understanding of the legal and regulatory framework that environmental scientists and policymakers must work within. Knowledge from the required Environmental Law and Real Estate Law courses is essential to work in regulation, conservation, endangered species protection, Brownfield mitigation, and sustainable development, while the remaining elective courses provide a customized learning experience suitable as preparation for law school, graduate public policy programs, and graduate environmental studies programs. Practical internship opportunities and directed studies in specialized legal areas are available.

**Management Focus:**

The Management Focus provides the student with basic preparation for management positions in the corporate environment. Some of the course work can also be applied towards an MBA, should you decide to continue with your management education. Even if you do not move into the management side of a particular business, the ability to understand management concepts and approaches to problems will be a useful addition to your skill set.

**Modern Languages Focus:**

The Modern Languages focus prepares students to work in the international job market by providing competence in a foreign language. Globalization requires the ability to function in countries where English is not the first language. Students who are conversant in a second language will find that they have a competitive advantage when applying for jobs abroad. In addition, because much of international business is conducted in English, a student who is conversant in both science and technology and a second language will find that they are uniquely equipped to serve as an intermediary in business and scientific discussions.

**Political Science Focus:**

The Political Science focus prepares students for jobs that involve interactions between environmental scientists and government. The required courses provide a basic understanding of how government functions and its role in society. Elective courses are selected to build expertise in a particular area of government – local, state, federal, and/or international relations. Given the globalization of the economy, interactions with foreign governments play an important role in dealing with environmental problems.

**STEM Teaching Minor**

In order to obtain certification as an Earth Science Teacher, the student will also have to take one of the following Astronomy with lab courses.

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<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>87.115</td>
<td>Astronomy</td>
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<tr>
<td>87.117</td>
<td>Astronomy Lab</td>
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<tr>
<td>OR</td>
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<tr>
<td>95.121</td>
<td>Exploring the Universe</td>
<td>3</td>
</tr>
<tr>
<td>96.121</td>
<td>Lab for Exploring the Universe</td>
<td>1</td>
</tr>
</tbody>
</table>

View the complete [Course of Study](pdf) (pdf)

**Environmental Geoscience Option**

The Environmental Geoscience option is designed for students who have an interest in the physical environment, but desire a broader preparation than that of the traditional geology major. The focus is on Earth Systems Science and a strong geoscience core is supplemented by additional courses in the biological sciences and geographical information systems. A suite of technical electives allows the student, in consultation with his/her advisor, to further deepen his/her understanding of a particular area of Earth Systems Science. Students who follow this program will not only be prepared for entry into the traditional areas of geological employment (petroleum and mining) but also for the expanding opportunities in hydrogeology, hazardous waste assessment and management, groundwater remediation, wetlands delineation and evaluation, and environmental management. Students who graduate from this option are also well prepared to continue their education at the graduate level in the geosciences or environmental sciences.

**General Education courses (24 credits)**

**Basic Science and Mathematics courses (35 credits):**

- Calculus I (4 credits), Calculus II (4 credits), Math elective (3 credits)
- Chemistry I + Lab (4 credits), Chemistry II + Lab (4 credits)
- General Physics I + Lab (4 credits), General Physics II + Lab (4 credits)
- Principles of Biology I + Experimental Biology I (4 credits), Principles of Biology II + Experimental Biology II (4 credits)

**Core Science courses (41 credits):**
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<td>Environmental Science Seminar</td>
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<td>Hydrogeology</td>
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<td>Earth History Lab</td>
<td>1</td>
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</table>

**Science Electives (12 - 20 credits):**

Four courses selected in consultation with the Academic Advisor. Courses that can be used for these electives are listed below. Courses not listed below may be used upon written approval by the department chair.

**Geoscience:**

<table>
<thead>
<tr>
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<tr>
<td>89.304</td>
<td>Igneous and Metamorphic Petrology</td>
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<td>89.306</td>
<td>Igneous and Metamorphic Petrology Laboratory</td>
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<tr>
<td>89.322</td>
<td>Structural Geology</td>
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<td>89.324</td>
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<td>89.341</td>
<td>Environmental and Engineering Geology</td>
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<tr>
<td>89.352</td>
<td>Sedimentation and Stratigraphy</td>
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<td>89.354</td>
<td>Sedimentation and Stratigraphy Laboratory</td>
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<tr>
<td>89.424</td>
<td>Regional Hydrogeology</td>
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<tr>
<td>89.452</td>
<td>Advanced Geochemistry</td>
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<td>89.456</td>
<td>Applied Geophysics</td>
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<tr>
<td>89.495</td>
<td>Honors Research Geology</td>
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<tr>
<td>89.501</td>
<td>Paleoclimatology</td>
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**Biology:**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.301</td>
<td>Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>81.303</td>
<td>Microbiology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>81.320</td>
<td>Botany</td>
<td>3</td>
</tr>
<tr>
<td>81.322</td>
<td>Botany Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>81.404</td>
<td>Environmental Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>81.423</td>
<td>Biology of Global Change</td>
<td>3</td>
</tr>
</tbody>
</table>

**Chemistry:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>84.221</td>
<td>Organic Chemistry IA</td>
<td>3</td>
</tr>
<tr>
<td>84.229</td>
<td>Organic Chemistry Laboratory IA</td>
<td>1</td>
</tr>
<tr>
<td>84.222</td>
<td>Organic Chemistry IIA</td>
<td>3</td>
</tr>
<tr>
<td>84.230</td>
<td>Organic Chemistry Laboratory IIA</td>
<td>1</td>
</tr>
<tr>
<td>84.313</td>
<td>Analytical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>84.315</td>
<td>Analytical Chemistry Laboratory I</td>
<td>2</td>
</tr>
<tr>
<td>84.314</td>
<td>Analytical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>84.316</td>
<td>Analytical Chemistry Laboratory II</td>
<td>2</td>
</tr>
<tr>
<td>84.344</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
</tbody>
</table>
Geoscience Minor

A minor in Geoscience consists of 8 credits of required courses and four additional courses (12-16 credits) from the list of Geoscience Electives.

Required Core Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>87.201/203</td>
<td>Principles of Earth and Environmental Systems I + Laboratory</td>
<td></td>
</tr>
<tr>
<td>87.202/204</td>
<td>Principles of Earth and Environmental Systems II + Laboratory</td>
<td></td>
</tr>
<tr>
<td>89.101/103</td>
<td>General Geology + Laboratory (or equivalent) can be substituted for 87.201/203.</td>
<td></td>
</tr>
</tbody>
</table>

Geoscience Electives (4 courses):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>89.215</td>
<td>Forensic Geology</td>
</tr>
<tr>
<td>89.304/306</td>
<td>Igneous and Metamorphic Petrology + Laboratory</td>
</tr>
<tr>
<td>89.307/309</td>
<td>Earth Materials I + Laboratory</td>
</tr>
<tr>
<td>89.308/310</td>
<td>Earth Materials II + Laboratory</td>
</tr>
<tr>
<td>89.314</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>89.315</td>
<td>Environmental Geochemistry</td>
</tr>
<tr>
<td>89.319/321</td>
<td>Surface Processes + Laboratory</td>
</tr>
<tr>
<td>89.322/324</td>
<td>Structural Geology + Laboratory</td>
</tr>
<tr>
<td>89.326</td>
<td>Glacial and Pleistocene Geology</td>
</tr>
<tr>
<td>89.331/333</td>
<td>Earth History + Laboratory</td>
</tr>
<tr>
<td>89.352/354</td>
<td>Sedimentation and Stratigraphy + Laboratory</td>
</tr>
</tbody>
</table>

Or any other course at the 300 level or above with an 89 prefix.

Environmental Science Major

The major in Environmental Science is a broad-based interdisciplinary program designed to provide students with an understanding of the complex interrelationships (Earth Systems Science) that exist between the lithosphere, hydrosphere, biosphere, and atmosphere. A basic understanding of science and mathematics is fundamental to the program and all students take introductory physics, chemistry, and calculus, plus additional science and mathematics courses as appropriate for their particular option. A two course sequence (Principles of Earth & Environmental Systems I & II) provides an integrated understanding of the behavior of natural systems, a preliminary step to more focused study of a particular aspect of the natural environment. Students interested in the atmospheric environment and meteorology should select the Atmospheric Science Option, those interested in the geologic environment should select the Environmental Geoscience Option, and those interested in both the scientific and social aspects of environmental problems should select the Environmental Studies Option.

Students who are enrolled in the Environmental Studies option may elect to do the STEM Teaching Minor. This minor leads to K-12 Earth Science teaching certification as part of the BS degree. The Environmental Science degree program also provides the basic course work, with a few additional courses required depending on the option, for students who wish to pursue a graduate degree in Earth Science teaching. This one-year long Master’s in Education degree program provides the course work and the apprentice teaching experience required for certification in Massachusetts and thirty-three other states.

Department of Environmental, Earth & Atmospheric Sciences

The Department of Environmental, Earth and Atmospheric Sciences offers programs of study that provide a firm base in science and mathematics and a broad understanding of the natural environment. The programs are multidisciplinary in approach with a strong emphasis on the physical environment. Multiple pathways and electives in the various options allow the student, in collaboration with his/her adviser, to structure a program that meets his/her interests and career goals.

Three program options are offered within the Bachelor of Science Degree in Environmental Science:

- Atmospheric Science
- Environmental Geoscience
Bachelor of Arts Degree in Mathematics

The Department of Mathematical Sciences offers a Major in Mathematics leading to the Bachelor of Arts degree.

A summary of requirements for the BA degree in Mathematics is given below. For additional information visit the Department of Mathematical Sciences or contact us.

View the complete course of study. (pdf)

Degree Requirements for the Bachelor of Arts in Mathematics

A mathematics major must satisfy university, college and departmental requirements. University and college requirements, described in detail in the university web site, are summarized below. Requirements for the BA degree in mathematics follow. All students, including freshmen and transfer students, should seek advice from the mathematics undergraduate coordinator or department advisor when planning individual courses of study. To graduate, a student must complete 120 credit hours of approved coursework. No more than 60 mathematics credits can be counted toward the BA degree. The following courses cannot be credited toward a degree in mathematics, science or engineering: 92.111, 92.121, 92.122, 92.124, 92.127, 92.151, 92.183, 92.283, 92.363. The following course can be used for credit only as a concentration elective in the mathematics teaching option: 92.410.

Mathematics Core Requirements: A mathematics major must take a minimum of 46 approved mathematics credits, including 92.131 Calculus I (or 92.141 Honors Calculus I with permission), 92.132 Calculus II (or 92.142 Honors Calculus II with permission), 92.231 Linear Algebra I, 92.222 Linear Algebra II, 92.234 or 92.236 Differential Equations (or 92.244 Honors Differential Equations with permission), 92.321 Discrete Structures I, one basic analysis course (92.305 Introduction to Real Analysis, 92.411 Complex Variables, 92.501 Real Analysis, 92.503 Mathematical Analysis), one additional analysis course (92.301 Introduction to Applied Mathematics, 92.305 Introduction to Real Analysis, 92.322 Discrete Structures II, 92.362 Numerical Analysis, 92.411 Complex Variables, 92.413 Number Theory, 92.420 Mathematical Problem Solving, 92.421 Abstract Algebra, 92.450 Mathematical Modeling), one course in probability and statistics (92.385 Applied Statistics, 92.386 Introduction to Probability and Mathematical Statistics I, 92.486 Introduction to Probability and Mathematical Statistics II, 92.375 Senior Seminar I, 92.475 Senior Seminar II, and three mathematics electives at the 300, 400 or 500 level, provided prerequisites are met. Note that a student may not take both 92.322 Discrete Structures II and 92.421 Abstract Algebra and may not take both 92.305 Introduction to Real Analysis and 92.503 Mathematical Analysis to satisfy the two-course analysis requirement.

Non-mathematics Concentration: Students in the BA program must complete an approved 18-credit-hour (six-course) concentration outside the Division of Sciences of the College of Arts and Sciences. These courses may lead to a minor or may cross departments. This concentration must be planned as a unified, coherent whole rather than a series of unrelated courses, and the concentration must be approved by the mathematics undergraduate coordinator or department chair.

Science Requirement: Students in the BA program must complete at least three science courses from among the offerings approved for science majors, including two courses with corequisite laboratories from outside the Department of Mathematical Sciences.

Computing Requirement: This requirement is satisfied by 91.101 Computing I or 92.576 Statistical Programming Using
SAS or another computer programming course as approved by the mathematics undergraduate coordinator or department chair.

**Writing Requirement:** In addition to College Writing I and II, mathematics majors must take 42.229 Essay Writing for Non-English Majors. If a student has completed other courses with substantial writing requirements, he/she can petition to have that work replace 42.229. Instead of 42.229, students double-majoring in mathematics and computer science should take 42.220 Oral and Written Communication for CS Majors.

**General Education (Gen Ed) Electives** must include College Writing I and II (42.101 and 42.102); at least three courses in Arts and Humanities (AH); and at least three courses in Social Sciences (SS). At least one General Education course must satisfy the Diversity (D) requirement and one the Ethics (E) requirement. No more than two courses from a single department can be used to satisfy these Gen Ed requirements. General Education requirements may vary with year of admission; see your advisor.

**Senior Seminar:** The senior seminar sequence (92.375 Senior Seminar I, 92.475 Senior Seminar II) provides a capstone experience in undergraduate mathematics. Each student undertakes an in-depth project, under the guidance of a faculty member (not necessarily in the Department of Mathematical Sciences). Senior Seminar I (1 credit hour) involves planning the project, typically in the spring of the junior year. Senior Seminar II (3 credit hours), taken the following semester, involves completing the project, writing a report and making a presentation to other students. Interested students can earn an additional 3 hours of independent research credit by taking 92.476 Senior Seminar III. For details, see the mathematics undergraduate coordinator or department chair.

**Student Exception Form:** Any deviations from stated requirements require written permission of the mathematics undergraduate coordinator or department chair. The student should use a Student Exception form and keep a copy for her/his records.

**Double Majors:** Many students choose to combine a mathematics major with a major in another discipline such as computer science, economics, engineering, philosophy, physics, and psychology.

For details, contact the mathematics undergraduate coordinator.

**Fast Track to Teaching**

**Five Year BS/MS Programs in Mathematics**

**Five Year “Plus One” Program in Mathematics**

Qualified students can earn both a bachelor’s degree and a master’s degree in mathematics in five years. Interested students should apply during the junior year. Applicants must have a grade point average of 3.0 or better in mathematics courses and overall.

Students may begin taking graduate courses during their junior year as long as course prerequisites are met. All the requirements for both the BS (or BA) and MS degrees in mathematics must be satisfied. However, students may count six graduate credits toward both the BS (or BA) and MS degrees. Furthermore, applicants do not need to take the Graduate Record Examination (GRE), which is required for admission to other graduate programs.

Application forms can be obtained from the graduate school or on the university web site. Students interested in this program should contact the mathematics graduate coordinator Dr. Dan Klain (Olney Hall 428N, Daniel_Klain@uml.edu) during their junior year.

**Fast Track to Teaching**

The Department of Mathematical Science and the Graduate School of Education jointly offer a five-year program leading to a BS (or BA) degree in mathematics, an MEd degree in curriculum and instruction, and initial teacher certification. To be eligible, a student must maintain an overall grade point average of 3.0 and take the Graduate Record Examination (GRE). All the requirements for both the BS (or BA) and MEd degrees must be satisfied. Mathematics majors interested in this program should contact the Graduate School of Education program coordinator Dr. Vera Ossen (O’Leary Library 510E, Vera_Ossen@uml.edu) during their junior year.

**Five Year “Plus One” Program in Mathematics and Epidemiology**

The Departments of Mathematical Sciences and Work Environment jointly offer a five-year program leading to a BS in mathematics and an MS in epidemiology. Mathematics majors may apply for the Plus One program during their junior year. Applicants must have a grade point average of 3.0 or better in mathematics courses and overall. Students may begin taking graduate courses during their junior year as long as course prerequisites are met.

In order to finish both degrees in five years, students must take 126 credits in the first four years, including 12 graduate credits. Six of these graduate credits will count towards both the BS and MS degrees (19.575 Introduction to Biostatistics and Epidemiology and 92.591 Linear Modeling and Regression Methods) and six credits will fulfill requirements for the master's degree (19.500 Analytical Context Work Environment and 19.503 Toxicology and Health).

Students interested in this program should contact the mathematics undergraduate coordinator Dr. Shelley Rasmussen...
Mathematical Sciences Minor Requirements

The Department of Mathematical Sciences offers a Minor in Mathematics for students majoring in other fields or pursuing degrees other than the Bachelor of Science.

A student who successfully completes the coursework gains greater depth of mathematical understanding than required by her/his major department and receives recognition for this accomplishment.

A minor in mathematics consists of at least 18 credits of mathematics courses numbered 92.129 or above, 9 of which are beyond those required for a student's major. Students may select courses from the mathematics major core and option lists. A minimum of six credits must be in courses at or above the 300 level. Linear Algebra II (92.222) may be substituted for one of the 300 level courses. Introduction to Data Analysis (92.363) does not count toward a mathematics minor.

Any interested student may find more details about Minor in Mathematics at [http://www.uml.edu/mathforms/mathminor.html](http://www.uml.edu/mathforms/mathminor.html) or contact the coordinator, Professor Alexander Kheifets, (Olney 428B, Alexander_Kheifets@uml.edu).

Mathematical Sciences Major

The Department of Mathematical Sciences offers a Major in Mathematics leading to the Bachelor of Science degree or the Bachelor of Arts Degree.

A mathematics major can earn a general degree or concentrate in a specific area. The concentrations offered are:

<table>
<thead>
<tr>
<th>Applied/Computational Mathematics</th>
<th>Bioinformatics</th>
<th>Business Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>Probability/Statistics</td>
<td>Teaching</td>
</tr>
</tbody>
</table>

A summary of requirements for the basic mathematics major is given below. For details and additional information about the concentrations, visit the Mathematical Sciences Department or contact us.

Degree Requirements for Undergraduate Mathematics Majors

A mathematics major must satisfy university, college and departmental requirements. University and college requirements, described in detail in the university web site, are summarized below. Requirements for the basic mathematics major are shown, along with a sample program of study. All students, including freshmen and transfer students, should seek advice from the mathematics undergraduate coordinator or department advisor when planning individual courses of study. To graduate, a student must complete 120 credit hours of approved coursework. No more than 60 mathematics credits can be counted toward the BS degree. The following courses cannot be credited toward a degree in mathematics, science or engineering: 92.111, 92.121, 92.122, 92.124, 92.127, 92.151, 92.183, 92.283, 92.363. The following course can be used for credit only as a concentration elective in the mathematics teaching option: 92.410.

Mathematics Core Requirements: A mathematics major must take a minimum of 46 approved mathematics credits, including 92.131 Calculus I (or 92.141 Honors Calculus I with permission), 92.132 Calculus II (or 92.142 Honors Calculus II with permission), 92.231 Calculus III (or 92.241 Honors Calculus III with permission), 92.221 Linear Algebra I, 92.222 Linear Algebra II, 92.234 or 92.236 Differential Equations (or 92.244 Honors Differential Equations with permission), 92.321 Discrete Structures I, one basic analysis course (92.305 Introduction to Real Analysis, 92.411 Complex Variables, 92.501 Real Analysis, 92.503 Mathematical Analysis), one additional analysis course (92.301 Introduction to Applied Mathematics, 92.305 Introduction to Real Analysis, 92.322 Discrete Structures II, 92.362 Numerical Analysis, 92.411 Complex Variables, 92.413 Number Theory, 92.420 Mathematical Problem Solving, 92.421 Abstract Algebra, 92.450 Mathematical Modeling), one course in probability and statistics (92.385 Applied Statistics, 92.386 Introduction to Probability and Mathematical Statistics I, 92.486 Introduction to Probability and Mathematical Statistics II), 92.375 Senior Seminar I, 92.475 Senior Seminar II, and three mathematics electives at the 300, 400 or 500 level, provided prerequisites are met. Note that a student may not take both 92.322 Discrete Structures II and 92.421 Abstract Algebra and may not take both 92.305 Introduction to Real Analysis and 92.503 Mathematical Analysis to satisfy the two-course analysis requirement.

Mathematics Concentrations: In addition to the basic mathematics major, six concentrations are available:
To complete a concentration, a student must satisfy the 46 credit hours of mathematics core requirements, plus an additional nine credits of approved concentration electives. Concentration electives are not limited to mathematics courses. The Registrar must be notified if the choice of concentration is to appear on a student’s transcripts. For concentration-specific requirements, an interested student should check with the mathematics undergraduate coordinator or her/his advisor.

View the complete course of study for concentrations (pdf):

- Mathematics: Applied Computational Math
- Mathematics: Bioinformatics
- Mathematics: Business Applications
- Mathematics: Computer Science
- Mathematics: Probability/Statistics
- Mathematics: Teacher Concentration

Computing Requirement: This requirement is satisfied by 91.101 Computing I or 92.576 Statistical Programming Using SAS or another computer programming course as approved by the mathematics undergraduate coordinator or department chair.

Writing Requirement: In addition to College Writing I and II, mathematics majors must take 42.229 Essay Writing for Non-English Majors. If a student has completed other courses with substantial writing requirements, he/she can petition to have that work replace 42.229. Instead of 42.229, students double-majoring in mathematics and computer science should take 42.220 Oral and Written Communication for CS Majors.

Bachelor of Science Requirements: To earn a BS degree, a student must complete a minimum of 74 credits and 20 courses from the offerings of physical sciences, mathematics and computer science. These must include four science lecture courses with associated laboratory offerings, including a two-semester sequence not in the mathematics department. The following courses may not be counted toward a degree in mathematics, science or engineering: 95.121 Exploring the Universe, 96.121 Exploring the Universe Laboratory, 99.101 Radiation and Life, 99.102 Radiation and Life Laboratory, 92.111, 92.121, 92.122, 92.124, 92.127, 92.151, 92.283, 92.363; 92.410 can be used as credit only as a concentration elective in the mathematics teaching option.

General Education (Gen Ed) Electives must include at least six courses, three in Arts and Humanities (AH) and three in Social Sciences (SS); one course must satisfy the Diversity (D) requirement and one the Ethics (E) requirement. No more than two courses from a single department can be used to satisfy these Gen Ed requirements. General Education requirements may vary with year of admission; see your advisor.

Senior Seminar: The senior seminar sequence (92.375 Senior Seminar I, 92.475 Senior Seminar II) provides a capstone experience in undergraduate mathematics. Each student undertakes an in-depth project, under the guidance of a faculty member (not necessarily in the Department of Mathematical Sciences). Senior Seminar I (1 credit hour) involves planning the project, typically in the spring of the junior year. Senior Seminar II (3 credit hours), taken the following semester, involves completing the project, writing a report and making a presentation to other students. Interested students can earn an additional 3 hours of independent research credit by taking 92.476 Senior Seminar III. For details, see the mathematics undergraduate coordinator or department chair.

Student Exception Form: Any deviations from stated requirements require written permission of the mathematics undergraduate coordinator or department chair. The student should use a Student Exception form and keep a copy for her/his records.

Double Majors: Many students choose to combine a mathematics major with a major in another discipline such as computer science, economics, engineering, philosophy and physics.

For details, contact the mathematics undergraduate coordinator.

Fast Track to Teaching

Mathematical Sciences

Mathematics provides tools for explanation and analysis in the physical, engineering, business and social sciences. These tools can help in areas as diverse as planning and evaluating market research, modeling problems in business and finance, developing new educational practices, comparing treatment groups in the biological and social sciences, providing fundamental organizing structure for the physical world and giving satisfaction to those who love mathematics for its own sake.
Mathematics faculty strive to meet the needs of all students: nontechnical majors; future mathematics teachers; physical scientists; social scientists; those interested in business, economics and finance; engineers; graduate students expanding their technical skills and/or engaging in original mathematical research.

For up-to-date information, go to the [Mathematical Sciences Department webpage](#).

**Radiological Health Physics Option**

Radiological health physics involves the study of the effects of radiation and radioactivity on life processes. It also can be called radiation protection science and is particularly involved with the effects of radiation on the human body and the control of such radiation.

View the complete [course of study](#) (pdf).

View the [Learning Outcomes](#).

A graduate of this curriculum would enter the profession of health physics, which is devoted to the protection of human beings and their environment from radiation hazards, while at the same time making it possible for our advancing civilization to enjoy all of the benefits resulting from uses of radiation.

Radiation control in its professional aspects incorporates an understanding of many disciplines. It has common scientific interests with many areas of specialization: biophysics, physics, biochemistry, chemistry, biology, genetics, ecology, nuclear engineering, metallurgy, medicine, physiology, and toxicology. Other aspects of the profession include working knowledge of labor relations, public relations, teaching, philosophy, and administration. The wide spectrum of knowledge required of the health physicist makes this profession both challenging and rewarding.

Health physicists are employed by federal agencies (such as the Nuclear Regulatory Commission and Department of Energy) at research, production, and testing facilities; state, and local government agencies responsible for regulating the use of radioactive materials; the military services; electric utilities operating nuclear power plants; businesses which use radioisotopes or x-ray equipment to detect flaws or defects in manufactured products, prepare or reprocess nuclear fuels, control nuclear wastes, or produce or use radioactive materials or devices; universities (in teaching, research, and equipment monitoring); hospitals and medical centers that use radionuclides, x-ray equipment, and accelerators in the diagnosis and treatment of patients; and consulting firms which advise the service installations that do not employ full-time health physicists.

Scholarships are available for undergraduate students who choose the Radiological Health Physics Option. These are available from the Nuclear Regulatory Commission, the Department of Energy, the Health Physics Society, the National Academy for Nuclear Training, and other organizations concerned with radiation protection. All students in the Radiological Health Physics Option who have completed the required sophomore year courses currently receive a $500 scholarship from funds donated by Northeast Utilities Service Company of Hartford, Connecticut. These scholarships have been sponsored to attract highly qualified young men and women into the much needed field of radiation protection sciences.

The Radiological Health Physics students enjoy excellent job opportunities and challenging careers in the radiation protection field upon graduation. Students may gain valuable applied work experience while also earning much needed money through various summer internship programs at the University of Massachusetts Lowell. They also may gain experience and academic credit through an internship course at the University Radiation Laboratory. This course is conducted under the direction of the health physics staff who have responsibility for the radiation safety programs at the nuclear reactor facility, accelerator facility, radioisotope research laboratories and x-ray facilities at the University of Massachusetts Lowell. The academic and job experience that the students receive provide excellent preparation for either an applied health physics position or the pursuit of an advanced degree in radiation protection or related fields. The University of Massachusetts Lowell offers, as well as the BS program, both M.S. and Ph.D. programs in radiological sciences and protection and receives research and scholarship support from government and industry. Radiological Health Physics graduates at all degree levels are receiving many high-salaried job opportunities.

**Physics Major with Optics Option**

Majors in the Department of Physics and Applied Physics may also elect an Optics Option which will be recognized on the student's transcript providing an official declaration form is filed at the end of the lower division program. This option will provide the student with intensive training in optics in preparation for immediate entry into a career in one of the many rapidly expanding fields in optics such as optical component and system design, lasers, and image processing. In addition, students wishing to continue their training will be qualified to enter graduate study in physics, optics, astronomy or engineering.

This option has been developed by the Department of Physics and Applied Physics in consultation with an Industrial Advisory Panel of distinguished physicists active in various fields of optics in order to fill a need in the New England area for graduates at the BS level with a strong background in optics. Students enrolled in the Optics Option will have an excellent chance of finding summer or part-time employment in the optics industry during their junior and senior years.

The topics which will be covered in the courses offered under the Optics Option include the basic principles of geometrical optics and their application to the design of optical components and systems such as lenses, microscopes and telescopes, the design and operation of optical devices such as lasers, spectrometers and interferometers, the generation and detection of various types of electromagnetic radiation, optical properties of materials and the properties of imaging systems and
image processing. There will be extensive laboratory work associated with the courses utilizing state-of-the-art equipment.

View the complete course of study (pdf)

**Five-year BS/MS Program in Radiological Sciences**

In recognition of the need for advanced training beyond the bachelor of science level in radiological sciences, the following represents a program by which outstanding undergraduates can pursue an accelerated five-year course of study leading to the BS and M.S. degrees in Radiological Sciences.

1. Undergraduate students who express an interest in this program will be evaluated by the graduate selection committee. Those students deemed commendable by the committee will be advised relative to the correct procedure for successful completion of their B.S degree, as well as a course of study toward the M.S. degree.

2. The first three years of undergraduate study will be identical to that which is specified for students enrolled in the current four-year BS program.

3. During the second semester of the junior year and upon approval and recommendation by the graduate selection committee, the student will file formal application to the Graduate School. This does not require the student to have taken the Graduate Record Examination. The committee decision will be based on: a) overall grade-point average, b) grade-point average in selected subjects, c) recommendations by program faculty, and d) a one year minimum residency requirement at the University of Massachusetts Lowell. Upon approval and recommendation by the Dean of the Graduate School, the student may be allowed to pursue graduate studies during the Senior year and officially become a provisional graduate student in the first semester of senior year.

4. During the senior year, the student will be permitted to take up to four graduate-level courses which can be applied towards the M.S. degree. Although advanced undergraduate (i.e., 400 level) courses are acceptable, no more than two such courses will be allowed towards the M.S. degree. It should be emphasized that the total number of credits for the combined degrees must be greater than the minimum number of credits required for both the undergraduate and graduate degrees. The University BS requirement is 120 credits, thus a student with a total of 124 credits may, with approval, transfer up to four of the credits used to obtain the BS degree toward the M.S. degree.

A maximum of 12 credits can be transferred toward the M.S. degree program.

5. Upon completion of the fourth year of study, assuming that all program and University requirements have been met, the student will be awarded the BS degree and may then be recommended for full matriculation status by the graduate selection committee and the Dean of the Graduate School prior to the fifth year of study. If the student chooses not to continue toward the M.S. degree (or fails the fifth year), this does not alter receipt of the BS degree.

6. Although the options exist for taking an overload in any semester and/or registration for one or more summer sessions, they are not a requirement of this program. However, students wishing to gain a full research experience will be encouraged to initiate their research as early as possible (e.g., during the junior to senior year summer session), which is a distinct advantage of this accelerated program.

7. During the fifth year, as in the standard M.S. degree program, the student may undertake: a) thesis option (nine semester hours of graduate research) or b) project option (three semester hours of graduate project). In either case, the student will be required to take two one-credit graduate seminar courses, as well as the other courses required for the M.S. degree in radiological sciences, and must satisfy the 30 credit minimum M.S. degree requirement. Upon completion of all program and graduate school requirements, the student will be awarded the M.S. degree.

**Physics Minor Requirements**

A student who has a basic background in physics and mathematics may be able to take more advanced physics courses. The goal of the physics minor program is to provide recognition for students in other majors who wish to enhance their understanding and mastery of a broader range of subjects than is provided in their major field alone.

The physics minor will establish the physics background needed to enter interdisciplinary fields such as Biophysics, Medical Physics or Material Science. In addition, a physics minor would be especially useful for students majoring in Biology, Chemistry, Mathematics, Earth Sciences, Engineering or Computer Science.

A minor in Physics consists of a minimum of 22 credits of physics courses.

All course prerequisites and co-requisites must be satisfied. The requirements for the minor are:

**Lower Division**

A. Students must earn nine credits by completing either of the following physics sequences:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.141</td>
<td>Physics I</td>
<td>3cr</td>
</tr>
<tr>
<td>95.144</td>
<td>Physics II</td>
<td>3cr</td>
</tr>
<tr>
<td>95.245</td>
<td>Phys. Prop.of Mat.</td>
<td>3cr</td>
</tr>
</tbody>
</table>

Or...

### Physics Major Requirements

- **Kernel Program**
- **Non-Physics Electives and General Education Requirements**
- **Physics Electives**
- **Electives (definitions)**
- **Course of Study**

#### Kernel Program

The courses listed below constitute the required Kernel for all physics majors. Sample programs of study are shown in the next section which illustrate how these courses can be integrated with General Education requirements and Physics Electives to make a four-year degree program.

#### I. Lower Division Courses

**Physics**

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.112 Fresh Phys Sem</td>
<td>1 cr</td>
</tr>
<tr>
<td>95.161 Physics I (H)</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.164 Physics II (H)</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.269 Physics III (H)</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.161 Physics I Lab (H)</td>
<td>2 cr</td>
</tr>
<tr>
<td>95.164 Physics II Lab (H)</td>
<td>2 cr</td>
</tr>
<tr>
<td>95.210 Intro Modern Phys</td>
<td>3 cr</td>
</tr>
<tr>
<td>96.260 Physical Instrumentation</td>
<td>2 cr</td>
</tr>
<tr>
<td>96.295 Inter Exper Phys</td>
<td>2 cr</td>
</tr>
</tbody>
</table>

**Non-Physics**

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.101 College Writing I</td>
<td>3 cr</td>
</tr>
<tr>
<td>42.102 College Writing II</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.121 Chemistry I</td>
<td>3 cr</td>
</tr>
<tr>
<td>84.122 Chemistry II</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

#### Upper Division

**E. Six cr. 300-400 level 6 cr**

**Total Minimum 22 credits**
II. Upper Division Courses*

Physics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.310</td>
<td>Quantum Physics</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.338</td>
<td>Optics and Waves</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.353</td>
<td>Elect - Magn I</td>
<td>3 cr</td>
</tr>
<tr>
<td>96.393</td>
<td>Adv Exper Phys I</td>
<td>2 cr</td>
</tr>
<tr>
<td>96.394</td>
<td>Adv Exper Phys II</td>
<td>2 cr</td>
</tr>
<tr>
<td>95.411</td>
<td>Sen Phys Sem</td>
<td>1 cr</td>
</tr>
<tr>
<td>95.413</td>
<td>Mechanics</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.421</td>
<td>Statistical Thermo</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.452</td>
<td>Contemporary Physics</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

Non-Physics

- 92.301 Applied Math I 3 cr
- 92.302 Applied Math II 3 cr

Any waivers or substitutions for these requirements must be approved by the Undergraduate Coordinator.

*Upon completion of the Lower Division courses (Freshman and Sophomore Level) the students’ records will be reviewed by a committee of at least three faculty members. A recommendation will be made to proceed to Upper Division courses (Junior and Senior Level) or to take remedial courses or repeat courses as deemed necessary to prepare the student for the Upper Division courses. A revised program will be formulated for each student requiring remedial work which may extend his/her program by one or more semesters. In appropriate cases the student will be advised to change major. The student attains the status of physics baccalaureate degree candidate when admitted to the Upper Division.

Non-Physics Electives and General Education Requirements

In addition to the Kernel Program in Physics, courses to satisfy the General Education requirement and the physics elective requirement must be chosen from among all of the course offerings of the University subject to the following conditions:

1. All elective courses must be approved by the student's faculty advisor.

2. General Education Guidelines (36-38 credits)

Students must conform to the General Education guidelines as outlined elsewhere in this document. These include:

1. College Writing - 2 courses – 42.101/42.102
2. Mathematics - 1 course (met by required math courses in major)
3. Art and Humanities - 3 courses
4. Social Sciences - 3 courses
5. Science and Technology - 3 courses, two of which must contain an experimental learning component (met by required science courses in major)

3. Technical electives required by the major

At least 13 credits (of which six must be from the Physics Electives list) in technical elective courses must be taken in a specialty field. These electives may include courses outside the department. Elect - Magn II (3) [95.354] is strongly recommended for students intending to pursue a graduate degree in physics, as well as Introductory Quantum Mechanics I and II (3,3) [95.435/436]. Experimental Analysis for Physicists (1) [95.191] is required for students who have not taken 96.161 and 96.164 and have an insufficient background in experimental error analysis.

If the Optics Option is chosen, then included in the Physics Electives the student must take the courses listed below.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.337</td>
<td>Geometrical Optics</td>
<td>3 cr</td>
</tr>
</tbody>
</table>
Successful completion of the Optics option will be certified by the Department on the student’s transcript provided an official declaration form is filed at the end of the lower division program. See Physics Electives list for additional courses in optics.

**Physics Electives**

1. **General Physics - Upper Division (all but 95.191)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.191</td>
<td>Exper Analysis for Physics Majors**</td>
<td>1 cr</td>
</tr>
<tr>
<td>95.212</td>
<td>Sophomore Physics Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>95.312</td>
<td>Junior Physics Seminar</td>
<td>1 cr</td>
</tr>
<tr>
<td>95.354</td>
<td>Elect - Magn II*</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.383</td>
<td>Astronomy &amp; Astrophysics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.384</td>
<td>Astronomy &amp; Astrophysics II</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.435</td>
<td>Intro Quantum Mechanics I*</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.436</td>
<td>Intro Quantum Mechanics II*</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.461</td>
<td>Nuclear Physics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.472</td>
<td>Solid State Physics</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.483</td>
<td>Relativity and Cosmology</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.484</td>
<td>Relativity and Cosmology</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.494</td>
<td>Elementary Particle Theory</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.497</td>
<td>Senior Thesis</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.498</td>
<td>Senior Thesis</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.605</td>
<td>Mathematical Physics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.606</td>
<td>Mathematical Physics II</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

Note: *Courses that are strongly recommended for students intending to pursue a graduate degree in physics.

**Experimental Analysis for Physics Majors (1) [95.191] is required for students who have not taken 96.161 and do not have a background in experimental error analysis and technical report writing

2. **Optics - Upper Division**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.337</td>
<td>Geometrical Optics</td>
<td>3 cr</td>
</tr>
<tr>
<td>96.337</td>
<td>Geometrical Optics Lab</td>
<td>2 cr</td>
</tr>
<tr>
<td>95.439</td>
<td>Electro-Optics w Lab</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.440</td>
<td>Image Processing</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.447</td>
<td>Laser Physics &amp; Applic</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.447</td>
<td>Experimental Laser Optics</td>
<td>2 cr</td>
</tr>
<tr>
<td>95.451</td>
<td>Fiber Optics</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.453</td>
<td>Optics Project***</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.454</td>
<td>Optics Project***</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

***supervisor needed before registering

3. **Radiological Health Physics**

**Upper Division**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.355</td>
<td>Phys of Rad &amp; Nucl</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.401</td>
<td>Rad Safety &amp; Control I</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.402</td>
<td>Rad Safety &amp; Control II</td>
<td>4 cr</td>
</tr>
<tr>
<td>95.411</td>
<td>Radiochemistry</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.422</td>
<td>Env Rad &amp; Nucl Site Cri</td>
<td>3 cr</td>
</tr>
<tr>
<td>95.462</td>
<td>Radiation Biology</td>
<td>3 cr</td>
</tr>
</tbody>
</table>
Electives (definitions)

Gen Ed Elect - general education elective

Physics Elect - physics elective - upper division

Special Elect - specialty elective (specialization)

Elective - free elective

Curriculum

View the complete course of study (pdf).

For additional information visit the Physics Department or contact us.

Physics Department

The Bachelor of Science (BS) degree offered in Physics is intended to prepare a student for a career in industry, teaching, or graduate study in a number of fields by providing him/her with a flexible course of study which superimposes a specialization chosen by the student (at least 13 credits of technical electives) on a general physics foundation (47 credits of required courses in the Kernel). At least 53 credits total must be taken in physics courses to satisfy the requirements for the BS in Physics. Some of the technical electives may be chosen from appropriate courses outside the Department or from the list of Physics Elective courses. There are five courses of study available: Standard, Optics Option, Radiological Health Physics Option, preparation for Graduate School, and preparation for teaching. Successful completion of either option program will be certified by the Department on the student’s transcript.

- Physics Major
- Physics Major with Optics Option
- Radiological Health Physics Option
- Physics Minor
- Five-Year BS/MS Radiological Sciences
- Course Listing

The Bachelor of Science in Physics

Physics is the science of matter and is concerned with its fundamental structure, properties and behavior. The fields of chemistry, biology, geology, astronomy and engineering, among basic understanding.

A present day physicist engages in research, development and design, teaching or administration. The employer may be an educational institution, a small business, a large industrial firm, a government laboratory or a non-profit research center. Those physicists who obtain a doctorate (Ph.D.) are prepared for a research career and are expected to have a high level of initiative with responsibility for a research program. This program can fall anywhere in the range from “basic” through “applied” depending upon one’s interests and those of his/her employer. The physics program is designed to give the student a continuum of career choices.

Accordingly, the University of Massachusetts Lowell program can prepare students for a research career. The required and elective courses develop a sound understanding of the principles of experimental and theoretical physics and can successfully prepare the physics major for graduate study. The program also accommodates students who will seek employment after receiving the Baccalaureate degree. It allows these students to develop a remunerable talent in some specialized field. This is possible because of the number of technical electives in the curriculum. Through these electives the student acquires at least 13 credits in some field of specialization.

The program is very flexible allowing the student to match his/her special interests with the study of physics. Specialties may be as far a field as economics or management or as close as mathematics or chemistry. They may be in any of the engineering fields or computer science. A student pursuing this course of study develops a solid foundation in physics and concurrently acquires a good background in a specialized field thereby obtaining the necessary practical knowledge to solve applied problems competently.

This combination of the general and the specialization prepares the student for immediate employment after graduation. Some graduates of this program have chosen industry, government work, or teaching. While such business employment may be the primary goal of the student, it is also possible to pursue graduate studies in either the specialized field or physics.

Students who complete the undergraduate program in physics often receive awards for complete support for graduate study. In the past, graduating seniors have received awards of complete tuition for graduate study and additional stipends from graduate schools such as Harvard University, the University of Chicago, Brown University, the University of Illinois, Johns Hopkins University, Brandeis University, Purdue University, the State University of New York at Stony Brook, Boston
Programs in the Sciences

The science and mathematics departments of the UMass Lowell College of Sciences offer undergraduate programs leading to the Bachelor of Science degree. Students who matriculate for the degree of Bachelor of Science may pursue majors in Biological Sciences, Chemistry, Computer Science, Environmental, Earth and Atmospheric Sciences, Mathematical Sciences, and Physics and Applied Physics.

Students should consult the Graduate Catalog for information concerning master’s programs in Biological Sciences, Chemistry, Computer Science, Mathematics, Physics and Applied Physics, Polymer Science, Radiological Sciences and Protection, and doctoral programs in Chemistry, Computer Science, Physics and Applied Physics.

In addition to satisfying general University requirements for Bachelor's degrees as are defined elsewhere in this publication under the heading Academic Policies: Baccalaureate Degrees, students who matriculate for degrees in the College of Sciences also must complete a specific minimum number of courses and credits in the College of Sciences. These college requirements are described below. Except as specified by the college and program restrictions, students are permitted to elect any course for which they can satisfy prerequisite requirements in fulfilling an unrestricted elective requirement. However, in order to designate courses from other colleges of the University as science or mathematics courses, students must petition the chairperson of the department in which they are enrolled as majors.

Minor areas of study are offered by all science departments. College majors may also wish to consider minors offered by the social sciences, humanities, and fine arts departments, and specialized course sequences of the College of Engineering. All minor programs of the University require 18-24 credits, six of which must be at the 300 course level or above.

Bachelor of Science Degree

The Bachelor of Science degree is designed to provide a specialized education in one or more of the basic sciences. Specialized Bachelor of Science curricula, which are offered in areas of science and mathematics, provide opportunities for major and minor program options but afford greater opportunities for major specialization than are permitted in comparable Bachelor of Arts curricula.

All Bachelor of Science programs require, as a minimum, 74 credits and 20 courses from the offerings of the science and mathematics departments. At least three courses are required in mathematics beyond pre-calculus mathematics and must include two calculus courses and one additional mathematics elective.

Four science lecture courses with co-requisite laboratories are required. These are selected from approved courses in each department and must include a two-semester sequence from one department outside the student's major.

For University policies concerning majors presented for the Bachelor of Science degree, see policies under the heading Academic Policies: Major Field Requirements.

Below is a list of major fields for the BS degree currently offered in the College of Sciences. Students need not choose an option or concentration.

1. Biological Science
   1. Bioinformatics Option
   2. Biotechnology Option
   3. Ecology Option
2. Chemistry
   1. Cheminformatics Option
   2. Forensics Option
3. Computer Science
   1. Bio/Cheminformatics Option
4. Environmental Science
   1. Atmospheric Science Concentration
   2. Environmental Studies Concentration
   3. Geoscience Concentration
5. Mathematics
   1. Applied/Computational Mathematics Option
   2. Bioinformatics Concentration
   3. Business Applications Concentration
   4. Computer Science Concentration
   5. Probability/Statistics Concentration
   6. Teaching Concentration
6. Physics
   1. Optics Option
   2. Radiological Health Physics Option

College Requirements for Science Students

In order to qualify for a Bachelor's degree offered by the science and mathematics departments of the College of Sciences,
undergraduates must comply with the University general education requirements, must conform to the rules of the College of Sciences that govern degree and major studies for such degrees, and must earn 2.000 averages in their major fields by the end of their senior year.

**College of Sciences General Policies**

To qualify for University degrees, baccalaureate candidates are required to obtain a 2.00 (C) average in their total course of study; to complete a minimum of 120 semester credits; to fulfill the minimum residency requirement designated for University day courses and for each major; to satisfy the regulations and academic standards of the colleges that exercise jurisdiction over the degrees for which they are matriculating; to complete all curriculum requirements and minimum averages in majors specified by the college in which they are enrolled and department(s) in which they are majoring; and to complete the University general education requirements.

- Second Majors and Minors
- Approved Minors
- Declaring and Changing Major
- Transfer Policies
- Courses from Other Institutions
- Repetition of Transfer Courses
- Intercollegiate Transfer
- Pre-professional Training
- Law School Requirements
- Medical/Dental School Requirements
- Teaching Careers

**Second Majors and Minors**

Options for second majors and minor studies are permitted as specified below:

1. Students may elect a second major that is offered by the College of Sciences or, upon approval of the Dean, they may elect a second major that is offered by other colleges of the University.

2. Students who elect academic majors in more than one college are candidates for one degree only, and they are considered to be degree candidates in the college of their initial major unless they indicate to the contrary at the time they make a declaration of second major by filing for intercollegiate transfer. Accordingly, a student who pursues academic majors in the College of Sciences and another college is subject to all degree requirements as specified by the college of his or her initial major and is subject only to major course requirements (including any collateral and prerequisite courses for the major) as specified by the department of his or her second major. For a full discussion of University requirements concerning second majors, students should consult the relevant section of this publication, which appears under the heading Academic Policies.

3. In accordance with the requirements of established minor programs, students who matriculate for degrees in the College of Sciences may undertake a minor from those areas cited below that are distinct from the disciplines comprising their majors. The curriculum committee of the College will from time to time review and, when appropriate, approve new minors in addition to those listed below. Students should consult with their advisors concerning additions to the approved listing of minors. Specific options for minor programs will depend on the major field that a student has elected to pursue and the collateral course requirements that have been specified by their major departments. Students are advised that an aggregation of courses that total 18 or more credits does not constitute a minor area and they are referred to University policies, which appear elsewhere in this publication under the heading Academic Policies: Minor Area Requirements for further discussion. Students who wish to elect a minor program in colleges other than the College of Sciences should refer to the appropriate section of this publication concerning prerequisites, restrictions, and prescribed sequences of courses.

4. With the approval of their faculty advisors, matriculating students in the College of Sciences may develop programs of elective courses for the purpose of providing greater personal and professional relevance to their major fields. Such programs may be developed from among those disciplines that are listed above as areas in which elective courses may be authorized for matriculating students of the College of Sciences.

5. Matriculating students in the College of Sciences who do not choose to take a second major or a minor must present at least six semester credits in courses that are on or above the ?300? level among those elective courses offered in fulfillment of collateral degree requirements. These courses may not be taken on a pass/fail basis.

**Declaring and Changing Major**

Students who are matriculating for degrees in the College of Sciences are required to designate degree majors in the college. Students who are admitted to Bachelor of Science programs in the sciences or mathematics are advised to declare their major fields during their freshman year and are required to make such declaration at the end of the sophomore year. Students should consult policies listed elsewhere in this publication under the heading Academic Policies: Major Field Requirements for a complete discussion of declaration of major, declaration of second major, and change of major with intercollegiate transfer.

**Transfer Policies**
Students transferring to the College of Sciences from other colleges of the University or from other institutions may expect recognition of previously completed college level courses that are applicable to the degree requirements of the college. Courses of a professional nature that are not relevant to the academic orientation of the student's major program may not be credited to the minimum degree requirement of 120 credits, and, regardless of any previous recognition by the Office of Admissions or by other colleges of the University, they may not be credited to degree requirements in the College of Sciences. Students wishing to transfer to Bachelor of Music programs are required to demonstrate their vocal or instrumental ability during an audition before the music faculty and are required to complete placement testing in music theory.

**Courses from Other Institutions**

The Office of Admissions initially evaluates courses that are transferred from other institutions when a student is admitted to the University. Courses are evaluated by major departments in terms of college and program requirements. Courses that are transferred to the University under provisions of the Commonwealth Transfer Compact and that are not creditable to requirements of the College of Sciences or as unrestricted elective courses will be listed on the student’s permanent record but will not apply to the minimum degree requirements. In the event that a student who has transferred to the University subsequently makes an intercollegiate transfer to the College of Sciences, all previously completed courses, including transferred courses from other institutions, will be reevaluated in terms of their applicability to degree requirements of the College of Sciences.

**Repetition of Transfer Courses**

A student who has been granted transfer credit, and on this basis has been assigned to advanced courses for which the transferred course is a prerequisite, may be advised to repeat such transferred work at the University or to take a more elementary course than that which has been transferred when the competence of the student has been demonstrably inadequate. Permission to repeat the transferred course is granted by filing an academic petition form through the office of the college dean. Since credit may not be granted more than once for the completion of any course, a condition for filing such a petition is the simultaneous filing of a request to revoke recognition of the previously transferred course.

**Intercollegiate Transfer to the College of Arts and Sciences**

Students wishing to transfer from another college of the University or from baccalaureate continuing education programs of the evening school must file an academic petition, together with a transcript, with the appropriate chairperson and the Dean of Sciences by November 1 for spring semester transfer and by April 1 for fall semester transfer. Students are referred to University policies concerning intercollegiate transfers, which appear elsewhere in this publication under the heading Academic Policies: Change of Major with Intercollegiate Transfer for further procedural details. Records of students who are approved for transfer are reviewed by the Office of the Dean of the College of Sciences and, irrespective of grades previously received in other college programs, all courses that may not be applied to college or program requirements are deleted from the student's cumulative grade-point average.

**Pre-Professional Training**

The curricula for the Bachelor of Science degrees do not prescribe patterns of courses for specific vocational goals. The students in these programs receive a broad general education in the sciences that will prepare them for further study in professional fields at the graduate level. Students planning to enter professional fields should seek the advice of faculty advisors in the area in which they are interested, as listed below.

**Law School Requirements**

Pre-law work should include social sciences (especially history, economics, and political science), humanities (especially literature and philosophy), and basic courses in physical sciences and mathematics. Law schools do not specify particular majors for applicants and the field of concentration is not a determinant in admissions. Law schools do, however, vary in specific requirements and the student should, therefore, become familiar with those requirements of the schools to which he or she is planning to apply. The pre-law advisors are Dr. Francis Talty, Director of Academic Programs and Advisor to the Pre-law Society, and Professor William Burke, Legal Studies Coordinator, Falmouth Hall, 302.

**Medical/Dental School Requirements**

The Council and Association of American Medical Colleges have established minimum requirements for admission to an approved medical school. These include general and organic chemistry, biology, physics, and mathematics. These are minimums and many medical colleges require course work beyond the minimum. For this reason, it is imperative that a pre-medical student plan his or her college program in close consultation with the faculty advisor for pre-medical students. The advisor for pre-medical students is located in the Department of Biological Sciences, Olsen Hall 604.

Most medical and dental schools prefer a broad, liberal education in addition to specific course requirements. They do not advocate a particular major or majors and the field of concentration is not a determining factor in admission as long as the specified course requirements are met. Many pre-medical students will major in biology or chemistry, but a major in the areas of humanities and social sciences allows sufficient electives to meet the requirements of most schools. Medical and dental schools require an aptitude examination, which is ordinarily taken in the spring semester of the junior year.
**Teaching Careers**

The Department of Music offers an undergraduate concentration in music studies for teacher preparation and the degree of Master of Music in Teaching, leading to initial licensure for teaching music in the Massachusetts public schools. More information about this program is available from Dr. Gena Greher or Dr. Alex Ruthmann in the Department of Music.

For those students interested in teaching subjects other than music, the Graduate School of Education offers graduate degree programs designed to prepare elementary and secondary school teachers. These programs provide the course work and the apprentice teaching experience required for initial licensure in Massachusetts and in many other states. See the Graduate Catalog, the Graduate School of Education web site, or the Office of the Dean, Graduate School of Education, for programs and the requirements for admission.

**Organization and Governance**

The College of Sciences contains six departments.

Dean's Office
Olney Hall, Room 524
(978) 934-3840

**Mission of the College of Sciences**

The mission of the College of Sciences is to foster critical and creative thinking for future solutions to environmental, economic, and human problems while helping students to develop the capacity to respond to a changing world. Faculty members emphasize quality instruction, research, and creative activity as well as service to the community. Through activities, such as applied research and student internships in which students and faculty use their expertise in the community, the College serves the economic and social needs of the Merrimack Valley region and beyond.

**College of Sciences Honor & Professional Societies**

Several departments with the College of Sciences host chapters of national honor societies in their disciplines. These honor societies encourage and acknowledge high achievement by students. Departments hosting honor or professional societies include:

- Association for Computing Machinery (Computer Science)
- American Chemical Society
- American Meteorological Society
- Optical Society of America (Physics)
- Pi Mu Epsilon (Mathematics)
- Radiological Health Physics Society
- Sigma Gamma Epsilon (Earth Sciences Honor Society)
- Sigma Xi (Scientific Research)

**Facilities**

**Special Facilities**

Special facilities of the UMass Lowell College of Sciences include science laboratories, computer laboratories, undergraduate and graduate research facilities, a greenhouse, a nuclear reactor and a linear accelerator.

**Departmental Facilities**

The faculty offices, including those of department chairpersons, are housed in the following locations:

<table>
<thead>
<tr>
<th>Biological Sciences</th>
<th>Olsen Hall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>Olsen Hall</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Olsen Hall</td>
</tr>
<tr>
<td>Environmental, Earth, and Atmospheric Sciences</td>
<td>Olsen Hall</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Olsen Hall</td>
</tr>
<tr>
<td>Physics</td>
<td>Olsen Hall</td>
</tr>
</tbody>
</table>

**College of Sciences**

The UMass Lowell College of Sciences, led by Dr. Mark Hines, fosters critical and creative thinking for future solutions to
environmental, economic and human problems, while helping students to develop the capacity to respond to a changing world.

A wide range of ongoing research and project opportunities exist within the various degree programs, and interdisciplinary study is emphasized. Graduates of these programs are heavily recruited both regionally and nationally by industry and governmental agencies.

**Policy**

- Facilities
- Honor & Professional Societies
- Mission of the College of Sciences
- Organization and Governance
- Policies and Requirements

**Programs**

- Programs in Sciences
- Biological Sciences
- Chemistry
- Computer Science
- Environmental, Earth, and Atmospheric Sciences
- Mathematical Sciences
- Physics

**Veteran's Benefits**

The Veterans Administration has approved the University of Massachusetts Lowell for undergraduate study. For details regarding veteran tuition benefits, refer to the [Office of Veterans Services](http://www.uml.edu/student-services/veterans/default.aspx)

**University Expenses**

The following is intended to provide information related to the cost of attending UMass Lowell (including state, federal, and University policies governing fees, residency and non-residency tuition rates, payment schedules, tuition waivers, the New England Regional Program, and financial requirements for international students) and our student financial aid programs.

**Rules Governing Massachusetts Residency for Tuition Purposes**

These rules and regulations apply to the classification of UMass Lowell students as Massachusetts or non-Massachusetts resident students for tuition and fee purposes. Residency regulations are based primarily on the “Residency Status For Tuition Classification Purposes” document from the Massachusetts Board of Higher Education, effective July 1, 2007. The Massachusetts Board of Higher Education, Board of Trustees, and Office of the General Counsel for the University of Massachusetts may revise or interpret this policy at any time. Also, UMass Lowell supplements these regulations with additional requirements or clarifications specific to our institution. The UMass Lowell website ([http://www.uml.edu](http://www.uml.edu)) is the primary source for information concerning residency regulations. In the event of a revision, the revised policy will supersede the following.

1. **0 Definitions**
2. **0 Classification**
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1. **0 Definitions**

1.1 “Board of Trustees” shall mean, the Board of Trustees of an institution.

1.2 “Continuous attendance” shall mean, enrollment at an institution for the normal academic year in each calendar year, or the appropriate portion or portions of such academic year as prescribed by the Board of Trustees or under its authority.

1.3 “Eligible person” shall mean: a U.S. citizen, lawful immigrant, permanent resident, or holder of another legal immigration
status, who has satisfied the durational residency requirement, and can demonstrate his/her intent to remain in Massachusetts.

1.4 “Emancipated person” shall mean, a person who has attained the age of 18 years and is financially independent of his or her parents, or, if under 18 years of age, (a) whose parents have entirely surrendered the right to the care, custody, and earnings of such person and who no longer are under any legal obligation to support or maintain such person; or (b) a person who is legally married; or (c) a person who has no parent. If none of the aforesaid definitions applies, said person shall be deemed an “unemancipated person.”

1.5 “Institution” shall mean the public college or university at which any person is or seeks to be enrolled as a student.

1.6 “Proof of Emancipation” shall be demonstrated through submission of evidence including, but not limited to:
(a) Birth certificate or any other legal document that shows place and date of birth;
(b) Legal guardianship papers – court appointment and termination must be submitted;
(c) Statement of the person, his or her parent(s), guardian(s), or others certifying no financial support;
(d) Certified copies of federal and state income tax returns filed by the person and his or her parent(s);
(e) Copies of applications for federal financial aid; or
(f) Where none of the foregoing can be provided, an affidavit of the emancipated person in explanation thereof and stating fully the grounds supporting the claim of emancipation.

1.7 “Parent” shall mean,
a) the person’s father and mother, jointly;
b) if the person’s father is deceased, the person’s mother; if the person’s mother is deceased, the person’s father;
c) if a legal guardian has been appointed by a court having jurisdiction, the legal guardian;
d) if neither the father nor mother is living and no legal guardian has been appointed, the person who then stands in loco parentis to the person;
e) if the father and mother are divorced, separated or unmarried, the parent who has been awarded legal custody of the person; or, if legal custody has not been awarded, the parent with whom the person lives.

With respect to any adopted student, the word “adoptive” should be inserted before the words “father” and “mother” wherever used.

1.8 “Reside,” “residency,” or “resident” shall mean “domicile,” i.e., a person’s true fixed and permanent home or place of habitation, where he or she intends to remain permanently.

2.0 Classification

2.1 For the purpose of assessing tuition and fees, each student shall be classified as a “Massachusetts resident” or a “Non-Massachusetts resident.” At the University and the state colleges, an eligible person shall be classified as a Massachusetts resident if he or she (or the parent of an unemancipated student) shall have resided in the Commonwealth of Massachusetts for purposes other than attending an educational institution (including a private educational institution) for twelve months immediately preceding the student’s entry or reentry as a student. At the community colleges, a person shall be classified as a Massachusetts resident if he or she (or the parent of an unemancipated student) shall have resided in the Commonwealth of Massachusetts for purposes other than attending an educational institution (including a private educational institution) for six months immediately preceding the student’s entry or reentry as a student.

2.2 Physical presence for this entire twelve-month or six-month period need not be required as long as the conduct of an individual, taken in total, manifests an intention to make Massachusetts his or her permanent dwelling place. However, residency is not acquired by mere physical presence in Massachusetts while the person is enrolled in an institution of higher education.

3.0 Determination of Residency

3.1 Proof of Residency
a) Each case will be decided on the basis of all facts submitted with qualitative rather than quantitative emphasis. A number of factors are required for residency to determine the intention of the person to maintain permanent residence in Massachusetts. No single indicium is decisive. The burden of proof rests on the student seeking classification as a Massachusetts resident.
b) The following shall be indicia of residence:

1) For unemancipated persons, the residency of parents, having custody, within Massachusetts;
2) Certified copies of federal and state income tax returns;
3) Permanent employment in a position not normally filled by a student;
4) Reliance on Massachusetts sources for financial support;
5) Possession of a Massachusetts high school diploma;
6) Continuous physical presence in Massachusetts during periods when not an enrolled student;
7) Military home of record; and
8) All other material of whatever kind or source which may have a bearing on determining residency.

3.2 Eligibility

a) The following individuals shall be eligible for in-state tuition:

1) Any person who is registered at an institution as a Massachusetts resident shall be eligible for continued classification as a Massachusetts resident for tuition purposes (until attainment of the degree for which he or she is enrolled) during continuous attendance at the institution.

2) The spouse of any person who is classified or is eligible for classification as a Massachusetts resident is likewise eligible for classification as a Massachusetts resident. This provision will not apply in the case of a spouse in the United States on a non-immigrant visa.

3) A person who is a lawful immigrant or permanent resident of the United States (or is eligible to apply and has applied for such status) is eligible to be considered for Massachusetts residency for tuition purposes provided that he/she meets the same requirements for establishing residency in Massachusetts as are required of a United States citizen. Non-citizens who are in (or who are eligible to apply and who have applied for) refugee/asylum status are likewise eligible to be considered for Massachusetts residency for tuition purposes provided that they meet the same requirements for establishing residency in Massachusetts as are required of a United States citizen. All non-citizens must provide appropriate United States Citizenship and Immigration Services documentation to verify their status.

4) Those students whose higher education pursuits are funded by the Department of Institutional Assistance, the Massachusetts Rehabilitation Commission, or any of the other Commonwealth of Massachusetts public assistance programs.

5) A member of the Armed Forces of the United States who is stationed in Massachusetts on active duty pursuant to military orders, his or her spouse and dependent children. A person does not gain or lose in state status solely by reason of his or her presence in any state or country while a member of the Armed Forces of the United States.

6) Full time faculty, professional staff, and classified staff employees of the public higher education system and their spouses and dependent students.

b) A person having his or her residency elsewhere than in Massachusetts shall not be eligible for classification as a Massachusetts resident for tuition purposes, except as herein provided.

4.0 Appeals and Reclassification

4.1 Reclassification: A student may at any time request the institution to reclassify him or her as a Massachusetts resident if the factual basis for his or her classification as a nonresident has changed. To do so, the student shall submit a “Residency Reclassification Form” to the Residency Reclassification Officer for its review and decision as delineated on the UMass Lowell website.

4.2 Appeals: A student or applicant may appeal the institution’s final decision to deny his or her classification (or reclassification) as a non-resident by filing an appeal through the appeal process established by the institution. The decision on appeal is final and may not be appealed further. Appeal letters should be submitted to the Residency Reclassification Appeals Committee as delineated on the UMass Lowell website.

4.3 Tuition Deadlines: All deadlines for the payment of tuitions, fees, and other financial obligations to the institution remain in force during the pendency of any request for Reclassification or any appeal.

4.4 Retroactive Effect: Any change in a student’s classification as the result of a request for reclassification or an appeal will be retroactive only to the beginning of the semester during which the institution makes the final decision to reclassify the student.

5.0 Penalties

5.0 Misrepresentation in or omission from any evidence submitted with respect to any fact which, if correctly or completely stated, would be grounds to deny classification as a Massachusetts resident, shall be cause for exclusion or expulsion from or other disciplinary action by the institution.
6.0 Miscellaneous

6.1 Each institution may adopt supplementary rules governing any procedures, deadlines, and related matters appropriate for the implementation of this policy.

6.2 The provisions of this policy shall apply to the classification of a student as the resident of any New England state for purposes of determining his or her eligibility for tuition benefits through the New England Board of Higher Education.

7.0 Deadlines

Written appeals of initial classifications (i.e., residency reclassification requests) must be submitted by the deadlines delineated on the UMass Lowell website. Students are responsible for the payment of tuitions, fees, and other financial obligations to the institution while waiting for a decision on a residency reclassification request.

Payment, Refund and Waiver Policies

Policies concerning university fees are determined by the University of Massachusetts Board of Trustees. Policies concerning room and meal plans are established by the Board of Trustees in conjunction with the UMass Building Authority and food vendor respectively.

Tuition and tuition waiver policies are established either by the General Court, the Massachusetts Board of Higher Education or the Board of Trustees of the University of Massachusetts as applicable.

View UMass Lowell's Payment Plans.

Policies below:

- Payment of Bills
- International Student Deposit
- Bookstore Financial Aid Voucher Program
- Refund Policy
- Refund on Room Reservation Deposit
- Refund on Room Fees

Payment of Bills

Students will be permitted to attend classes and to utilize University facilities only after they have cleared all their financial obligations to the University. Financial obligations in addition to tuition and fees include indebtedness for library fines, parking fines, rental payments, and repayment of emergency loans. All bills are payable on or before the due date indicated on student bills. Checks, money orders and major credit cards (Mastercard and VISA) are accepted. All payment of fees and tuition should be made payable directly to the University of Massachusetts Lowell. A student in debt to the University at the end of any semester or summer session is not permitted to register again at the University until his or her indebtedness has been discharged. Students are advised that the University utilizes the services of collection agencies authorized under the Commonwealth’s Master Service Agreement and where deemed warranted may include litigation. Students are held personally liable for associated collection costs in the event that their account is sent to a collection agency. In addition, official student transcripts and diplomas will not be released until all indebtedness has been discharged.

International Student Deposit

For students requiring a Form I-20, Certificate of Eligibility, a $4,000 prepayment of University tuition and fees must be received and credited to their student account before the form can be issued.

Bookstore Financial Aid Voucher Program

If anticipated financial aid exceeds a student's financial obligation to the University and the student has been otherwise financially cleared, the Accounts Receivable Office can authorize a Bookstore Voucher to be used at the University of Massachusetts Lowell Bookstore for the purchase of textbooks and school supplies. At the end of the drop/add course enrollment period, bookstore purchases made through this program are charged directly to the student’s account and will be repaid using that student’s financial aid award(s). Should the actual financial aid award be reduced for any reason, the student becomes personally responsible for charges to the bookstore. If complete payment is not made, as with all charges, University services may be withheld, and the financial obligation will be sent to a collection agency. In such case, the student assumes responsibility for all associated collection costs.

Refund Policy

If a student officially withdraws on or before the tenth day of class, s/he will be entitled to a full refund.

Student health insurance (because the policy is held with an independent insurance company and remains in effect regardless of enrollment status).

Residence hall deposits (are forfeited when a student remains enrolled at the University but elects to leave the residence hall)
during the term).

Book vouchers (because the bookstore is an independent operator and students generally have the option of returning the materials purchased for a refund).

Note: Refunds will first be returned to applicable student financial assistance programs, consistent with the refund distribution prescribed by law and regulation, before any refund is disbursed to a student.

Please contact the Accounts Receivable Office for further details. Please note that the refund policy is also subject to change without notice.

Refund on Room Reservation Deposit

The $200 room reservation deposit reserves a space in the residence halls until occupancy and is applied to the spring semester room rental. This deposit is generally non-refundable except in the case of an academic dismissal or graduation from the University (see section below, Refund on Room Fees).

Refund on Room Fees

All cancellations of room contracts must be submitted, in writing, to the Office of Residence Life. In addition to forfeiting their room reservation deposit, students canceling their housing contract for reasons other than academic dismissal or graduation will be responsible for the room fees according to the following guidelines:

Resident Life

Residents required to leave the residence halls and/or the University due to judicial sanctions will not be granted a refund of their room fees.

The Office of Residence Life has a Housing Contract Appeals Board to hear appeals from students who request exemption from the above refund schedule. This Board consists of the Director of Residence Life, a professional Resident Director, a member of the University Life staff and the president of the Residence Hall Association. Students may appeal their exemption from charges due to military obligations, change in personal situation, family finances, financial aid, illness, or other extenuating circumstances as may be deemed appropriate by the Appeals Board. All appeals must be documented in writing for review by the Appeals Board. The finding of this Board can be appealed to the Dean of Students whose decision is final.

New England Regional Student Program

Students who meet the eligibility requirements for residents of their state and admission requirements of a University program approved as a regional curriculum will receive preference in admission among out-of-state applicants and will be charged the in-state tuition plus 50% upon admission. It is assumed that students accepted into a program of study offered under the New England Regional Student Program will remain in the same field of study. If a student subsequently transfers into a program which is not included in the regional student program, out-of-state tuition will be applicable as of the date of transfer. The same holds true for the inverse. The date of transfer into a regional student program is the effective date for the reduced tuition rate.

The following is a listing of programs of the University of Massachusetts Lowell which are presently offered under the New England Regional Student Program.

UMass Lowell Programs* Eligible States

American Studies RI, VT
Chemical Engineering VT
Community Health Education NH, RI, VT
Computer Engineering CT, VT
Criminology & Justice Studies RI
Meteorology ME, NH, RI, VT
Music Business CT, ME, NH, RI, VT
Nuclear Engineering CT, ME, NH, RI, VT
Plastics Engineering CT, ME, NH, RI, VT
Sound Recording Technology CT, ME, NH, RI, VT
Radiological Health Physics CT, ME, NH, RI, VT

*This list of approved programs differs from that which has been approved for state colleges.
Financial Aid

Applying for Financial Aid
Eligibility Requirements
Satisfactory Academic Progress
Determining Financial Need
Types of Aid Financial Aid
Need Based Aid Programs
Non-need Based Aid Programs - University Scholarships
Non-need Based Aid Programs - Categorical Tuition Waivers
Non-need Based Aid Programs - Loans
Rights and Responsibilities

Applying for Financial Aid:

The University requires students to file a Free Application for Federal Student Aid (FAFSA). Students may apply for the FAFSA online at www.FAFSA.ed.gov. It is recommended that students and parents save time by requesting personal identification numbers called Federal Student Aid PINs before the student applies for aid. The PIN can be used to electronically sign the FAFSA, electronically sign certain loan contracts, and access online information about federal student aid the student has received. The PIN must be requested online at www.pin.ed.gov.

The FAFSA should be completed as early as possible beginning January 1st for each upcoming aid year. Students are strongly encouraged to file the FAFSA by the University’s priority deadline of March 1st. Incoming students accepted to the University who complete their FAFSA by the March 1st priority deadline will receive notification of their awards by the end of March. Returning students registered for the upcoming semester who complete their FAFSA by the March 1st priority deadline will receive notification of their awards in early June. Students applying after March 1st receive aid as funds become available.

Copies of students’ and parents’ federal income tax, W2 forms and other forms may be requested by the Financial Aid Office to verify information provided on the FAFSA. Many forms requested are available on the financial aid website at www.uml.edu/financialaid. All information requested by the Financial Aid Office is required to complete the application process and is held in strictest confidence.

Eligibility Requirements:

To receive financial aid from the various student aid programs, a student must:
- Have demonstrated financial need to qualify for need-based aid programs. Need is defined as the cost of attendance minus the expected family contribution derived from filing the FAFSA. Students may also be eligible for non-need based aid programs, such as the Federal Direct Unsubsidized Loan program and meritorious awards.
- Be a U.S. citizen or eligible non-citizen.
- Have a valid Social Security Number.
- Make satisfactory academic progress.
- Have a high school diploma or a General Education Development (GED) certificate, pass a test approved by the U.S. Department of Education, meet other standards the state of Massachusetts establishes that are approved by the U.S. Department of Education, or complete a high school education in a home school setting that is treated as a home school or private school under state law.
- Be a matriculated student enrolled in a degree granting or approved certificate program. Students enrolled in non-degree programs are not eligible for financial aid.
- Be enrolled at least half-time (6 credits) each semester. Undergraduate students enrolled less than half time may qualify for Federal Pell grant in limited cases.
- Cannot be in default or in overpayment on a federal student loan.
- Register with the Selective Service, if required (www.sss.gov)

Satisfactory Academic Progress

In accordance with Title IV, Financial Aid regulation 34 CFR 668.16(e), the University of Massachusetts Lowell monitors the academic progress of all Title IV financial aid applicants. This policy also extends to university and state financial aid awards. Satisfactory academic progress (SAP) is reviewed on a yearly basis at the end of the spring semester grading period. All financial aid applicants will be reviewed using a quantitative measure (percentage of coursework completed) and a qualitative measure (cumulative grade point average), in accordance with federal regulations. Students must maintain a minimum cumulative grade point average of 2.0, and earn the necessary credits hours to reach graduation with in six years (150% of published length of undergraduate program).

A student failing to meet the established guidelines will at minimum receive a probationary notice. If a student does not meet the academic standards defined by the financial aid office, the student may become ineligible to receive federal, state, and institutional funding. A student has a right to appeal that decision. To appeal, a student must send a written letter to the
Financial Aid Office stating the reason for the appeal. To regain financial aid eligibility, a student must achieve acceptable status or have the appeal granted in writing by a financial aid counselor. Please contact the financial aid office for more information.

**Determining Financial Need:**

Demonstrated financial need is the difference between the cost of attendance and the expected family contribution. The cost of attendance (COA) includes direct expenses such as tuition and fees, and also includes indirect such as room, board, books and transportation. The expected family contribution (EFC) is determined by the federal needs analysis formula and is calculated by completing a Free Application for Federal Student Aid (FAFSA).

**Types of Aid Financial Aid:**

The University participates in various federal, state, institutional and private financial aid programs. There are three major types of financial aid. (1) Grants and Waivers - gift aid that does not need to be repaid, unless an overpayment has resulted due to the student withdrawing from school before the end of the enrollment period for which the grant was awarded. The school will notify the student whether any funds may need to be returned. Students should meet with their financial aid counselor in person if they plan to withdraw from school. (2) Work Study – provides income for part time employment and does not have to be repaid. (3) Loans – money lent to a student that must be repaid with interest. The following is a description of financial aid programs. Please note that the term “undergraduate” in following section refers to students who are pursuing their first undergraduate degree.

**Need-Based Aid Programs:**

**Federal Pell Grant:** Federal grant awarded to students pursuing their first undergraduate degrees with exceptional need. For 2008-2009, awards range from $523 to $4731, depending on eligibility. The Federal Pell Grant is gift aid and does not need to be repaid.

**Federal Supplemental Educational Opportunity Grant (FSEOG):** Federal grant awarded by the University to students pursuing their first undergraduate degrees with exceptional need. Awards range from $200 to $2000, depending on available funds and number of eligible applicants. The Federal SEOG award is gift aid and does not need to be repaid.

**Academic Competitiveness Grant (ACG):** Federal grant that provides up to $750 for the first year of undergraduate study and up to $1,300 for the second year of undergraduate study to full-time students who are U.S. citizens, eligible for a Federal Pell Grant, and who had successfully completed a rigorous high school program, as determined by the state or local education agency and recognized by the Secretary of Education. Second year students must also have maintained a cumulative grade point average (GPA) of at least 3.0. The program is available for first year students who graduated from high school after January 1, 2006 and for second year students who graduated from high school after January 1, 2005. The ACG award is gift aid and does not need to be repaid.

**National Science and Mathematics Access to Retain Talent (SMART) Grant:** Federal grant that provides up to $4,000 for each of the third and fourth years of undergraduate study. In order to be eligible for this Grant a student must be a full-time U.S. citizen, eligible for a Federal Pell Grant, and majoring in Computer Science, Engineering, Critical Foreign Languages, Life Sciences, Mathematics, Physical Sciences, Technology, or Multidisciplinary Studies. A complete list of eligible majors can be found online at [http://ifap.ed.gov/dpcletters/attachments/GEN0706MajorChangeLetter.pdf](http://ifap.ed.gov/dpcletters/attachments/GEN0706MajorChangeLetter.pdf)

The student must also have maintained a cumulative grade point average (GPA) of at least 3.0 in coursework required for the major. The SMART award is gift aid and does not need to be repaid.

**MASS Grant Program:** State funded grant program administered by the Commonwealth of Massachusetts. Awards are based on demonstrated financial need. Awards are available to students pursuing their first undergraduate degree, enrolled full-time, and filed a FAFSA the state deadline of May 1st. Non-residents should contact their state scholarship office to determine eligibility requirements and if an award is transferable to University of Massachusetts Lowell.

**MASS Part-Time Grant:** State funded grant program administered by the Commonwealth of Massachusetts. Awards are based on demonstrated financial need, depending upon funding and number of eligible applicants. Awards are available to students pursuing their first undergraduate degree, enrolled less than full-time but at least half time (6-11 credits).

**Board of Higher Education Tuition Waiver (BHE Waiver):** State funded program administered by the financial aid office. Eligibility is determined by demonstrated financial need, priority is given to fulltime students. Awards are available to undergraduate students enrolled at least half time (6 credits) and legal residents of Massachusetts as defined by the state of Massachusetts. The BHE tuition waiver applies to state funded-undergraduate degree courses only. Continuing education courses are not covered by this program.

**Board of Higher Education Grant (BHE Grant):** State funded program administered by the financial aid office. Eligibility is determined by demonstrated financial need, priority is given to full time students. Awards are available to undergraduate students enrolled at least half time (6 credits) and legal residents of Massachusetts as defined by the state of Massachusetts.

**University Awards:** The University provides grants and scholarships from various sources to undergraduate students who demonstrate financial need. These scholarships are awarded as merit-based, need-based or a combination of both. Award amounts range from $200 to $5000, depending upon funding.
Federal Work Study (FWS) Program: Federally funded work program administered by the financial aid office. A need based program that provides students with part-time employment in various on-campus departments and off-campus agencies. Awards range from $1,500 to $5,500. FWS earnings are paid directly to the students and are to be used for educational related expenses. Students have the option to complete a student withholding form to have 70% of their bi-weekly earnings go directly toward their University of Massachusetts Lowell bill. This form may be downloaded from the financial aid website at www.uml.edu/financialaid by clicking on forms. Completed forms must be returned to the financial aid office.

Campus Work Program (CWP): Institutionally funded work program administered by the financial aid office. A need based program that provides undergraduate students with part-time employment in various on-campus departments and off-campus agencies. Awards range from $1,500 to $5,500. CWP earnings are paid directly to the students and are to be used for educational related expenses. Students have the option to complete a student withholding form to have 70% of their bi-weekly earnings go directly toward their University of Massachusetts Lowell bill. This form may be downloaded from the financial aid website at www.uml.edu/financialaid by clicking on forms. Completed forms must be returned to the financial aid office.

William D. Ford Federal Direct Subsidized Loan: A need-based federal loan available through the University. Eligibility for a "subsidized" loan is determined by completing the FAFSA and students must be enrolled at least half time (6 credits) in a degree granting program. First year students may borrow up to $3,500; second year students may borrow up to $4,500; students who have completed two years of undergraduate study may borrow up to $5,500 for each year thereafter up to lifetime aggregate loan limit of $23,000. First time borrowers at University of Massachusetts Lowell are required to complete and sign an On-Line Master Promissory Note and Entrance Counseling before funds are disbursed to the students’ University account. Repayment starts six months after graduation, withdrawal, or when the student’s course load drops below half time (6 credits) status. The federal government pays the annual interest rate on the subsidized loans while the student is enrolled in school and during the six month grace period after graduation or withdrawal from school. Students are required to complete an Exit Counseling at point of graduation, withdrawal from school, or enrollment status drops below half time (6 credits) status. DL Entrance and Exit Counseling may be done online at https://www.dlsonline.com, and DL Master Promissory Notes may be signed electronically at https://dlenote.ed.gov. This is a loan that must be repaid.

*Please also refer to the Non-Need Based Aid Programs - Loans section of this catalog for information on the Federal Direct Unsubsidized Loan.

Federal Perkins Loan: A 5% fixed interest Federal loan administered by the University. Awards range from $500 to $4,000, depending upon funding. Repayment starts nine months following graduation, a student’s withdrawal from school, or when a student drops to less than half-time (6 credits) enrollment. Repayment may be extended over a ten-year period. Principal and interest are deferred while a student is enrolled at least halftime in a degree program. Students must sign a Master Promissory Note and Entrance counseling at the Financial Aid Office prior to the loans being applied to students’ University bill. An Exit Interview must be complete with the Accounts Receivables Office at point of graduation, withdrawal or enrollment drops below half time (6 credits) enrollment. This is a loan that must be repaid.

Non-Need Based Aid Programs - University Scholarships:

Charles J. Hoff Scholarship: The largest campus-wide scholarship opportunity is the Hoff Scholarship. Awards are in the amount of $4,000, which is applied directly to a student's financial account. This amount ($4,000) pays for almost half of the $8,500 annual tuition and fees and may be continued until graduation on a semester basis, conditional upon satisfactory performance and financial aid eligibility. To be considered, students must be enrolled full time as an undergraduate student in the Francis College of Engineering, Manning School of Business, College of Health Sciences, College of Sciences or College of Fine Arts, Humanities and Social Sciences. Students must also be classified as a sophomore, junior or senior, have a cumulative GPA of 3.0, have no have more than 30 transfer credits and demonstrate financial need by apply for the FAFSA. The maximum length of the award is six semesters. There is no pre-determined number of new recipients selected for this scholarship each year, but for the 2008-2009 academic year, there will be about 30 awards. For more information and application, please visit http://www.uml.edu/financialaid/scholarships/hoff.html.

Chancellor’s Scholarship: The Chancellor's Scholarships are available to new freshmen in all undergraduate colleges who are in the top 25 percent of their graduating high school class, have a combined SAT score of 1200 or above and have demonstrated need. These scholarships provide up to $3,000 a year towards tuition and fees and $2,000 towards on-campus room and board. This scholarship is renewable for a total of four years, if the student maintains a 3.0 cumulative grade point average and continues to demonstrate financial need.

Commonwealth Scholars Program: The Commonwealth Scholarships are four-year scholarships that cover full academic year tuition and fees, and room and board for recipients who live on campus. An allowance of up to $2,000 will be awarded to cover commuting and living expenses for recipients who live off campus. These scholarships are awarded to a limited number of high school seniors, who have a minimum, cumulative, recalculated high school grade point average (GPA) of 3.75, combined SAT scores of 1400 or above. Commonwealth Scholarships are renewable annually for a maximum of four years, provided that the student maintains full time status and either a cumulative GPA of 3.25 or better.

University Scholars Program: The University Scholars Program is a scholarship available to the two top ranking seniors who are enrolled at a high school in Massachusetts accredited by the New England Association of Schools and Colleges. To be eligible, students will be required to achieve a minimum combined SAT score of 1200 (ACT of 27), be nominated by the high school principal, be a Massachusetts resident (as determined by university policy on residency status), apply and meet all admissions criteria established by the campus, and be admitted to that campus for the semester following high school
graduation. University scholars will receive a scholarship of up to $10,000 per year renewable annually for four years provided that the student maintains a 3.0 overall GPA while taking at least 12 credits per semester. This scholarship will be discontinued beginning with the 2009/2010 academic year, the last class to be awarded this scholarship is the 2008/09 class.

Dean's Scholarship Program: The Dean's Scholarship Program supports 62 renewable $4,000/year scholarships. Entering freshmen considered for a Dean's Scholarship must have a high school GPA of 3.25 (out of a possible 4.0) and must have a combined SAT score of at least 1100. Recipients are selected, during the admissions process, by each dean of UMass Lowell's undergraduate colleges on the basis of academic achievements and extra curricular activities. This scholarship is renewable for a total of four years, if the student maintains a cumulative GPA of 3.0 beginning at the end of freshman year.

University Community College Scholars Program: The University Community College Scholars Program presents top-ranked community college students with scholarships of up to $10,000. To be eligible for this award, a community college student must be nominated by his or her community college president, be a resident of Massachusetts, be the top academically ranked student of his or her graduating class, and have earned a designated transfer associate degree at a Massachusetts community college achieving at that college at the time of nomination an overall grade point average of 3.75 or above, and have filed an application to the University of Massachusetts Lowell, meet all of the admission criteria and be admitted. Eligibility for the program is determined without regard to proven financial need. The University Community College Scholarships are granted for a maximum of four (4) semesters to recipients who maintain at least a 3.25 overall GPA while taking 12 or more credits per semester.

UMass Lowell Community College Transfer Scholarship: Thirty scholarships are available each year for fall and spring enrollment at UMASS Lowell. Each award is $2,500 per year for full-time students (the amount is pro-rated for students who enroll part-time) with a maximum value of $5,000 per student. To be eligible, applicants will be required to achieve a minimum cumulative grade point average (GPA) of 3.7 at the time of application, complete at least forty-five (45) of the total number of credits for the Associates degree at a Massachusetts Community College, complete the transfer admissions process to the University, complete graduation requirements at one of the Massachusetts Community Colleges prior to enrollment at UMass Lowell, plan to matriculate as a day school student at UMass Lowell, and be a U.S. citizen, lawful immigrant, permanent resident, or holder of another legal immigration status.

Continuing Studies Dean's Scholarship: The Continuing Studies Dean’s Scholarship awards are for $1,000 and may be continued on a semester basis, conditional upon satisfactory academic performance. The maximum length of the award is 4 semesters. See our website at http://continuinged.uml.edu for details.

Millie McGuire Technical Writing Scholarship Fund: The Millie McGuire Scholarship is awarded in May each year to a student enrolled in the Continuing Studies Technical Writing Certificate Program at UMass Lowell. The scholarship is managed by the UMass Lowell Director of Giving. The recipient is selected by the NNE Scholarship committee in conjunction with UMass Lowell. For additional information please visit http://www.stc-nne.org

Veterans Online and Off-Campus Scholarships: Scholarships will be awarded to Veterans who are enrolled in a Continuing Studies degree or certificate program for $300 each. These scholarships can be used one time only and for one course only. Applications will be evaluated by the CSCDE Scholarship Committee and will be judged by merit and thoughtfulness in written response. Download the application form from our website.

Leo F. King Scholarship: The friends of the Dean Leo F. King Scholarship Committee are pleased to announce the availability of an annual scholarship award for adult learners returning to school through Continuing Education. Contact the Faculty and Student Support Center at (978) 934-2474 for details.

ASL Adult Education Foundation Scholarships: Alpha Sigma Lambda Adult Education Foundation Scholarships are available for Continuing Studies, Corporate and Distance Education students who are matriculated in associate’s or bachelor’s degree programs and who demonstrate academic strength and leadership. Submissions are due by early April. For more information, visit http://www.alphasigmalambda.org/foundation/scholarship.php

Additional University Scholarships: More than 150 University of Massachusetts Lowell scholarships are available to eligible students each year. Scholarships are awarded by the academic college or department, as stated in the fund criteria. To learn more about each fund, review the UMass System Scholarship Database or go to this list of University of Massachusetts Lowell endowed scholarship funds as of January 2008. For more information about the selection process, contact the department chair. Students may also fill out the Scholarship Interest Form to indicate interest in specific scholarships and/or to receive more information.

Unless otherwise stated, scholarships are awarded every spring for the following academic year. For example, scholarships awarded during the spring of 2008 will take effect during the 2008-2009 academic year, and will appear on student accounts at that time. The endowment is divided equally between the academic year’s two semesters. Awards are applied directly to student accounts in the following order of priority; (1) to pay any balance due to the University, (2) to reduce student loans, (3) as a refund check, if all other obligations have been met.

Non-Need Based Aid Programs-Categorical Tuition Waivers:

Categorical Tuition Waivers: To be eligible for a Categorical Tuition Waiver, a student must be permanent legal resident of Massachusetts for at least one year prior to the opening of the academic year, be a U.S. Citizen or eligible non-citizen, have registered for Selective Service, not be in default of any federal or state loan, or owe a refund on any previously received
financial aid, and be a member of an eligible category as defined below:

**Veteran**: As provided in M.G.L. Chapter 4, Section 7(43) including: Spanish War, World War I, World War II, Korean, Vietnam, Lebanese peace keeping force, Grenada rescue mission, the Panamanian intervention force, or the Persian Gulf. For purposes of tuition waivers, the term "veteran" shall also include any individual who served in the army, navy, marine corps, coast guard or air force of the United States for not less than ninety days at least one of which was served in the theatre of operation for the Somalian mission known as "Operation Restore Hope" and whose last discharge or release was under honorable conditions.

**Native American**: As certified by the Bureau of Indian Affairs.

**Senior Citizen**: Persons over the age of 60.

**Armed Forces**: An active member of the Armed Forces (Army, Navy, Marine, Air Force or Coast Guard) stationed and residing in Massachusetts.

**Clients of the Massachusetts Rehabilitation Commission or Commission for the Blind**: As certified by the respective commission.

Students must present documentation of categorical waiver eligibility to the Accounts Receivables office, enroll in at least three undergraduate credits per semester in state supported undergraduate degree or certificate program, and maintain satisfactory academic progress in accordance with federal and institutional standards.

**Non-Need Based Aid Programs - Loans**:

*William D. Ford Federal Direct Unsubsidized Loan*: A non-need based federal loan available through the University. Eligibility for an "unsubsidized" loan is determined by completing the FAFSA and students must be enrolled at least half time (6 credits) in a degree granting program. An "unsubsidized" loan is not awarded on the basis of need. A student will be charged interest from the time the loan is disbursed until it is paid in full. If a student allows the interest to accumulate, it will be capitalized—that is, the interest will be added to the principal amount of the loan and additional interest will be based upon the higher amount.

First time borrowers at University of Massachusetts Lowell are required to complete and sign an On-Line Master Promissory Note and Entrance Counseling before funds are disbursed to the students’ University account. Repayment of principal starts six months after graduation, withdrawal, or when the student’s course load drops below half time (6 credits) status. Students are required to complete an Exit Counseling at point of graduation, withdrawal from school, or enrollment status drops below half time (6 credits) status. DL Entrance and Exit Counseling may be done online at [https://www.dlsonline.com](https://www.dlsonline.com), and DL Master Promissory Notes may be signed electronically at [https://dlenote.ed.gov](https://dlenote.ed.gov). This is loan that must be repaid.

Borrowers may receive both the subsidized* and unsubsidized loans for the same loan period, although the combination of both cannot exceed the following loan limits:

**ANNUAL MAXIMUM FEDERAL DIRECT LOAN LIMITS FOR 2008-2009:**
- **Dependent Independent**
  - Freshman: $3,500 $7,500
  - Sophomore: $4,500 $8,500
  - Junior: $5,500 $10,500
  - Senior: $5,500 $10,500
- **Graduate**: $20,500
  - Aggregate dependent undergraduate loans cannot exceed $23,000
  - Aggregate independent undergraduate loans cannot exceed $46,000 ($23,000 may be in subsidized loans).
  - Aggregate graduate loans cannot exceed $140,500 (only $65,500 of this amount may be in subsidized loans). The graduate debt limit includes any student loans received for undergraduate study.
  - A fee of 2% will be deducted from each disbursement of your loan.

Dependent students whose parent/stepparent has been denied a Federal Direct Parent Plus Loan may apply for an additional Unsubsidized Federal Direct Student Loan of up to $4,000 for freshmen and sophomores and $5,000 for juniors and seniors. The interest rate on the Subsidized and Unsubsidized Direct Student Loans is fixed. All prior federal student loans may be consolidated under one Federal Direct Loan when a student enters repayment. Several flexible repayment options are available. For more information regarding loan repayment or consolidation, contact the Direct Loan Servicing Center at 1 (800) 848-0979.

*A fee of 2% will be deducted from each disbursement of your loan.

Please also refer to the Need-Based Aid Programs - Loans section of this catalog for information on the Federal Direct Subsidized Loan.

**Federal Direct PLUS Loan**: A non-need based federal loan offers up to the cost of attendance minus financial aid per academic year to qualified graduate students and parents/stepparents of undergraduate dependent students. Interest rate is fixed and repayment begins 45-60 days after the second disbursement. Refer to the Direct Loan web site ([http://www.ed.gov/offices/OSFAP/DirectLoan/index.html](http://www.ed.gov/offices/OSFAP/DirectLoan/index.html)) for current interest rates. A FAFSA is not required to apply for the PLUS loan; however, students are encouraged to file a FAFSA so that they can receive the maximum aid available. Parents may download an application online from the financial aid webpage [www.uml.edu/financialaid](http://www.uml.edu/financialaid) by clicking on forms. Applications should be returned to the financial aid for processing. This is a loan that needs to be repaid by the parent/stepparent.
Other Services Provided

The Job Locator Program: An employment service provided by the Financial Aid Office to assist students in finding off-campus employment. Various companies in the greater Lowell area post open positions in the Financial Aid Office, which are updated on a weekly basis, these positions are also emailed to students on a list serve on a weekly basis.

Disbursement of Financial Aid:

Disbursement of financial aid, in accordance with the University’s policy, is directly made to the student’s account, except in the case of on-campus employment. Financial aid is disbursed after the add/drop period of each semester.

Rights and Responsibilities:

- A student has the right to privacy. All records and information submitted with an application for financial aid are confidential, subject to legal requirements concerning disclosure of such information.
- A student’s award is determined in accordance with the laws, regulations, and appropriations of the U.S. Congress, Commonwealth of Massachusetts and the University of Massachusetts Lowell and is subject to adjustment or cancellation in the event of any changes.
- A student must notify the university if there are any changes to their address or telephone number.
- A student receiving financial aid must maintain satisfactory academic progress (SAP). SAP is evaluated at the end of each academic year. A student failing to meet the established guidelines will receive a Notice of Ineligibility. A student has a right to appeal that decision. To appeal, a student must send a written letter to the Financial Aid Office stating the reason for the appeal. To regain financial aid eligibility, a student must achieve acceptable status or have the appeal granted in writing by a financial aid counselor.
- A student must reapply every year for financial aid by using the Renewal FAFSA online at http://www.FAFSA.ed.gov.
- All new Direct Loan borrowers must complete an Entrance Counseling. Online Entrance Counseling is available by visiting our website at http://www.uml.edu/financialaid and clicking on loan servicing. All students, who graduate, withdraw or drop below half-time status must complete an Exit Counseling Interview which is also available on our web site.

Return of Title IV Financial Aid Funds

Withdrawals:

Undergraduate students withdrawing from the University are required to discharge all financial obligations to the University, return all University property, and file a written notification of withdrawal with the Registrar’s Office.

Graduate students, withdrawing from the University, must obtain the appropriate signatures on the withdrawal clearance form and submit it to the Graduate School to ensure that academic and financial obligations are cleared before leaving the University.

Policy Guidelines:

The University of Massachusetts Lowell is required by Federal Law to determine the earned and unearned Title IV aid a student has earned as of the date the student ceased attendance based on the amount of time the student spent in attendance. The calculation of Title IV funds earned by the student has no relationship to the student’s incurred institutional charges. The amount of aid earned is determined on a pro-rata basis. Once the student has completed more than 60 percent of the payment period or period of enrollment, they earn all of their assistance. If the amount disbursed to the student is greater than the amount the student earned, unearned funds must be returned. The University and the student share in the return of the funds. The University’s share is the lesser amount of the institutional charges multiplied by the unearned percentage of the funds or the entire amount of the excess funds. Any loan funds that the student must return, the student (or the parent for a PLUS Loan) repay in accordance with the terms of the promissory note. If the amount disbursed to the student is less than the amount the student earned and for which the student is other wise eligible, he or she is eligible to receive a post-withdrawal disbursement of the earned aid that was not received. Post-withdrawal disbursements will be credited first toward unpaid institutional charges. Any portion of the post-withdrawal disbursement that exceeds unpaid institutional charges will be offered to the student who must accept this disbursement within 14 days of the offer. If a response is not received or if the offer is declined, these excess funds will be returned to the appropriate Title IV program.

Financial Information

Financial Aid Office

Dugan Hall Room 102
883 Broadway Street
Lowell, MA 01854
Telephone: 978.934.4220
Fax: 978.934.3009
Website: http://www.uml.edu/financialaid
Office Hours: Mon-Fri 8:30 a.m. to 5:00 p.m.

General Information

The Financial Aid Office provides students and parents with financial planning resources and administers financial aid funds to qualified students to reach their educational goals. Financial aid award packages may consist of combination of grants,
scholarships, tuition waiver, work study and loans from federal, state and institutional sources. Financial aid award packages are made on a yearly basis and are dependent upon federal state and institutional funding.

The information provided covers all matters relating to University expenses (including state, federal, and University policies governing fees, residency and non-residency tuition rates, payment schedules, tuition waivers, the New England Regional Program, and financial requirements for international students) and to financial aid programs (including V.A. benefits and scholarship, loan and work-study programs).

**Colleges & Schools of Undergraduate Study**

- **College of Engineering**
- **College of Fine Arts, Humanities & Social Sciences**
- **College of Health Sciences**
- **Manning School of Business**
- **College of Sciences**

The **Graduate School of Education** offers an undergraduate minor in education.

- **Aerospace Studies Program** is offered in cooperation with the United States Air Force for students interested in serving as an Air Force officer.

- **Army ROTC Program** is offered in cooperation with the United States Army for students interested in serving as an Army officer.

**Radiological Sciences Option - Doctor of Philosophy Degree Program**

The Applied Physics Concentration is designed to expand the scope of the Ph.D. Program in Physics to encompass an option in Radiological Sciences. It is intended to develop advanced professional and academic competence in practical, applied, technological health physics and medical physics and to provide professional training for students whose previous specialization need not necessarily have been in the field of physics, but could have involved engineering, other science, or mathematical disciplines. This program is particularly well suited for those seeking to pursue careers in research, education or public service.

For physics majors, the acquisition of the doctoral degree would normally require about four years beyond the bachelor's degree, or a minimum of two years beyond the master's degree; for non-physics majors, an additional year of study would customarily be entailed.

**Graduate Credits**

At least 60 graduate credit hours are required, of which at least 15 and at most 24 are to be Ph.D. Dissertation Research. At most 3 credits of Physics Colloquium and seminar courses may be applied to the 60 credit requirement.

**Colloquia and Seminars**

Attendance at departmental colloquia, 95-701/702, and seminar in Radiological Sciences, 98-711/712, each carrying 1 credit per semester, is obligatory in each semester of graduate enrollment.

**Computer Skills**

All candidates are required to demonstrate proficiency in computer programming, which may be accomplished by passing the Departmental computer language exam or by achieving a grade of at least B in a high level programming language, or by demonstrating equivalent competence to the Physics Department.

**Language Requirement**

There is no foreign language requirement.

**Comprehensive Examination**

All candidates must pass a written and oral Physics Comprehensive Examination. The examination covers I. Classical mechanics, II. Electricity and magnetism, and III. Radiological sciences. In addition Part I includes some elementary thermodynamics and Part II elementary optics. Part III is based on the advanced undergraduate course requirements in Radiological Health Physics.

**Graduate Research Admission Examination**

Before commencing Ph.D. dissertation research each doctoral candidate must pass two semesters of Advanced Projects in Physics 96.731/732 and defend this project in an oral examination before a committee of the Physics graduate faculty. Students who have already completed a master’s thesis in Physics or a related discipline may apply for a waiver of the Advanced Projects requirement. However, if the M.S. degree is from another institution the student must make an oral presentation of the M.S. work before a committee of the Physics Faculty to satisfy the Graduate Research Admission Examination requirement. Alternatively, a one-semester M.S. project may be substituted for one semester of Advanced
Project on the recommendation of the student's research supervisor. The Graduate Research Admission Examination must be passed before a student may submit a Ph.D. dissertation proposal.

**Dissertation**

The dissertation is to be based upon original research performed under the supervision of a member or adjunct member of the Physics Faculty (or the Faculty of a Department participating in a joint program with the Physics Department) holding an earned doctoral degree. If a student wishes to do a dissertation under the supervision of a faculty member in another department, the student must also have a co-supervisor who is a member of the Physics Faculty. Ph.D. candidates must submit to the Department, for its approval, eleven copies of a typewritten proposal briefly describing the research to be carried out. The proposal must bear the written approval of the research supervisor. A student may not register for Ph.D. Dissertation Research until the Comprehensive Examination and the Graduate Research Admission Examination have been passed. Furthermore, the dissertation proposal must be submitted prior to or during the first semester in which the student is registered for Ph.D. dissertation research. Students registered for Ph.D. Thesis must submit a brief progress report on the research to the Graduate Coordinator each semester unless a thesis is submitted. After completing the work, the student must submit four copies of a typewritten dissertation to the Department. The student then must pass an oral examination, administered by a Dissertation Committee appointed by the Physics Graduate Coordinator, based on, but not necessarily limited to, the dissertation work.

**Course Requirements**

95.513 Classical Mechanics (4-0)
95.553/554 Electromagnetism I,II (3-0) 6
95.535/536 Intro Quantum Mechanics III (3-0) 6
95.605/606 Mathematical Methods of Physics I,II (4-0) 8
95.561/662 Nuclear Physics I,II (3-0) 6

Plus, at least twelve credits from among the following graduate level Radiological Sciences courses, assuming the core courses for the Master of Science Degree in Radiological Sciences and Protection have already been completed.

98.514 Advanced External Radiation Dosimetry (3-0) 3
98.516 Advanced Internal Radiation Dosimetry (3-0) 3
98.541 Radiochemistry (3-0) 3
98.543 Radiochemistry Lab (1-0) 1
98.552 Special Topics in Radiological Sciences (3-0) 3
98.575 Certification Preparation in Radiological Sciences (3-0) 3
98.581 Mathematical Methods of Radiological Sciences (3-0) 3
98.582 Numerical Methods of Radiological Sciences (3-0) 3
98.585 MCNP for Radiological Sciences (3-0) 3
98.596 Medical Physics (3-0) 3
98.670-98.693 Various Health or Medical Physics Internships (1/2/3-0)

Note: It is expected that the requirements for the Master of Science degree in Radiological Sciences and Protection will be met during the first four semesters if the student has not already earned an M.S. degree.

See [Physics and Applied Physics](#) section for related information.

**Undergraduate Minors**

**Alphabetical Listing**

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<td>Cultural Studies</td>
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<td>Digital Media</td>
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<td>Disability Studies</td>
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<td>Economics</td>
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<td>European History</td>
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Majors

Alphabetical Listing

- American Studies
- Art
- Biological Sciences
  - Biotechnology Option
  - Bioinformatics
  - Ecology
- Business Administration
  - Accounting Concentration
  - Entrepreneurship Concentration
  - Finance Concentration
  - Management Concentration
  - Management Information Systems Concentration
  - Marketing Concentration
- Chemical Engineering
  - Biological Engineering Option
  - Nano-Materials Engineering Option
  - Nuclear Engineering Option
  - Paper Engineering Option
- Chemistry
  - Forensic Science Option
- Civil & Environmental Engineering
  - Clinical Laboratory and Nutritional Sciences
    - Clinical Laboratory Sciences Option
    - Medical Laboratory Science Option
- Community Health & Sustainability
  - Community Health
  - Environmental Health
- Computer Engineering
- Computer Science
  - Bioinformatics
  - Robotics
- Criminology and Justice Studies
  - Corrections
  - Homeland Security
  - Information & Technology
  - Police
  - Research & Evaluation
  - Violence
- Economics
- Education (minor)
- Electrical Engineering
  - Robotics (minor)
- English
  - Creative Writing
  - Journalism & professional Writing
  - Literature
  - Writing
- Environmental Science
  - Atmospheric Science Option (Meteorology)
  - Environmental Studies Option
  - Geoscience Option
- Exercise Physiology (leads to Doctor of Physical Therapy)
- History
- Liberal Arts
Minor in Biomedical Engineering & Biotechnology (BMEBT)

Courses for a Minor in Biomedical Engineering & Biotechnology

Requires Courses:
Fourteen credits of core courses are required in the following subject areas. Recommended courses are indicated with an asterisk (*) but alternate courses may be substituted as appropriate.

Subject-Area/Suggested Courses

**Biology**

*81.210 Biology for Engineers (3 credits)
*81.212 Biology for Engineers Lab (1 credit)

or

81.111 Principles of Biology I (3 credits)
81.117 Experimental Biology I (1 credit)

**Physiology & Anatomy**

*83.102 Life Science II (3 credits)
*83.104 Life Science II Lab (1 credit)

or

35.102 Human Anatomy and Physiology II (3 credits)
35.104 Human Anatomy and Physiology II Lab (1 credit)

or

81.252 Physiology (3 credits)
81.254 Physiology Lab (1 credit)
Statistics

*92.386 Probability and Statistics I (3 credits)
or
14.286 Probability and Statistics for Engineers (3 credits)
or
92.283 Introduction to Statistics (3 credits)
or
92.385 Applied Statistics (3 credits)
or
22.361 Math Methods for Mechanical Engineers (3 credits)
or
19.575 Introduction Biostatistics and Epidemiology (3 credits)

Biomedical Engineering

*IB.400 Intro to Biomedical Engg & Biotechnology (3 credits)

Elective Courses:

Two courses from a selected list which is approved by the College of Engineering, College of Sciences and College of Health Sciences. This can be chosen based on the specialization, or track.

Track/Suggested Courses (3 credits)

Assistive Technology

16.441 Introduction to Biosensors
34.510 Models and Measurement in Disability
26.554 Medical Device Design

Biochemistry

36.350 Human Biochemistry
81.419 Biochemistry I
81.420 Biochemistry II
84.570 Protein Chemistry

Biomaterials

10.506 Colloidal, Interfacial and Nanomaterials Science
10.533 Macromolecular Colloidal Science and Engineering
26.542 Colloidal Nanoscience and Engineering
26.575 Biomaterials I
26.675 Biomaterials II
26.579 Problems in Biomaterials
84.672 Surface and Colloid Chemistry
97.503 Polymer Science I
97.504 Polymer Science II

Biomechanics

19.530/531 Ergonomics and Work/Lab
19.632 Advanced Biomechanics
19.638 Methods in Work Analysis

Bioprocessing

10.548 Process Analytical Technology and Quality by Design for Biopharmaceuticals
10.535 Cell and Microbe Cultivation
10.538 Advanced Separations in

Biotechnology

10.545 Isolation and Purification
10.555 Biopharmaceutical GMP
81.586 Biotechnology Process Project Laboratory

Forensics

84.303 Forensic Science I
84.304 Forensic Science II

Genetics
35.435 Medical and Clinical Genetics
81.335 Principles of Genetics
81.405 Bioinformatics
81.460 Stem Cell Biology

Immunology
36.331 Immunology
81.482 Cancer Biology
81.493 Immunology

Medical Devices
16.441 Introduction to Biosensors
26.553 Polymers in Medicine
26.554 Medical Device Design

Medical Imaging
16.411 Medical Diagnostic Imaging
16.460 Biomedical Instrumentation
95.498 Introduction to Medical Imaging
95.477 Electronic and Optoelectronic Devices

Molecular Biotechnology
81.421 Biochemistry Techniques
81.476 Cell Culture

Toxicology
19.503 Toxicology and Health
19.514 Aerosol Science
19.621 Nanomaterials: Exposure, Health and Safety

Additional courses may be added by each College to their list of elective courses.

Energy Engineering Minor

Courses for a Minor in Energy Engineering

Required Courses: Fifteen credits of core courses are required in the following subject areas.

Subject Area/Satisfying Courses (one required for each subject area):

Thermodynamics
- 10.311 Chemical Engineering Thermodynamics (Credits: 3)
- 10.347 Elements of Thermodynamics and Heat Transfer (Credits: 3)
- 22.242 Thermodynamics (Credits: 3)
- 26.247 Thermodynamics (Credits: 3)

Electrical Circuits
- 10.205 Fundamentals of Electricity (Credits: 3)
- 16.201 Circuit Theory I (Credits: 3)
- 16.211 Fundamentals of Electricity I (Credits: 3)
- 16.213 Fundamentals of Electricity I (Credits: 3)

Engineering Economics
- 10.409 Engineering Economics (Credits: 3)
- 14.470 Engineering Economics (Credits: 3)
23.414 Engineering Economics (Credits: 3)

Energy Policy

- 18.3xx Energy, Policy, and Society (Credits: 3)
- 18.572 Energy and Environment (Credits: 3)

Energy Conversion Systems

- 16.428 Alternative Energy Sources (Credits: 3)
- 22.3xx Energy Conversion Systems (Credits: 3)

Elective Courses: At least 6 credits of upper division elective courses are required; students must meet all course pre-requisites or obtain permission of the instructor. While not mandatory, it is recommended that the courses be chosen to develop depth within one of the following Energy Engineering tracks.

Track/Suggested Courses

Alternative Energy

- 16.428 Alternative Energy Sources
- 16.444 Power Distribution System
- 22.426 Green Energy Engineering

Electric Vehicles

- 16.429 Electric Vehicle Technology
- 16.515 Power Electronics

Energy Conservation

- 14.579 Green and Sustainable Civil Engineering
- 14.581 Engineering Systems Analysis
- 22.545 Advanced Industrial Heat/Mass Transfer

Nuclear Engineering

- 10/24.331 Introduction to Nuclear Engineering I
- 10/24.434 Introduction to Nuclear Engineering II
- 24.507 Reactor Engineering and Safety

Solar Engineering

- 22.521 Solar Fundamentals
- 22.527 Solar Energy Engineering
- 22.528 Photovoltaics Manufacturing

Wind Engineering

- 22.426 Green Energy Engineering
- 22.558 Aero/Wind Engineering

Additional courses may be added by the College of Engineering to the list of elective courses.

Requirements for Continued Matriculation in the College of Health Sciences

STUDENT RESPONSIBILITY

It is the responsibility of each student to be aware of and comply with current policies and procedures. Students who need reasonable academic accomodations based on documented disabilities are encouraged to consult with the Office of Disability Services.

ACADEMIC REQUIREMENTS

To qualify for continued matriculation in programs of the College of Health Sciences students must meet the academic requirements of the University and of the college and program in which the student is enrolled. Academic requirements for cumulative GPA, semester GPA, science GPA and GPA for professional courses are listed on each department’s website.
Students are advised to review the Appeals Procedure for Reinstatement in the College of Health Sciences.

PROFESSIONAL SKILLS / TECHNICAL STANDARDS

All students in the College of Health Sciences must demonstrate a level of professionalism and a state of emotional and physical health which will enable them to provide safe, competent practice in their chosen professional field. All students are expected to demonstrate essential skills necessary to work accurately and safely with peers, faculty, staff, other members of the health care team and patients/clients in a variety of settings. Students must demonstrate professional behavior in all theory, practicum and pre-practicum courses. Specific Professional Competencies, Technical Standards &/or Essential Functions are listed on each department’s website. Failure to meet these Competencies and Technical Standards including professional skills in observation and examination, communication, motor function, critical thinking and behavioral/social function will result in course failure and may jeopardize continued matriculation in the student’s major.

UTeach UMass Lowell - STEM Teaching Minor

For more information visit UTeach.

- Exploratory Courses
- STEM Teaching Minor
- UTeach Courses

UTeach is an innovative program that prepares math, science, engineering and computer science students to become middle school or high school teachers. Teaching is a rewarding career, and this minor provides STEM majors with the opportunity to find out whether teaching is for them. The program is open to science, math, computer science and engineering students. Students begin by taking two, 1 credit courses (UTL 101 and UTL 102) commonly known as Step 1 and Step 2. The courses provide students with classroom experience and the opportunity to find out what teaching is like without committing to a full program.

Students who choose to enter the STEM TEACHING MINOR, take 24 credits of course work which, if completed successfully, will provide them with an initial teaching license to become employed as a teacher after graduation. Students therefore have a bachelor’s degree in their STEM field, a STEM teaching minor and a Massachusetts teaching license.

The UTeach program (which includes Step 1, Step 2 and the STEM Teaching minor) is an innovative model developed at the University of Texas Austin. UTeach UMass Lowell was launched in spring 2012 under a $1.6 million Massachusetts Department of Education grant. UMass Lowell is the only university in New England to offer the UTeach program.

<table>
<thead>
<tr>
<th>Exploratory Courses (do not count toward minor)</th>
<th>Credits: 1, Semester: Fall, Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Inquiry Approaches to Teaching</td>
<td></td>
</tr>
<tr>
<td>Step 2: Inquiry-Based Lesson Design</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>STEM Teaching Minor (24 credits)</th>
<th></th>
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<tbody>
<tr>
<td>*Knowing &amp; Learning in Math &amp; Science</td>
<td>Credits: 3, Semester: Fall</td>
</tr>
<tr>
<td>*Perspectives on Mathematics &amp; Science</td>
<td>Credits: 3, Semester: Spring</td>
</tr>
<tr>
<td>Interactions and Equity</td>
<td>Credits: 3, Semester: Spring</td>
</tr>
<tr>
<td>Project-Based Instruction</td>
<td>Credits: 3, Semester: Fall</td>
</tr>
<tr>
<td>Research Methods</td>
<td>Credits: 3, Semester: Spring</td>
</tr>
<tr>
<td>Teaching English Language Learners</td>
<td>Credits: 3, Semester: Fall</td>
</tr>
<tr>
<td>Practicum</td>
<td>Credits: 6, Semester: Spring</td>
</tr>
</tbody>
</table>

*These courses are Gen Ed approved

In addition to the above courses, Math and Computer Science majors** must also take the following course which for math majors is an elective in their math degree:

Functions and Modeling                         | Credits: 3, Semester: Fall         |

**Math and Computer Science majors are also required to have a course in Geometry

Please visit the UTeach website for further information, call the UTeach offices at Pasteur 106, or contact the UTeach faculty: Sumudu Lewis: Sumudu_Lewis@uml.edu or Irene Martin: Irene_Martin1@uml.edu.

UTeach COURSES

SCIENCE, TECHNOLOGY-ENGINEERING AND MATHEMATICS TEACHING

UTL 101 - Step 1: Inquiry Approaches to Teaching (1 credit)

This course provides students with an introduction to teaching in order for them to explore a career as a middle or high school math or science teacher. During the course, student-pairs teach math and/or science lessons in a local elementary school classroom and receive feedback from a mentor teacher. Additionally, students are introduced to the theory and practice that is necessary to design and deliver excellent instruction. This course is the first step for students interested in
exploring the STEM TEACHING MINOR with UTeach UMass Lowell.

Pre-Co-requisites: Math, Science & Engineering Majors only.

UTL 102 - Step 2: Inquiry Based Lesson Design (1 credit)
Students who are exploring teaching as a career become familiar with the middle school setting by observing and discussing the middle school environment, and by teaching several lessons in a middle school classroom. They build upon and practice lesson design skills that were developed in Step 1 and also become familiar with excellent science and mathematics curricula for the middle school setting.

Pre-requisite: UTL101

UTL 201 - Knowing and Learning in Mathematics and Science (3 credits)
(General Education Social Sciences for all undergraduates)
The course starts by imparting the understanding that there is a science to learning and by having students examine ideas of what it means for an individual to know or understand something. This course focuses on several essential questions which enable students to explore how knowing and learning are structured with specific emphasis on mathematics and science. Students will come to understand what it means to know something, how we can understand student thinking and how theories of learning inform instructional decisions; in particular students will explore the idea that learning is a social activity. Students are prompted to reflect on their own ways of looking at various ideas and concepts and to consider alternative perspectives. Students will conduct an analysis of reasoning processes through a clinical interview process, one-on-one with learners engaging in problem solving. This course is required for the STEM TEACHING MINOR.

UTL 202 - Interactions and Equity (3 credits)
This course examines the organization of instructional settings that maximize learning for all. Students will examine gender issues, cultural issues, bilingual education and learning disabilities as they impact learner success. A major portion of the course is a field experience in which students interview high school teachers, observe a high school classroom, then teach three lessons. The purpose of these experiences is to ensure that students recognize the diversity of students and their specific learning needs. This course is required for the STEM TEACHING MINOR.

UTL 204 - Perspectives on Mathematics and Science (3 credits)
(General Education Humanities for all undergraduates)
This course examines the history and philosophy of mathematics and science. Students will explore a selection of topics and episodes in the history of science and mathematics recognizing that many gains in knowledge have emerged through struggle, and in spite of resistance from cultural, religious and social structures. Students will learn that ideas in science and mathematics are dynamic and that disagreement can often lead to major breakthroughs. Students must think critically about how K-12 STEM education texts portray the history and philosophy of science and mathematics. This course is required for the STEM TEACHING MINOR.

UTL 301 - Project-based Instruction (3 credits)
This is a key component of the minor as it engages students in designing, implementing and employing a project-based curriculum. Students will observe project-based learning in high schools, before creating and leading their own field-based unit. The unit must incorporate major components of project-based learning, namely collaboration, formulating questions, making predictions, designing investigations, collecting and analyzing data, making products and sharing ideas. This course is required for the STEM TEACHING MINOR.

Pre-requisites UTL 201 and 202

UTL 302 - Research Methods for STEM Inquiries (3 credits)
The goal of this course is to provide students with an understanding of and the ability to use tools that scientists use to solve problems. Students will also learn how scientists communicate their findings and engage in peer-review. Students design and carry out four independent inquiries, which they write up and present in the manner that is common in the scientific community. Students will work in multi-disciplinary teams. The course is divided between class and lab sessions, but is primarily lab-based. The topics of the class sessions are: Curiosity and Scientific Inquiry, Experimental Design and Analysis, Statistics, Modeling, Presenting Scientific Information. Students conduct their inquiries, incorporate statistics to interpret their results and present their scientific work orally. This course is required for the STEM TEACHING MINOR.

UTL 401 - Practicum (6 credits)
This is the culminating experience in the STEM TEACHING MINOR and includes a biweekly seminar. Students are required to spend 12 weeks (minimum) teaching a STEM subject in a middle or high school. Candidates are required to have (i) declared the STEM TEACHING MINOR, (ii) passed both MTEL examinations and (iii) maintained an overall GPA of 2.5.

Pre-requisites: All UTL courses and 92.210 (Math and Computer Science only).

UTL 441 - Teaching English Language Learners (3 credits)
The purpose of this course is to prepare new teachers with the knowledge and skills to effectively shelter their content instruction, so that the growing population of English language learners (ELLs) in K-12 schools can achieve academic success, and contribute their multilingual and multicultural resources. The course will provide aspiring teachers with practical research-based protocols, methods, and strategies to integrate subject area content, language, and literacy development. Successful completion of this course provides the SEI (Sheltered English Immersion) endorsement required for teaching in the Commonwealth of Massachusetts.
Pre-requisites: UTL 301 and Must be taken in the senior year prior to the practicum

92.210 - Functions and Modeling (3 credits - Math and Computer Science majors only)
Engage in lab-based activities designed to strengthen their problem-solving skills and expand knowledge of the topics in secondary mathematics, focusing especially on topics from precalculus and the transition to calculus. Explore a variety of contexts that can be modeled using families of functions. Topics include conic sections, parametric equations and polar equations. Multiple representations, transformations, data analysis techniques and interconnections among geometry, probability and algebra. Quantitative approaches and building relationships between discrete and continuous reasoning will be recurrent themes.

Programs

- Undergraduate Program
- Nuclear Science & Engineering Minor
- Engineered Materials Concentration
- Computer-Aided Process Design & Controls Concentration
- Five year BS/MS Chemical Engineering
- Chemical Engineering Option
- Paper Option
- Nuclear Engineering Option
- Biological Engineering Option
- Computer-Aided Process Design and Controls
- Nanomaterials Engineering Option
- Paper Option
- Course of Study
- Course Listing

Policy

- Mission Statement
- Double Majors
- Objectives
- Outcomes and Assessment
- The Education We Offer
For more information, please visit the UMass Lowell Electrical & Computer Engineering site.

Programs

- BSEE/MSEE Combined Program
- Course Listing
- Electrical & Computer Engineering Majors
- Double Major: Electrical Engineering & Computer Science
- Double Major: Electrical Engineering & Physics
- Graduate Programs
- Program of Study for BSE in Computer Engineering
- Program of Study for BSE in Electrical Engineering
- Sound Recording Technology Minor

Policies

Information about the College of Sciences:

- Facilities
- Honor & Professional Societies
- Mission of the College of Science
- Organization & Governance
- Policies & Requirements

Residency Requirement

In addition to the minimum University residency requirements, the Manning School of Business requires the senior year work,
Applying for Financial Aid

The University requires students to file a Free Application for Federal Student Aid (FAFSA). Students may apply for the FAFSA online at www.FAFSA.ed.gov. It is recommended that students and parents save time by requesting personal identification numbers called Federal Student Aid PINs before the student applies for aid. The PIN can be used to electronically sign the FAFSA, electronically sign certain loan contracts, and access online information about federal student aid the student has received. The PIN must be requested online at www.pin.ed.gov.

The FAFSA should be completed as early as possible beginning January 1st for each upcoming aid year. Students are strongly encouraged to file the FAFSA by the University’s priority deadline of March 1st. Incoming students accepted to the University who complete their FAFSA by the March 1st priority deadline will receive notification of their awards by the end of March. Returning students registered for the upcoming semester who complete their FAFSA by the March 1st priority deadline will receive notification of their awards in early June. Students applying after March 1st receive aid as funds become available.

Copies of students’ and parents’ federal income tax, W2 forms and other forms may be requested by the Financial Aid Office to verify information provided on the FAFSA. Many forms requested are available on the financial aid website at www.uml.edu/financialaid. All information requested by the Financial Aid Office is required to complete the application process and is held in strictest confidence.

Eligibility Requirements

To receive financial aid from the various student aid programs, a student must:

- Have demonstrated financial need to qualify for need-based aid programs. Need is defined as the cost of attendance minus the expected family contribution derived from filing the FAFSA. Students may also be eligible for non-need based aid programs, such as the Federal Direct Unsubsidized Loan program and merit-based awards.
- Be a U.S. citizen or eligible non-citizen.
- Have a valid Social Security Number.
- Make satisfactory academic progress.
- Have a high school diploma or a General Education Development (GED) certificate, pass a test approved by the U.S. Department of Education, meet other standards the state of Massachusetts establishes that are approved by the U.S. Department of Education, or complete a high school education in a home school setting that is treated as a home school or private school under state law.
- Be a matriculated student enrolled in a degree granting or approved certificate program. Students enrolled in non-degree programs are not eligible for financial aid.
- Be enrolled at least half-time (6 credits) each semester. Undergraduate students enrolled less than half time may qualify for Federal Pell grant in limited cases.
- Cannot be in default or in overpayment on a federal student loan.
- Register with the Selective Service, if required (www.sss.gov)

Determining Financial Need

Demonstrated financial need is the difference between the cost of attendance and the expected family contribution. The cost of attendance (COA) includes direct expenses such as tuition and fees, and also includes indirect such as room, board, books and transportation. The expected family contribution (EFC) is determined by the federal needs analysis formula and is calculated by completing a Free Application for Federal Student Aid (FAFSA).

Satisfactory Academic Progress

In accordance with Title IV, Financial Aid regulation 34 CFR 668.16(e), the University of Massachusetts Lowell monitors the academic progress of all Title IV financial aid applicants. This policy also extends to university and state financial aid awards. Satisfactory academic progress (SAP) is reviewed on a yearly basis at the end of the spring semester grading period. All financial aid applicants will be reviewed using a quantitative measure (percentage of coursework completed) and a qualitative measure (cumulative grade point average), in accordance with federal regulations. Students must maintain a minimum cumulative grade point average of 2.0, and earn the necessary credits hours to reach graduation with in six years (150% of published length of undergraduate program).

A student failing to meet the established guidelines will at minimum receive a probationary notice. If a student does not meet the academic standards defined by the financial aid office, the student may become ineligible to receive federal, state and institutional funding. A student has a right to appeal that decision. To appeal, a student must send a written letter to the Financial Aid Office stating the reason for the appeal. To regain financial aid eligibility, a student must achieve acceptable status or have the appeal granted in writing by a financial aid counselor. Please contact the financial aid office for more information.

Types of Aid

The University participates in various federal, state, institutional and private financial aid programs. There are three major
types of financial aid. (1) Grants and Waivers - gift aid that does not need to be repaid, unless an overpayment has resulted due to the student withdrawing from school before the end of the enrollment period for which the grant was awarded. The school will notify the student whether any funds may need to returned. Students should meet with their financial aid counselor in person if they plan to withdraw from school. (2) Work Study – provides income for part-time employment and does not have to be repaid. (3) Loans – money lent to a student that must be repaid with interest. The following is a description of financial aid programs. Please note that the term "undergraduate" in following section refers to students who are pursuing their first undergraduate degree.

Need-Based Aid Programs

**Federal Pell Grant**: Federal grant awarded to students pursuing their first undergraduate degrees with exceptional need. For 2008-2009, awards range from $523 to $4731, depending on eligibility. The Federal Pell Grant is gift aid and does not need to be repaid.

**Federal Supplemental Educational Opportunity Grant (FSEOG)**: Federal grant awarded by the University to students pursuing their first undergraduate degrees with exceptional need. Awards range from $200 to $2000, depending on available funds and number of eligible applicants. The Federal SEOG award is gift aid and does not need to be repaid.

**Academic Competitiveness Grant (ACG)**: Federal grant that provides up to $750 for the first year of undergraduate study and up to $1,300 for the second year of undergraduate study to full-time students who are U.S. citizens, eligible for a Federal Pell Grant, and who had successfully completed a rigorous high school program, as determined by the state or local education agency and recognized by the Secretary of Education. Second year students must also have maintained a cumulative grade point average (GPA) of at least 3.0. The program is available for first year students who graduated from high school after January 1, 2006 and for second year students who graduated from high school after January 1, 2005. The ACG award is gift aid and does not need to be repaid.

**National Science and Mathematics Access to Retain Talent (SMART) Grant**: Federal grant that provides up to $4,000 for each of the third and fourth years of undergraduate study. In order to be eligible for this Grant a student must be a full-time U.S. citizen, eligible for a Federal Pell Grant, and majoring in Computer Science, Engineering, Critical Foreign Languages, Life Sciences, Mathematics, Physical Sciences, Technology, or Multidisciplinary Studies. A complete list of eligible majors can be found online at [http://ifap.ed.gov/dpcletters/attachments/GEN0706MajorChangeLetter.pdf](http://ifap.ed.gov/dpcletters/attachments/GEN0706MajorChangeLetter.pdf)

The student must also have maintained a cumulative grade point average (GPA) of at least 3.0 in coursework required for the major. The SMART award is gift aid and does not need to be repaid.

**MASSGrant Program**: State funded grant program administered by the Commonwealth of Massachusetts. Awards are based on demonstrated financial need. Awards are available to students pursuing their first undergraduate degree, enrolled full-time, and filed a FAFSA the state deadline of May 1st. Non-residents should contact their state scholarship office to determine eligibility requirements and if an award is transferable to University of Massachusetts Lowell.

**MASS Part-Time Grant**: State funded grant program administered by the Commonwealth of Massachusetts. Awards are based on demonstrated financial need, depending upon funding and number of eligible applicants. Awards are available to students pursuing their first undergraduate degree, enrolled less than full-time but at least half time (6-11 credits).

**Board of Higher Education Tuition Waiver (BHE Waiver)**: State funded program administered by the financial aid office. Eligibility is determined by demonstrated financial need, priority is given to full time students. Awards are available to undergraduate students enrolled at least half time (6 credits) and legal residents of Massachusetts as defined by the state of Massachusetts. The BHE tuition waiver applies to state funded-undergraduate degree courses only. Continuing education courses are not covered by this program.

**Board of Higher Education Grant (BHE Grant)**: State funded program administered by the financial aid office. Eligibility is determined by demonstrated financial need, priority is given to full time students. Awards are available to undergraduate students enrolled at least half time (6 credits) and legal residents of Massachusetts as defined by the state of Massachusetts.

**University Awards**: The University provides grants and scholarships from various sources to undergraduate students who demonstrate financial need. These scholarships are awarded as merit-based, need-based or a combination of both. Award amounts range from $200 to $5000, depending upon funding.

**Federal Work Study (FWS) Program**: Federally funded work program administered by the financial aid office. A need based program that provides students with part-time employment in various on-campus departments and off-campus agencies. Awards range from $1,500 to $5,500. FWS earnings are paid directly to the students and are to be used for educational related expenses. Students have the option the complete a student withholding form to have 70% of their bi-weekly earnings go directly toward their University of Massachusetts Lowell bill. This form may be downloaded from the financial aid website at [www.uml.edu/financialaid](http://www.uml.edu/financialaid) by clicking on forms. Completed forms must be returned to the financial aid office.

**Campus Work Program (CWP)**: Institutionally funded work program administered by the financial aid office. A need based program that provides undergraduate students with part-time employment in various on-campus departments and off-campus agencies. Awards range from $1,500 to $5,500. CWP earnings are paid directly to the students and are to be used for educational related expenses. Students have the option the complete a student withholding form to have 70% of their bi-weekly earnings go directly toward their University of Massachusetts Lowell bill. This form may be downloaded from the
William D. Ford Federal Direct Subsidized Loan: A need-based federal loan available through the University. Eligibility for a "subsidized" loan is determined by the completing the FAFSA and students must be enrolled at least half time (6 credits) in a degree granting program. First year students may borrow up to $3,500; second year students may borrow up to $4,500; students who have completed two years of undergraduate study may borrow up to $5,500 for each year thereafter up to lifetime aggregate loan limit of $23,000. First time borrowers at University of Massachusetts Lowell are required to complete and sign an On-Line Master Promissory Note and Entrance Counseling before funds are disbursed to the students’ University account. Repayment starts six months after graduation, withdrawal, or when the student’s course load drops below half time (6 credits) status. The federal government pays the annual interest rate on the subsidized loans while the student is enrolled in school and during the six month grace period after graduation or withdrawal from school. Students are required to complete an Exit Counseling at point of graduation, withdrawal from school, or enrollment status drops below half time (6 credits) status. DL Entrance and Exit Counseling may be done online at https://www.dlsonline.com, and DL Master Promissory Notes may be signed electronically at https://dlenote.ed.gov. This is a loan that must be repaid.

*Please also refer to the Non-Need Based Aid Programs - Loans section of this catalog for information on the Federal Direct Unsubsidized Loan.

Federal Perkins Loan: A 5% fixed interest Federal loan administered by the University. Awards range from $500 to $4,000, depending upon funding. Repayment starts nine months following graduation, a student’s withdrawal from school, or when a student drops to less than half-time (6 credits) enrollment. Repayment may be extended over a ten-year period. Principal and interest are deferred while a student is enrolled at least halftime in a degree program. Students must sign a Master Promissory Note and Entrance Counseling at the Financial Aid Office prior to the loans being applied to students’ University account. Repayment starts six months after graduation, withdrawal, or when the student’s course load drops below half time (6 credits) status. This is a loan that must be repaid.

University Scholarships

Charles J. Hoff Scholarship: The largest campus-wide scholarship opportunity is the Hoff Scholarship. Awards are in the amount of $4,000, which is applied directly to a student's financial account. This amount ($4,000) pays for almost half of the $8,500 annual tuition and fees and may be continued until graduation on a semester basis, conditional upon satisfactory performance and financial aid eligibility. To be considered, students must be enrolled full time as an undergraduate student in the Francis College of Engineering, Manning School of Business, College of Health Sciences, College of Sciences or College of Fine Arts, Humanities and Social Sciences Students must also be classified as a sophomore, junior or senior, have a cumulative GPA of 3.0, have no more than 30 transfer credits and demonstrate financial need by apply for the FAFSA. The maximum length of the award is six semesters. There is no pre-determined number of new recipients selected for this scholarship each year, but for the 2008-2009 academic year, there will be about 30 awards. For more information and application, please visit http://www.uml.edu/financialaid/scholarships/hoff.aspx.

Chancellor's Scholarship: The Chancellor's Scholarships are available to new freshmen in all undergraduate colleges who are in the top 25 percent of their graduating high school class, have a combined SAT score of 1200 or above and have demonstrated need. These scholarships provide up to $3,000 a year towards tuition and fees and $2,000 towards on-campus room and board. This scholarship is renewable for a total of four years, if the student maintains a 3.0 cumulative grade point average and continues to demonstrate financial need.

Commonwealth Scholars Program: The Commonwealth Scholarships are four-year scholarships that cover full academic year tuition and fees, and room and board for recipients who live on campus. An allowance of up to $2,000 will be awarded to cover commuting and living expenses for recipients who live off campus. These scholarships are awarded to a limited number of high school seniors, who have a minimum, cumulative, recalculated high school grade point average (GPA) of 3.75, combined SAT scores of 1400 or above. Commonwealth Scholarships are renewable annually for a maximum of four years, provided that the student maintains full time status and either a cumulative GPA of 3.25 or better.

University Scholars Program: The University Scholars Program is a scholarship available to the two top ranking seniors who are enrolled at a high school in Massachusetts accredited by the New England Association of Schools and Colleges. To be eligible, students will be required to achieve a minimum combined SAT score of 1200 (ACT of 27), be nominated by the high school principal, be a Massachusetts resident (as determined by university policy on residency status), apply and meet all admissions criteria established by the campus, and be admitted to that campus for the semester following high school graduation. University scholars will receive a scholarship of up to $10,000 per year renewable annually for four years provided that the student maintains a 3.0 overall GPA while taking at least 12 credits per semester. This scholarship will be discontinued beginning with the 2009/2010 academic year, the last class to be awarded this scholarship is the 2008/09 class.

Dean's Scholarship Program: The Dean's Scholarship Program supports 62 renewable $4,000/year scholarships. Entering freshmen considered for a Dean's Scholarship must have a high school GPA of 3.25 (out of a possible 4.0) and must have a combined SAT score of at least 1100. Recipients are selected, during the admissions process, by each dean of UMass Lowell's undergraduate colleges on the basis of academic achievements and extra curricular activities. This scholarship is renewable for a total of four years, if the student maintains a cumulative GPA of 3.0 beginning at the end of freshman year.

University Community College Scholars Program: The University Community College Scholars Program presents top-
ranked community college students with scholarships of up to $10,000. To be eligible for this award, a community college student must be nominated by his or her community college president, be a resident of Massachusetts, be the top academically ranked student of his or her graduating class, and have earned a designated transfer associate degree at a Massachusetts community college achieving at that college at the time of nomination an overall grade point average of 3.75 or above, and have filed an application to the University of Massachusetts Lowell, meet all of the admission criteria and be admitted. Eligibility for the program is determined without regard to proven financial need. The University Community College Scholarships are awarded for a maximum of four (4) semesters to recipients who maintain at least a 3.25 overall GPA while taking 12 or more credits per semester.

**UMass Lowell Community College Transfer Scholarship:** Thirty scholarships are available each year for fall and spring enrollment at UMASS Lowell. Each award is $2,500 per year for full-time students (the amount is pro-rated for students who enroll part-time) with a maximum value of $5,000 per student. To be eligible, applicants will be required to achieve a minimum cumulative grade point average (GPA) of 3.7 at the time of application, complete at least forty-five (45) of the total number of credits for the Associates degree at a Massachusetts Community College, complete the transfer admissions process to the University, complete graduation requirements at one of the Massachusetts Community Colleges prior to enrollment at UMass Lowell, plan to matriculate as a day school student at UMass Lowell, and be a U.S. citizen, lawful immigrant, permanent resident, or holder of another legal immigration status.

**Continuing Studies Dean's Scholarship:** The Continuing Studies Dean’s Scholarship awards are for $1,000 and may be continued on a semester basis, conditional upon satisfactory academic performance. The maximum length of the award is 4 semesters. See our website at [http://continuinged.uml.edu](http://continuinged.uml.edu) for details.

**Millie McGuire Technical Writing Scholarship Fund:** The Millie McGuire Scholarship is awarded in May each year to a student enrolled in the Continuing Studies Technical Writing Certificate Program at UMass Lowell. The scholarship is managed by the UMass Lowell Director of Giving. The recipient is selected by the NNE Scholarship committee in conjunction with UMass Lowell. For additional information please visit [http://www.stc-nne.org](http://www.stc-nne.org)

**Veterans Online and Off-Campus Scholarships:** Scholarships will be awarded to Veterans who are enrolled in a Continuing Studies degree or certificate program for $300 each. These scholarships can be used one time only and for one course only. Applications will be evaluated by the CSCDE Scholarship Committee and will be judged by merit and thoughtfulness in written response. Download the application form from our [website](http://www.uml.edu)

**Leo F. King Scholarship:** The friends of the Dean Leo F. King Scholarship Committee are pleased to announce the availability of an annual scholarship award for adult learners returning to school through Continuing Education. Contact the Faculty and Student Support Center at (978) 934-2474 for details.

**ASL Adult Education Foundation Scholarships:** Alpha Sigma Lambda Adult Education Foundation Scholarships are available for Continuing Studies, Corporate and Distance Education students who are matriculated in associate’s or bachelor’s degree programs and who demonstrate academic strength and leadership. Submissions are due by early April. For more information, visit [http://www.alphasigmalambda.org/foundation/scholarship.php](http://www.alphasigmalambda.org/foundation/scholarship.php)

**Additional University Scholarships:** More than 150 University of Massachusetts Lowell scholarships are available to eligible students each year. Scholarships are awarded by the academic college or department, as stated in the fund criteria. To learn more about each fund, review the [UMass System Scholarship Database](http://www.uml.edu) or go to this list of University of Massachusetts Lowell endowed scholarship funds as of January 2008. For more information about the selection process, contact the department chair. Students may also fill out the [Scholarship Interest Form](http://www.uml.edu) to indicate interest in specific scholarships and/or to receive more information.

Unless otherwise stated, scholarships are awarded every spring for the following academic year. For example, scholarships awarded during the spring of 2008 will take effect during the 2008-2009 academic year, and will appear on student accounts at that time. The endowment is divided equally between the academic year’s two semesters. Awards are applied directly to student accounts in the following order of priority: (1) to pay any balance due to the University, (2) to reduce student loans, (3) as a refund check, if all other obligations have been met.

**Categorical Tuition Waivers**

To be eligible for a Categorical Tuition Waiver, a student must be permanent legal resident of Massachusetts for at least one year prior to the opening of the academic year, be a U.S. Citizen or eligible non-citizen, have registered for Selective Service, not be in default of any federal or state loan, or owe a refund on any previously received financial aid, and be a member of an eligible category as defined below:

- **Veteran:** As provided in M.G.L. Chapter 4, Section 7(43) including: Spanish War, World War I, World War II, Korean, Vietnam, Lebanese peace keeping force, Grenada rescue mission, the Panamanian intervention force, or the Persian Gulf.
  
  For purposes of tuition waivers, the term "veteran" shall also include any individual who served in the army, navy, marine corps, coast guard or air force of the United States for not less than ninety days at least one of which was served in the theatre of operation for the Somali mission known as "Operation Restore Hope" and whose last discharge or release was under honorable conditions.

- **Native American:** As certified by the Bureau of Indian Affairs.

- **Senior Citizen:** Persons over the age of 60.

- **Armed Forces:** An active member of the Armed Forces (Army, Navy, Marine, Air Force or Coast Guard) stationed and residing in Massachusetts.
Clients of the Massachusetts Rehabilitation Commission or Commission for the Blind: As certified by the respective commission. Students must present documentation of categorical waiver eligibility to the Accounts Receivables office, enroll in at least three undergraduate credits per semester in state supported undergraduate degree or certificate program, and maintain satisfactory academic progress in accordance with federal and institutional standards.

Non-Need-Based Loans

**William D. Ford Federal Direct Unsubsidized Loan**: A non-need based federal loan available through the University. Eligibility for an "unsubsidized" loan is determined by the completing the FAFSA and students must be enrolled at least half time (6 credits) in a degree granting program. An "unsubsidized" loan is not awarded on the basis of need. A student will be charged interest from the time the loan is disbursed until it is paid in full. If a student allows the interest to accumulate, it will be capitalized—that is, the interest will be added to the principal amount of the loan and additional interest will be based upon the higher amount.

First time borrowers at University of Massachusetts Lowell are required to complete and sign an On-Line Master Promissory Note and Entrance Counseling before funds are disbursed to the students' University account. Repayment of principal starts six months after graduation, withdrawal, or when the student's course load drops below half time (6 credits) status. Students are required to complete an Exit Counseling at point of graduation, withdrawal from school, or enrollment status drops below half time (6 credits) status. DL Entrance and Exit Counseling may be done online at [https://www.dlsonline.com](https://www.dlsonline.com), and DL Master Promissory Notes may be signed electronically at [https://dlenote.ed.gov](https://dlenote.ed.gov). This is a loan that must be repaid.

Borrowers may receive both the subsidized* and unsubsidized loans for the same loan period, although the combination of both cannot exceed the following loan limits:

**ANNUAL MAXIMUM FEDERAL DIRECT LOAN LIMITS FOR 2008-2009:**

<table>
<thead>
<tr>
<th></th>
<th>Dependent</th>
<th>Independent</th>
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<tr>
<td>Freshman</td>
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<td>$10,500</td>
</tr>
</tbody>
</table>

Graduate: $20,500

- Aggregate dependent undergraduate loans cannot exceed $23,000
- Aggregate independent undergraduate loans cannot exceed $46,000 ($23,000 may be in subsidized loans).
- Aggregate graduate loans cannot exceed $140,500 (only $65,500 of this amount may be in subsidized loans). The graduate debt limit includes any student loans received for undergraduate study.
- A fee of 2% will be deducted from each disbursement of your loan.

Dependent students whose parent/stepparent has been denied a Federal Direct Parent Plus Loan may apply for an additional Unsubsidized Federal Direct Student Loan of up to $4,000 for freshmen and sophomores and $5,000 for juniors and seniors. The interest rate on the Subsidized and Unsubsidized Direct Student Loans is fixed. All prior federal student loans may be consolidated under one Federal Direct Loan when a student enters repayment. Several flexible repayment options are available. For more information regarding loan repayment or consolidation, contact the Direct Loan Servicing Center at 1 (800) 848-0979.

*Please also refer to the Need-Based Aid Programs - Loans section of this catalog for information on the Federal Direct Subsidized Loan.

**Federal Direct PLUS Loan**: A non-need based federal loan offers up to the cost of attendance minus financial aid per academic year to qualified graduate students and parents/stepparents of undergraduate dependent students. Interest rate is fixed and repayment begins 45-60 days after the second disbursement. Refer to the Direct Loan web site [http://www.ed.gov/offices/OSFAP/DirectLoan/index.html](http://www.ed.gov/offices/OSFAP/DirectLoan/index.html) for current interest rates. A FAFSA is not required to apply for the PLUS loan; however, students are encouraged to file a FAFSA so that they can receive the maximum aid available. Parents may download an application online from the financial aid webpage [www.uml.edu/financialaid](http://www.uml.edu/financialaid) by clicking on forms. Applications should be returned to the financial aid for processing. This is a loan that needs to be repaid by the parent/stepparent.

Other Services Provided

The Job Locator Program: An employment service provided by the Financial Aid Office to assist students in finding off campus employment. Various companies in the greater Lowell area post open positions in the Financial Aid Office, which are updated on a weekly basis, these positions are also emailed to students on a list serve on a weekly basis.

**Disbursement of Financial Aid**: Disbursement of financial aid, in accordance with the University’s policy, is directly made to the student’s account, except in the case of on-campus employment. Financial aid is disbursed after the add/drop period of each semester.

**Rights & Responsibilities**

- A student has the right to privacy. All records and information submitted with an application for financial aid are
necessary to apply advanced mathematics, science and engineering science, including atomic and nuclear physics, and the
laboratory projects. The Nuclear Option courses combined with their other required courses give the student all the elements
Engineering Option provide a well balanced mix of engineering science, nuclear theory, design experience, and hands-on
subjects usually taken as part of an undergraduate degree program in Nuclear Engineering. The courses in the Nuclear
education useful for working in a variety of nuclear technologies. The course selection integrates the key nuclear-related
The Nuclear Engineering Option consists of a sequence of four courses that are specifically designed to give specialized
summer internships and part time jobs are also available to qualified candidates.
Scholarships through the American Nuclear Society and the UMass Lowell Hoff Scholarships which award up to full tuition for
organizations is being used to support students.
The Nuclear Engineering Program is fortunate to have outside support from such sponsors as Seabrook Nuclear Power
Nuclear Engineering Program Scholarships
The Nuclear Engineering Program is fortunate to have outside support from such sponsors as Seabrook Nuclear Power Station, the Department of Energy and the Institute for Nuclear Power Operations. A large portion of the funds from these organizations is being used to support students.
Student scholarships, up to $2500, are available on a competitive basis from the Institute for Nuclear Power Operations, Department of Energy and American Nuclear Society. Students are also eligible to apply for $3500 need based scholarships through the American Nuclear Society and the UMass Lowell Hoff Scholarships which award up to full tuition for a maximum of six semesters. Several of our students have received these scholarships.
Summer industrial internships, cooperative education work experience opportunities, UMass Lowell Research Reactor summer internships and part time jobs are also available to qualified candidates.
Nuclear Engineering Option
The Nuclear Engineering Option consists of a sequence of four courses that are specifically designed to give specialized education useful for working in a variety of nuclear technologies. The course selection integrates the key nuclear-related subjects usually taken as part of an undergraduate degree program in Nuclear Engineering. The courses in the Nuclear Engineering Option provide a well balanced mix of engineering science, nuclear theory, design experience, and hands-on laboratory projects. The Nuclear Option courses combined with their other required courses give the student all the elements necessary to apply advanced mathematics, science and engineering science, including atomic and nuclear physics, and the

Return of Title IV Financial Aid Funds
Withdrawals:
Undergraduate students withdrawing from the University are required to discharge all financial obligations to the University, return all University property, and file a written notification of withdrawal with the Registrar’s Office.
Graduate students, withdrawing from the University, must obtain the appropriate signatures on the withdrawal clearance form and submit it to the Graduate School to ensure that academic and financial obligations are cleared before leaving the University.
Policy Guidelines:
The University of Massachusetts Lowell is required by Federal Law to determine the earned and unearned Title IV aid a student has earned as of the date the student ceased attendance based on the amount of time the student spent in attendance. The calculation of Title IV funds earned by the student has no relationship to the student’s incurred institutional charges. The amount of aid earned is determined on a pro-rata basis. Once the student has completed more than 60 percent of the payment period or period of enrollment, they earn all of their assistance. If the amount disbursed to the student is greater than the amount the student earned, unearned funds must be returned. The University and the student share in the return of the funds. The University’s share is the lesser amount of the institutional charges multiplied by the unearned percentage of the funds or the entire amount of the excess funds. Any loan funds that the student must return, the student (or the parent for a PLUS Loan) repay in accordance with the terms of the promissory note. If the amount disbursed to the student is less than the amount the student earned and for which the student is other wise eligible, he or she is eligible to receive a post-withdrawal disbursement of the earned aid that was not received. Post-withdrawal disbursements will be credited first toward unpaid institutional charges. Any portion of the post-withdrawal disbursement that exceeds unpaid institutional charges will be offered to the student who must accept this disbursement within 14 days of the offer. If a response is not received or if the offer is declined, these excess funds will be returned to the appropriate Title IV program.
Non-Need-Based Aid
- Loans
- University Scholarships
- Categorical Tuition Waivers
Nuclear Engineering Program Scholarships
The Nuclear Engineering Program is fortunate to have outside support from such sponsors as Seabrook Nuclear Power Station, the Department of Energy and the Institute for Nuclear Power Operations. A large portion of the funds from these organizations is being used to support students.
Student scholarships, up to $2500, are available on a competitive basis from the Institute for Nuclear Power Operations, Department of Energy and American Nuclear Society. Students are also eligible to apply for $3500 need based scholarships through the American Nuclear Society and the UMass Lowell Hoff Scholarships which award up to full tuition for a maximum of six semesters. Several of our students have received these scholarships.
Summer industrial internships, cooperative education work experience opportunities, UMass Lowell Research Reactor summer internships and part time jobs are also available to qualified candidates.
Nuclear Engineering Option
The Nuclear Engineering Option consists of a sequence of four courses that are specifically designed to give specialized education useful for working in a variety of nuclear technologies. The course selection integrates the key nuclear-related subjects usually taken as part of an undergraduate degree program in Nuclear Engineering. The courses in the Nuclear Engineering Option provide a well balanced mix of engineering science, nuclear theory, design experience, and hands-on laboratory projects. The Nuclear Option courses combined with their other required courses give the student all the elements necessary to apply advanced mathematics, science and engineering science, including atomic and nuclear physics, and the
transport and interaction of radiation with matter, to nuclear and radiological systems and processes. Students will be able to work in the areas of analysis and design, and to safely utilize nuclear technology in a variety of areas. The four-course sequence is designed to simultaneously satisfy the bulk of the technical electives required as part of the Chemical Engineering curriculum.

Nuclear Science and Engineering Minor

The Nuclear Science and Engineering Minor is for science majors such as Physics, Health Physics, Chemistry or Mathematics; or engineering majors such as Chemical, Civil, Electrical or Mechanical. Any qualified student with interests in this area of specialization can be admitted into the program.

Most technical disciplines already have a solid mathematics, science, and engineering foundation, and a few specialized courses in nuclear technology would open up additional avenues for employment and career growth. Most students in science and engineering can satisfy the requirements for the Nuclear Science and Engineering Minor with only additional courses beyond the normal sequence for their major program of study. In addition, the core courses from the nuclear minor may also satisfy a portion of the technical electives required by the major program.

The Nuclear Science and Engineering minor consists of 18 credits of required course work that follows either an engineering or science track. Three core courses, common to both tracks, form the basis of the nuclear focus. These three courses are identical with those required as part of the Nuclear Engineering Option in Chemical Engineering.

Professional Development Activities in Nuclear Engineering

Students have the opportunity to gain practical experience at operating nuclear reactors through course work and through part-time work at the UMass Lowell Research Reactor and through cooperative education and summer work at nuclear power reactors and nuclear engineering firms. Students can study to take the U.S. Nuclear Regulatory Commission License examination and become a federally licensed reactor operator at the University of Massachusetts Lowell research reactor. Cooperative education appointments and summer internships are available for students to work at a power reactor such as Seabrook Station and at other local companies involved in nuclear related operations and support. Students interested in the nuclear field are encouraged to join the student chapter of the American Nuclear Society (ANS). This entitles them to receive the journal Nuclear News and to attend regional and national meetings and to otherwise participate with other nuclear engineering students around the country. A local chapter of the Nuclear Engineering Honor Society, Alpha Nu Sigma, is open to qualified students. In addition students are encouraged to attend American Nuclear Society local and national meetings. Both faculty and students participate in the annual ANS Regional Student Conference. UMass Lowell students attend and typically present papers based on their research, in competition with their peers at other schools. In recent years, the University has taken several awards for “best paper” in a session. There is financial support for students to participate in these professional development activities.

Programs in Nuclear Engineering

The nuclear programs in the Department of Chemical Engineering offer a series of courses and research opportunities that allow specialization in the field of nuclear engineering. At the undergraduate level the program supports a formal Nuclear Engineering Option for Chemical Engineering students and a Nuclear Science and Engineering Minor for other engineering and science students at the University. At the graduate level the program offers an M.S. degree in Energy Engineering with a Nuclear Option.

Gradduates with focused training via the undergraduate Nuclear Engineering Option or Nuclear Science and Engineering Minor programs, can help the nuclear industry face the technical challenges of the future in areas such as continued safe operation of existing nuclear power plants, improved plant performance, design of new power plants, safe disposal of radioactive waste, and other advanced industrial and medical applications of nuclear technology.

Additional Information:

- Nuclear Engineering Program Scholarships
- Professional Development Activities
- Research Facilities

Required Courses for Nuclear Engineering Option

Introduction to Nuclear Engineering I/II

This two-course sequence provides an overview of pertinent topics in basic nuclear physics, nuclear reactor physics and shielding, health physics concepts, heat generation and removal in a nuclear reactor, power conversion, and overall system integration and safety.
Nuclear Reactor Systems and Operations

This course involves a detailed study of the operation and integration of the various systems needed in any nuclear reactor facility. Hands-on training is provided in the UMass Lowell 1 MW research reactor, including actual operation of the reactor and familiarization with several support systems (water cleanup system, primary coolant system, heat exchangers, etc.).

The fourth course for the Nuclear Engineering Option can be selected from a wide variety of nuclear-related courses offered within the Chemical and Nuclear Engineering Department or within other programs at the University. This last course is chosen in consultation with the student’s advisor and is based on the particular interests of the individual student. This gives some flexibility in focusing the student’s education in one of several areas. Qualified seniors can also select the fourth course for the Nuclear Engineering Option from a variety of approved graduate courses.

Research Facilities in Nuclear Engineering

Students in the Nuclear Engineering Option or Nuclear Science and Engineering Minor can participate in ongoing faculty and graduate research using a variety of modern research tools and facilities. Program faculty are involved with the UMass Lowell Radiation Laboratory which includes a 1 MW research reactor, a Co-60 irradiation facility, a 5 MeV van de Graaf accelerator, and a variety of radiation counting laboratories. The Center for Advanced Materials also houses state-of-the-art analytical equipment for the micro-characterization of materials. In addition to a large array of networked computer facilities throughout the University, the Department of Chemical Engineering also maintains a computer laboratory where students can work individually or in small teams to address a variety of homework and design projects, or perform advanced research. One of the major strengths of the UMass Lowell nuclear program lies in its emphasis in advanced computational techniques, with special focus towards the development and application of numerical methods for the analysis of nuclear systems.

Chemical and Nuclear Engineering Industrial Advisory Board

Richard J. Cacciapouti, Marketing Manager [retired], ANP DE & S
Anne Marie Chesno, Technical Maintenance Manager, Florida Power and Light, Seabrook Nuclear Power Station
Rick Couto, Vice President and General Manager, Brooks Automation, Inc.
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Educational Objectives and Student Outcomes

Strong Foundation

The Chemical Engineering program builds a strong foundation for the professional development of its students. With a bachelor’s degree, graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and science. To achieve these broad objectives, the program provides the knowledge, skills and resources for lifelong learning and professional development.

Educational Objectives

To achieve its mission, the chemical engineering program provides the knowledge, skills and resources for continued learning and professional development over a lifetime. The program emphasizes its historic, nationally-recognized strength in processing and manufacturing and draws on the scholarly accomplishments of its faculty to integrate traditional chemical engineering topics with specialized studies in the contemporary fields of biological engineering, nanomaterials engineering,
nuclear engineering and paper engineering. The goals of the program are to produce graduates that will:

- pursue rewarding professional careers by skillfully leveraging chemical engineering principles
- effectively bridge engineering and non-engineering fields through a commitment to lifelong professional development
- engage in service activities highlighting the societal benefits of engineering principles

Student Outcomes

The faculty members of the department are committed to providing a stimulating learning environment that encourages active learning and high quality student performance. A set of Program Outcomes have been developed based on the Educational Objectives to achieve this result. The chemical engineering program including the options in Biological, Nanomaterials, Nuclear, and Paper Engineering integrates the knowledge and skills acquired in a rigorous set of courses, the extracurricular experiences, and the faculty scholarship needed to enable the graduates of the program to achieve the following outcomes:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

An Undergraduate Focus with a Complementary Graduate Program

An important focus of the department is undergraduate education. The majority of our graduates stay in the New England area. The graduate program builds upon the strengths of the department faculty and complements the undergraduate program. The faculty have close ties primarily with local and regional industry through consulting, research, advising graduate students from regional companies, and participation in local, as well as national professional society meetings. The department obtains input from its advisory board to continually assess the relevancy of the curriculum to the needs of industry.

The quality of the program is of constant importance and interaction with industry helps to maintain and improve it. More importantly, department courses are taught only by faculty. Graduate students are used only as laboratory and grading assistants.

Financial Support in Chemical Engineering

There are different sources of support for students in the Department of Chemical Engineering enhance their professional development. A number of scholarships are available to qualified students in chemical engineering, in the paper engineering option, and in the nuclear engineering option.

Undergraduates are encouraged to gain practical experience and are directed to employment in industry. Through a Cooperative Education Program or the Scholar/Intern Program, it is possible for an undergraduate student to integrate productive work experience with academic studies. Part-time or summer work experience opportunities are available as well.

Mission Statement

The mission of the Department of Chemical Engineering is to produce competent graduates. The program builds a strong foundation for the professional development of its students, and graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and science. Through specialization in the option areas of biological engineering, nanomaterials engineering, nuclear engineering and paper engineering, graduates obtain special skills, so that they are actively pursued by local and regional industries and government because of their ability to immediately contribute to solving today's engineering problems. The mission of the Department of Chemical Engineering is to produce competent graduates. The program builds a strong foundation for the professional development of its students, and graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and science. Through specialization in the option areas of biological engineering, nanomaterials engineering, nuclear engineering and paper engineering, graduates obtain special skills, so that they are actively pursued by local and regional industries and government because of their ability to immediately contribute to solving today's engineering problems. Department faculty members develop and maintain interactive associations with alumni, local and regional industries and professional societies to continually assess, modify, improve and support the program.

Specialization
Through specialization in the option areas of biological engineering, nanomaterials engineering, nuclear engineering and paper engineering, graduates obtain special skills, so that they are actively pursued by local and regional industries and government because of their ability to immediately contribute to solving today's engineering problems.

Relationship with Alumni and Industry

Department faculty members develop and maintain strong associations with alumni as well as with local and regional industries to continually assess, modify, improve and support the program.

Policies

- Mission Statement
- Educational Objectives and Standards
- Financial Support

Visit the UMass Lowell Chemical Engineering site for more information.

Biological Engineering Option

The Biological Engineering Option is designed to prepare the student for work in the biopharmaceutical or biotechnology industry. One technical elective is required and must be selected from the following list of courses.

Elective Courses (Select one of the following)

- 10.538 Advanced Separations in Biotechnology
- 10.555 Biopharmaceutical Regulatory Compliance
- 10.586 Bioprocessing Projects Laboratory
- 81.252 Physiology
- 81.476 Cell Culture
- 92.593 Experimental Design

Five Year Bachelor of Science/Master of Science in Engineering Program

The Department of Chemical Engineering offers a special five-year program that makes it possible for qualified students to complete the requirements for the BS degree and the MS degree in five years. During the first three years, the course work under this program is the same as that specified for students in the four-year bachelor program. In the junior year, students with at least a 3.00 cumulative grade point average may be admitted into the BS/MS program. Those students can take three or four graduate-level courses in their senior year, which may be counted for both the undergraduate and the graduate degrees. This gives them a nine to twelve credit head start on their MS program in Chemical or Energy Engineering, which normally can be completed in the fifth year.

Chemical Engineering Major

General Requirements For Chemical Engineering Curriculum

1. The student is required to take six (6) three credit general education courses as follows:

- Three three-credit courses in the Arts and Humanities. Either Introduction to Ethics (45.203) or Engineering and Ethics (45.334) must be used to satisfy one of the Arts and Humanities course requirements.
- Three three-credit courses in the Social Sciences. Either Economics I (49.201) or Economics II (49.202) must be used to satisfy one of the Social Science course requirements.
- A General Education course that fulfills the Diversity requirement must be taken.
- No more than two General Education courses can be taken from the same department.

2. The student in the General Chemical Engineering curriculum must take three chemical engineering technical electives, one other approved technical elective and an approved advanced chemistry elective or equivalent.

3. The student in the Biological Engineering option must take one Chemical Engineering technical elective and one technical elective from the recommended list of courses.

4. The student in the Nanomaterials option must take two chemical engineering technical electives from a recommended list of courses, one other approved technical elective and an approved advanced chemistry elective or equivalent.

5. The student in the Nuclear Engineering option must take one Nuclear Engineering technical elective from a recommended list of courses.

6. The student in the Paper Engineering option must take three chemical engineering technical electives from the recommended list of courses, another approved technical elective and an approved advanced chemistry elective or equivalent.
7. The following 12 “core” courses have been identified for special tracking:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>10.201</td>
<td>Material Balances</td>
</tr>
<tr>
<td>10.202</td>
<td>Energy Balances and Intro to Thermo</td>
</tr>
<tr>
<td>10.303</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>10.304</td>
<td>Heat Transfer</td>
</tr>
<tr>
<td>10.308</td>
<td>Intro to Mat. Sci. &amp; Eng.</td>
</tr>
<tr>
<td>10.310</td>
<td>Separation Processes w/Mass Transfer</td>
</tr>
<tr>
<td>10.311</td>
<td>Thermodynamics</td>
</tr>
<tr>
<td>10.317</td>
<td>Applied Problem Solving w/Matlab</td>
</tr>
<tr>
<td>10.403</td>
<td>Chemical Reaction Eng.</td>
</tr>
<tr>
<td>10.409</td>
<td>Engineering Economics</td>
</tr>
<tr>
<td>10.410</td>
<td>Plant Design</td>
</tr>
<tr>
<td>10.413</td>
<td>Process Dynamics &amp; Control</td>
</tr>
</tbody>
</table>

A student must obtain a grade of C– or higher in the 12 “core” courses and an overall GPA of 2.000 or higher in those courses. Also, the student must have and overall GPA of 2.000 or higher in “core” courses listed as prerequisites in order to enroll in the senior capstone design course sequence: 10.409 Engineering Economics and Process Analysis and 10.410 Plant Design. In addition, a student is permitted only 3 attempts including withdrawals (except for medical reasons), to obtain a C– or higher grade in the “core” courses. If a student fails to earn a minimum grade after 3 attempts, the student will be “dismissed” from the program for one semester in which the student will not be allowed to enroll in any courses offered by the department. The student may apply for reinstatement into the program for the semester following the “dismissal” at which time the student will be allowed to enroll only in the department “core” course that caused the “dismissal” from the program as well as any other non-departmental courses to achieve full-time student status. The student must earn a grade of C- or better on the fourth attempt in order to continue in the program; otherwise the student will be permanently dismissed from the program. The student must also satisfy the University requirement of an overall GPA of 2.000 or higher to graduate.

Course of Study

View the complete courses of study for students entering the Chemical Engineering program before Fall 2011:

- Chemical Engineering - General
- Chemical Engineering - Biological Engineering Option
- Chemical Engineering - Nuclear Option
- Chemical Engineering - Paper Option
- Chemical Engineering - Nanomaterials Track

View the complete courses of study for students entering the Chemical Engineering program for Fall 2011 and beyond:

- Chemical Engineering - General
- Chemical Engineering - Biological Engineering Option
- Chemical Engineering - Nuclear Option
- Chemical Engineering - Paper Option
- Chemical Engineering - Nanomaterials Track

Chemical Engineering, Concentration in Computer-Aided Process Design and Controls

The Computer Aided Process Design and Controls concentration, which consists of four courses, provides the student with a specialization in the design, analysis and computer control of chemical processes. Courses are taught on the hardware and software aspects of computer control and advanced methods of chemical process analysis, design and control. The four courses for the concentration satisfy the technical and Chemical Engineering elective requirements in the curriculum.

Required Courses

- 10.518 Microprocessor Control with Lab
- 10.522 Computer Aided Chemical Process Design
- 10.530 Advanced Control Strategies
- 10/24.509 System Dynamics

Chemical Engineering, Concentration in Engineered Materials

The Engineered Materials Concentration allows the student to develop a specialization in a particular area. The concentration begins with the survey course 10.308 Introduction to Materials Science and Engineering, which is required for
all Chemical Engineering juniors, and is followed by four additional courses. Courses must be selected to cover at least three areas of specialization. The four courses for the concentration satisfy the technical and Chemical Engineering elective requirements in the curriculum.

**Required Courses**

- 10.405 Design of Paper
- 10.506 Interfacial Science and Engineering and Colloids OR
- 10.527 Nanomaterials Science and Engineering

**Elective Courses** (Select two of the following)

- 10.501 Paper Ind. and Proc. Analysis
- 10.523 Nanodevices and Electronic Materials
- 10.525 Construction and Use of Packaging Materials
- 10.533 Macromolecular Science and Engineering
- 10.541 Nanocharacterization by SEM, TEM and AFM
- 16.470 VLSI Fabricating with Lab
- 26.543 Survey of Plastic Materials
- 26.544 Survey of Plastics Materials II

**Chemical Engineering Major**

**General Requirements For Chemical Engineering Curriculum**

1. The student is required to take six (6) three credit general education courses as follows:
   - Three three-credit courses in the Arts and Humanities. Either Introduction to Ethics (45.203) or Engineering and Ethics (45.344334) must be used to satisfy one of the Arts and Humanities course requirements.
   - Three three-credit courses in the Social Sciences. Either Economics I (49.201) or Economics II (49.202) must be used to satisfy one of the Social Science course requirements.
   - A General Education course that fulfills the Diversity requirement must be taken.

2. The student in the Basic Chemical Engineering curriculum must take three chemical engineering technical electives, two other approved technical electives and an approved advanced chemistry elective or equivalent.

3. The student in the Biological Engineering option must take one technical elective from the recommended list of courses.

4. The student in the Nanomaterials option must take four technical elective from the recommended list of courses and an approved advanced chemistry elective or equivalent.

5. The student in the Nuclear Engineering option must take one technical elective from the recommended list of courses, another approved technical elective and an approved advanced chemistry elective or equivalent.

6. The student in the Paper Engineering option must take one technical elective from the recommended list of courses, another approved technical elective and an approved advanced chemistry elective or equivalent.

7. To qualify for graduation, students are required to obtain an overall gpa of 2.0 or higher in departmental courses, in addition to satisfying the general degree requirements of the university.

**Course of Study**

View the complete courses of study for:

- Chemical Engineering - General (pdf)
- Chemical Engineering - Biological Engineering Option (pdf)
- Chemical Engineering - Nuclear Option (pdf)
- Chemical Engineering - Paper Option (pdf)
- Chemical Engineering - Nanomaterials Track (pdf)

**Five-Year Bachelor of Science/Master of Science in Engineering Program**

The Department offers a special five-year program that makes it possible for qualified students to complete the requirements for the BS degree and the MS degree in five years.

**Nanomaterials Engineering Option, Chemical Engineering**

The Nanomaterials Engineering Option is designed to prepare the student to work in a materials related industry. Five technical electives are required and must be selected from the following list of courses.

**Elective Courses** (Select five of the following)

- 10.405 Design of Papers
Nuclear Engineering Option, Chemical Engineering

The Department of Chemical Engineering offers an option in Nuclear Engineering, with a focus on nuclear processes and technology and on nuclear electric power generation. This degree is accredited by the Engineering Accreditation Commission of ABET, [http://www.abet.org](http://www.abet.org) The option gives concentrated training in a variety of nuclear technologies. Engineering graduates with the Nuclear Engineering Option can work in the nuclear industry in areas such as the continued safe and economical operation of existing nuclear power plants and processing facilities, improved plant performance, design of new facilities, the safe disposal of nuclear waste, and other advanced industrial and medical applications of nuclear technology. The option requires three Nuclear Engineering courses and one elective course within the Basic Chemical Engineering curriculum.

Nuclear Science and Engineering Minor

The Nuclear Engineering Option consists of a sequence of four courses that are specifically designed to give a traditional chemical engineer concentrated training in a variety of nuclear technologies. The course selection integrates the key nuclear-related subjects usually taken as part of an undergraduate degree program in Nuclear Engineering. The four course sequence is designed to be taken during the junior and senior years, one course per semester. These courses satisfy the technical and Chemical Engineering elective requirements in the curriculum. One technical elective is required and must be selected from the following list of courses.

**Elective Courses** (Select one of the following)

- 24.432 Nuclear Systems Design and Analysis
- 24.436 Undergraduate Directed Studies
- 95.422 Environmental Radiation and Nuclear Site Criteria
- 98.306 Nuclear Instrumentation
- 24.505 Reactor Physics
- 24.506 Special Topics in Reactor Physics
- 24.507 Reactor Engineering and Safety
- 24.509 System Dynamics (with nuclear projects)
- 24.511 Advanced Reactor Concepts
- 24.514 Chemical and Nuclear Waste
- 85.585 Nuclear Chemistry
- 95.441 Radiochemistry

Chemical Engineering with Paper Option

The Department of Chemical Engineering offers an option in Paper Engineering, in which courses are taught on paper processing and paper and paper-like materials. The option requires three Paper Engineering courses and one elective course within the Basic Chemical Engineering curriculum.

As the demand for paper and paper products continues to grow, concerns about deforestation and waste have prompted legislation at both the state and federal levels requiring minimum recycle fiber contents in many consumer grades of paper. There is a particular interest in exploring the expanded use of recycled cellulose waste fibers in commercial and industrial products and in the evaluation of the properties of paper and paper products. The Department has nationally recognized expertise in determining recycled fiber content and in testing and evaluating paper and paper-like materials.

The Paper Engineering Option consists of four courses that are designed to give chemical engineers training in the processing and testing of paper and paper-like materials in order to prepare them for work in the paper industry. One technical elective is required and must be selected from the following courses:

**Elective Courses** (Select one of the following)

- 10.402 Engineering Analysis of Coating & Converting Systems
- 10.541 Nanocharacterization by SEM, TEM and AFM
- XX.XXX Approved Technical Elective

Programs

- [Undergraduate Program](#)
- [Nuclear Science & Engineering Minor](#)
Undergraduate Program

The chemical engineering curriculum provides a thorough grounding in chemistry and an understanding of chemical processing. While the undergraduate program maintains its traditional role to educate students for employment in the chemical industry and to prepare them for advanced study in chemical or a related field, the curriculum provides students with a unique opportunity to specialize in areas of individual interest. Options in Biological Engineering, Nanomaterials Engineering, Nuclear Engineering and Paper Engineering or concentrations in Engineered Materials and Computer-Aided Process Design and Control are offered.

The students are constantly made aware that chemical engineering is a dynamic profession and that there are frontiers with exciting opportunities in traditional areas as well as in the new fields such as biotechnology and nanomaterials. The faculty highlight new applications as well as the fundamentals in the curriculum, and students are given the tools to play a role in commercializing new technologies.

The curriculum requires a series of courses in basic science and mathematics. These provide a firm understanding of fundamentals, help the student to develop analytical techniques, and serve as the basis for specialized engineering courses. Another component of the curriculum consists of courses that serve as an introduction to engineering, link the basic sciences and engineering, and introduce engineering analysis, synthesis and design. Woven throughout the curriculum are courses in the arts and humanities and the social sciences. These courses broaden perspectives, maintain and improve communication skills, and expose the engineering students to concepts of values and ethics. The curriculum emphasizes the study of advanced problems and topics in engineering design. The purpose is to develop skills in the use of science, sensitivity in the application of ethical considerations, sensibility in economic matters, and creativity in solving engineering problems. Laboratory work and computer applications are extensive in the program.

Students seeking admission into chemical engineering should be familiar with the admission and retention requirements of the College of Engineering. The curriculum is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET), http://www.abet.org>. All undergraduate students are assigned a faculty advisor and are encouraged to meet with their advisor during each semester or whenever there is some matter of concern. Students must meet with their advisor at least once each semester during the advising and registration period.

Department of Chemical Engineering

Chemical Engineering is a highly diversified discipline. The program at the University is broadly based and builds upon a student's high school training in science and mathematics. It provides a fundamental base from which graduates can develop their skills by entering general engineering practice or pursuing an advanced degree.

The Department has many focus areas that reflect its strengths such as biotechnology, bioprocessing, advanced engineered materials, nuclear engineering, paper engineering and process controls. Students may select a general chemical engineering curriculum or an option in biological, nanomaterials, nuclear, or paper engineering stemming from the general program.

The faculty are involved with University Centers and research facilities such as the Massachusetts Biomanufacturing Center, the Toxic Use Reduction Institute, the Center for Advanced Materials, and the University Research Nuclear Reactor. The Department is associated with several specialized laboratories such as the biotechnology and bioprocessing laboratories, the ceramics laboratory, the advanced materials characterization laboratories, the pulp and paper testing laboratories and a computer laboratory.

The faculty are nationally and internationally recognized for research especially in the areas of bioprocessing and biotechnology, advanced materials, nuclear engineering, and paper engineering. For more information visit Chemical Engineering or contact us.
Allowable Course Substitutions

The UMass Lowell Department of Civil and Environmental Engineering allows certain courses to be substituted for an equivalent course listed.

<table>
<thead>
<tr>
<th>UMass Lowell Courses</th>
<th>Permissible Substitution</th>
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</thead>
<tbody>
<tr>
<td>25.107 Introduction to Engineering I</td>
<td>Any computer programming or intro. to computer course, 91.101 Computing</td>
</tr>
<tr>
<td>25.108 Introduction to Engineering II</td>
<td>Any computer aided drafting course</td>
</tr>
<tr>
<td>14.203 Statics</td>
<td>22.211 Statics</td>
</tr>
<tr>
<td>14.204 Strength of Materials</td>
<td>22.212 Mechanics of Materials</td>
</tr>
<tr>
<td>14.205 Dynamics</td>
<td>22.213 Dynamics</td>
</tr>
<tr>
<td>14.286 Probability &amp; Statistics for Engineers</td>
<td>92.386 Probability &amp; Statistics I; a course in statistics</td>
</tr>
<tr>
<td>14.225 Surveying</td>
<td>15.123 Surveying I</td>
</tr>
<tr>
<td>92.236 Engineering Differential Equations</td>
<td>92.234 Differential Equations</td>
</tr>
<tr>
<td>49.201 Economics I</td>
<td>49.202 Economics II</td>
</tr>
<tr>
<td>10.347 Elements of Thermodynamics &amp; Heat Transfer</td>
<td>22.242 Thermodynamics; 26.247 Elements of Thermodynamics</td>
</tr>
<tr>
<td>14.470 Engineering Economics</td>
<td>23.414 Engineering Economics</td>
</tr>
</tbody>
</table>

Five-Year Bachelor of Science/Master of Science in Civil Engineering Program

The purpose of this program is to offer qualified undergraduate students an accelerated program of study leading to a Master of Science in Civil and Environmental Engineering at the end of five years of study. Students benefit from the efficiency of a continuous, coordinated sequence of subjects that allows for reduced credit hour requirements. Students can receive the B.S. in Engineering at the end of the fourth year and the M.S. in Engineering at the end of the fifth year if all requirements are met.

General Requirements

Application to the five-year program is made during the second semester of the junior year. A minimum grade point average of 3.0 based upon the first five semesters of grades, is required for admission into the program.

Applicants who satisfy the Graduate School and departmental admission requirements for the five-year program will be assigned to a graduate faculty member who will act as their program advisor. The M.S.C.E. degree requires the successful completion of a minimum of 30 credit hours. These 30 hours include at least 24 hours in class and seminar study, of which at least 18 hours must be at the 500 level or higher. Courses at the 400 level are designed for seniors, but may be taken by graduate students for graduate credit if written approval is given by the student’s advisor.

Special Requirements

A student seeking a five-year M.S.C.E. must choose an area of specialized study. These areas include: environmental, geotechnical, geoenvironmental, structural, and transportation engineering. Programs of study in each of these areas are described in the Graduate Catalog.

Program Goals and Objectives

The goal of the Department of Civil and Environmental Engineering is to provide its students with a well balanced, high quality education in four principal areas of civil engineering: environmental, geotechnical, structural, and transportation engineering that will permit them to practice civil engineering at a professional level, that will prepare them for graduate study, that will promote life long learning and continuing professional development and that will provide them with the skills and knowledge necessary to develop into active contributors to the economic and social vitality of the region.

To this end, the Educational Objectives of the CEE Department are:

1. Graduates will be prepared to practice the profession of Civil Engineering or related fields at a professional level.
2. Graduates will be prepared to continue their education in graduate school.
3. Graduates will recognize the need for engaging in life-long learning and continued professional development.

Please visit the UMass Lowell Civil Engineering site for more information.
Civil Engineering is a profession that applies the basic principles of science in conjunction with mathematical and computational tools to solve problems associated with developing and sustaining civilized life on our planet. Civil Engineering is one of the broadest of the engineering disciplines both in terms of the range of problems that fall within its purview and in the range of knowledge required to solve those problems. Civil engineers plan, design, build, manage and rehabilitate the facilities essential to modern society: homes and work places; transportation systems for commerce and recreation, and water treatment and waste disposal systems for a healthful life. As part of the construction industry, they build bridges, buildings, tunnels, dams, canals, irrigation systems, harbors, highways, airports, water supply systems, and waste disposal facilities. They develop solutions to environmental problems, study new methods to control traffic, and design outer space and under sea structures.

Civil and Environmental Engineering practice encompasses a wide range of specialties, including: construction management, engineering mechanics, environmental engineering, geotechnical and foundation engineering, hydraulics, intelligent transportation systems, irrigation and drainage, materials engineering, structural engineering, surveying and site engineering, urban planning and development, urban transportation, water and wastewater treatment system design, water resources planning and management, hazardous waste site remediation, and waterway, port, coastal and ocean engineering.

Civil engineers work in both the public and private sector. They serve as city, town and state public works and environmental engineers. They own and are employed by consulting firms, construction companies and industries. They are employed by a variety of federal and state agencies such as, the Corps of Engineers, the Department of Transportation, the Environmental Protection Agency, the Federal Aviation Administration, Massachusetts Water Resources Authority and the Massachusetts Highway Department.

Civil & Environmental Engineering Major

The first year of undergraduate study is devoted to developing writing skills and proficiency in the areas of mathematics and science that serve as a foundation for upper level professional studies. During the second year of study, students learn the principles of engineering mechanics, strength of materials, and surveying. Junior and senior year course work gives students a working knowledge of structural, environmental, geotechnical, and transportation engineering. In addition to education in these four basic areas of civil engineering practice, advanced elective courses are available in each area during the senior year. Engineering design concepts and computer-aided engineering are integrated throughout the program.

Course of Study (pdf)
Flowchart (pdf)
Course Substitutions

Electrical and Computer Engineering Mission Statement

The ECE Department mission for undergraduate education is to provide a thorough grounding in electrical science, electrical engineering, and computer engineering, together with an intensive training in mathematics. The techniques of experimental science and technology are emphasized through investigative laboratory work and classroom lecture/demonstrations.

The curriculum includes engineering science and design courses that provide a balanced view of hardware, software, application trade-off and the basic modeling techniques used to represent the computing process, and include the following student experiences: requirements analysis and specification, evaluation and testing, hardware-software integration, use of computer aided design tools and documentation. Such experiences are integrated throughout the curriculum and designed to encourage each student to engage in a major and meaningful design experience. An important aspect of the electrical and computer engineering curricula is the technical elective program of the senior year. Technical electives provide opportunities for broadening or deepening technical knowledge in a flexible manner and according to student interests and competencies. New tracks with a focus in computing skills as well as double majors in EE and Computer Science and EE and Physics are also offered. The capstone project is organized to bring together knowledge from several courses toward solving a real-world engineering problem. The ECE Department has also linked with many local companies, both large and small, in order to offer co-op opportunities for which course credit can be earned.

A significant portion of the curriculum is also devoted to studies in the humanities and social sciences and considerable choice of subjects is allowed. These subjects broaden the student's outlook and serve to focus attention on the importance of
non-technical knowledge in determining the student's ultimate level of responsibility in professional life.

Electrical and Computer Engineering Policy in Double Majors

The Electrical and Computer Engineering Department also offers double majors in Electrical Engineering/Computer Science, and Electrical Engineering/Physics provided the students adhere to the following university policy.

College Policy on double majors requires that:

1. ALL curriculum requirements in Engineering must be satisfied.
2. Must inform both Departments/Colleges by the start of the junior year.
3. Must submit a program for approval by the Departments involved.
4. The Dean or Deans in the case of a double major involving two colleges must approve a declaration of a second major.
5. Must file the approved declaration of a second major with the Office of Enrollment Services.
6. Students may not present less than 57 credits outside the two major fields in order to satisfy the minimum degree requirements of 120 credits.
7. Students are candidates for only one degree in one College. They must choose which degree they want; if they do not it will be the degree for which they originally enrolled.

Electrical and Computer Engineering Program Objectives

Specific program objectives in support of our undergraduate educational mission are that after 4-5 years of experience, our graduates should:

1. Be established and recognized as a valued professional and effective communicator in industries related to electrical, computer and electronic technologies.
2. Practice their profession in a collaborative, team-oriented manner that embraces the multidisciplinary and multicultural environment of today’s business world.
3. Engage in lifelong learning and professional development via post graduate education and participation in professional organizations.
4. Function as a responsible member of society with willingness to mentor fellow employees and an understanding of the ethical, social and economic impact of their work in a global context.

Electrical and Computer Engineering Program Outcomes and Assessment

Given our student body and our particular constituencies, our program outcomes can be summarized as follows:

When a University of Massachusetts Lowell ECE student graduates he/she shall have:

1. A strong grounding in the fundamentals including the ability to formulate and solve engineering problems by applying the principles of mathematics, science and electrical & computer engineering.
2. Ability to analyze and synthesize engineering problems including design and conduct experiments, use standard test equipment and interpret experimental data.
3. Ability to design reliable systems, devices or processes from initial specifications to a deliverable system.
4. Ability to work in a multidisciplinary team environment.
5. Ability to communicate effectively in both verbal and written forms.
6. Ability to appreciate the complexities of professional environments, including taking responsibility for oneself, working effectively and professionally as a team member, and being mindful of ethical, economic, and contemporary concerns.
7. Competence in taking the initiative for one’s own professional development and recognition of the need and ability in engaging in post graduate education and lifelong continual learning.
8. Ability to independently accomplish engineering tasks.
9. Ability to enter industry with the engineering techniques, skills, and tools required to be able to solve real-world problems in electrical and computer engineering.

Policies

- Mission Statement
- Double Majors
- Objectives
- Outcomes and Assessment
- The Education We Offer

For more information, please visit the UMass Lowell Electrical & Computer Engineering site.

The Education We Offer

Office of the Registrar 83 Broadway Street, Dugan 101, Lowell, MA 01854-5129
The Electrical and Computer Engineering Department has been long known throughout the region for producing competent "hands-on" engineers who are the mainstay of the region's industries. For example, Raytheon, a major employer in the region has more Electrical Engineering and Computer Engineering graduates from our Department than from any other Department in the country. We value this reputation and, in concert with industry's needs, but without compromising the long term value of the educational needs, we strive to maintain and enhance this image.

The Department offers a co-op program, which the College and the University have helped to formalize. We believe that making such opportunities available to students greatly enhances their experience of engineering both with respect to the relevance of our courses as well as the exposure to working with other professionals.

Constant attention is paid to the state of our laboratories with a view to acquiring new equipment, developing new experiments and maintaining equipment. Thanks to our close ties with industry four new laboratories have been created recently. These are: The Cadence – Sun Microsystems Laboratory in which state-of-the-art VLSI circuit design techniques can be learnt; the Analog Devices Laboratory which was funded to promote the education of students in analog to digital conversion and hybrid analog and digital integrated circuits; a new laboratory was funded by EST/Wind River to allow students to gain experience in programming embedded microprocessors for a large number of control applications; the industrial technology teaching laboratory supported by UPS which will be available for use by all of our students. The sophomore laboratory has been upgraded (partially funded by Bell Atlantic) in the summer of 1999. A new capstone project laboratory with a special emphasis on Assistive Technology projects (in which over 40 students are typically engaged in each year) is under development seeded by a substantial donation of $250,000 from an alumnus.

Strategic alliances have been formed with several of our Industry Board members. For example, Analog Devices has started a scholarship program with us, providing four BSE in ECE students each year a guaranteed internship for each of them during the winter and summer vacations. A pipeline of co-op students is in place with several companies that provides for very close interaction and feedback between our programs and their expectations. Ten other companies have since joined this program and offer scholarships to prospective electrical and computer engineering students.

Most of our students go into industry and a significant percentage among them goes into companies within 100 miles of Lowell. Industry is our main constituency. While some go to graduate school directly, our typical graduates go directly into the workforce, with the expectation that the employer will most likely fund graduate school education. Since the majority of our graduate student body is part time, our graduate courses are only offered in the evenings, enabling them to take one or two courses per semester.

The Industry Advisory Board plays an important role in considering our program objectives providing us immediate industrial needs. These have to be balanced against the need to identify truly fundamental topics that will serve our particular student body well in the long term. Technical areas sometimes take second place to a "can-do" attitude, excellent communication skills and the initiative required to teach oneself. Meetings with our Board are typically once per semester. Our close ties with industry through the co-op program, research and consulting, as well as alumni also provide valuable feedback on our program about the expectations of these entities.

Five-Year BSEE/MSEE Combined Program

To encourage outstanding undergraduate students to continue study toward a Master's degree, the Electrical and Computer Engineering Department offers an accelerated program. If all the requirements of the department and of the Graduate School are met, the students will receive the BSE in EE at the end of the fourth year. To complete the work for both degrees within five years, the student must make a commitment to the BSE in EEE/MSE in EE program before the end of their senior year and they must take two 500-level graduate courses as their technical electives. The grades in these courses should be "B" or better and they will count toward the MSE as well as the BSE Degrees.

Double Major: Electrical Engineering & Computer Science

The Electrical and Computer Engineering Department offers double majors in electrical engineering/computer science and electrical engineering/physics. Students must adhere to the University and College policies on double majors. All curriculum requirements in engineering must be satisfied. Students should inform both departments and colleges by the start of their junior year and submit a program for approval to the departments involved with the dean approving a declaration of a double major. A declaration of a second major form must be submitted to the Office of Enrollment. Students may not present less that 57 credits outside the two major fields in order to satisfy the minimum degree requirements of 120.

Note: To satisfy prerequisites for upper level courses, EE/CS double majors may substitute 16.317 for 91.203, 16.363 for 92.386, and 92.360 for 92.321 & 92.322.

View the complete Course of Study (pdf)

Double Major: Electrical Engineering & Physics

The Electrical and Computer Engineering Department also offers double majors in electrical engineering/computer science and electrical engineering/physics provided the students adhere to the University and college policy on double majors.

View the complete Course of Study (pdf)
Electrical & Computer Engineering

The UMass Lowell Department of Electrical and Computer Engineering (ECE) offers two undergraduate degrees: a B.S. Eng. in Electrical Engineering and a B.S. Eng. in Computer Engineering. The ECE Department also offers opportunities for double majors with computer science (CS) and physics.

- Bachelor of Science in Electrical Engineering (B.S. in EE)
- Bachelor of Science in Computer Engineering (B.S. in CpE)
- Double major: Electrical Engineering/Computer Science (EE/CS)
- Double major: Electrical Engineering/Physics (EE/Physics)

All undergraduate students are assigned faculty advisors and students are required to meet with their advisors, especially during registration periods or whenever there is some matter of concern. Students should consult with their advisor on the best path through each track. This is especially true for co-op and part-time students, since the need to adhere to prerequisite course requirements is very important.

Graduate Programs in Electrical & Computer Engineering

Graduate programs include the degrees of Master of Science in Electrical Engineering (MSE in EE), Master of Science in Computer Engineering (MSE in CPE) and Doctor of Engineering. Flexibility is the hallmark of these degree programs. They require 3 core courses and permit specialization in one of several concentration areas. The Doctor of Engineering program requires a research dissertation and some additional technical and engineering management courses. Several certificate programs are also offered to provide an opportunity for part-time students to be exposed to developments in this field.

This information is offered for general guidance. It interprets information in the UMass-Lowell Graduate Catalog. Specific applications of requirements in the Graduate Catalog may differ from case to case. The Department also offers several certificate programs at the graduate and undergraduate levels. Certificate programs are offered in the areas such photonics, telecommunication, energy conversion, biomedical engineering and VLSI and microelectronics.

Program of Study for BSE in Computer Engineering

The UMass Board of Trustees and the Massachusetts Board of Higher Education, approved the new program in computer engineering. A copy of the four-year BS CpE program curriculum and the corresponding list of courses for this new major is available in the Department of Electrical and Computer Engineering Office. The Department began offering courses for this program in Fall 2001, (e.g. 16.317, and 16.322 that are new for Electrical Engineering and Computer Engineering major. However the first two years of this computer engineering program are identical to the EE.

View the complete Course of Study (pdf)

Program of Study for BSE in Electrical Engineering

The traditional EE track is the BSE in Electrical Engineering degree, providing a thorough grounding in the fundamentals of electrical engineering that would allow a graduate to function effectively in industry or continue on to graduate school.

Students seeking admission into electrical engineering should be familiar with the admission and retention requirements of the College of Engineering. This curriculum is accredited by the Accreditation Board for Engineering and Technology (ABET), http://www.abet.org

All undergraduate students are assigned faculty advisors and students are required to meet with their advisors during each semester, especially during registration periods or whenever there is some matter of concern.

We have also provided for a BSE in EE/Physics double major. We note that the semester by semester outline for this double major sometimes includes a large number of courses. However it is the sequence in which courses are taken that is more important than in which semester they are taken.

Students should consult with their advisor on the best path through each track. This is especially true for co-op and part-time students, since the need to adhere to prerequisite courses is very important.

In addition to the above EE track, the ECE Department also offers a BSE in EE/CS double major and a BSEng in EE/Physics double major, as mentioned earlier, to cater to those students who want a significant amount of math and basic sciences

View the complete Course of Study (pdf).

For additional information visit the Electrical & Computer Engineering Department or contact us.

Programs
Sound Recording Technology Minor

This supportive minor in Sound Recording Technology for Electrical Engineering majors is designed to assist in the development of qualified individuals to enter the recording industry as maintenance technicians (for recording studios, television and radio stations, equipment distributors, video houses, sound reinforcement and systems design companies) and careers in audio engineering research and development.

The sequence of study focuses on providing the student with practical knowledge of the function and usage of audio and video equipment, equipment maintenance and design theories and applications, theory of audio equipment, and basic music skills. The student is introduced to artistic concepts and applications of audio and music synthesis and production, while being taken through advanced concepts in audio theory.

The minor culminates with a research project in hardware design, including the building of a prototype of the design project.

The Minor in SRT is specifically devised to support the University of Massachusetts Lowell's Bachelor of Science in Electrical Engineering program. A major in EE from UMass Lowell's Department of Electrical and Computer Engineering, the College of Engineering, must be taken concurrently with the minor in SRT. Students apply to the College of Engineering for admission into the Electrical Engineering major.

Department of Electrical & Computer Engineering

- Policy
- Programs

Electrical and computer engineering are dynamic fields, advancing as a result of breakthroughs in technology as well in the pure sciences. Because engineering disciplines continuously incorporate new concepts and developments, a viable engineering education cannot be limited to the acquisition of specific skills and methods, but also must provide the student with a deep understanding of both the current and the emerging engineering fields.

The Electrical and Computer Engineering Department is well placed to help fulfill the campus' role within the UMASS system. The faculty embrace the mission of serving a technologically oriented department, closely linked to regional and national industry.

The Electrical and Computer Engineering Department strives to be a department of choice for students and is actively repositioning itself. We have responded to our ties to industry by offering focused programs both at the undergraduate and graduate levels in order to provide a thinking and technically literate engineer of immediate value to the community. Our graduates are knowledgeable and practical problem solvers, most of whom remain to work in the State.

In several areas like atmospheric research, electromagnetic scattering, properties of materials, acoustics, signal processing and imaging, the Department is nationally and internationally recognized for its research. The Department has successfully developed a program of project-based R&D specifically designed to provide support to the disabled. Many different electronic and microprocessor based systems have been delivered that have made a major impact on the freedom and quality of life for the disabled. The Department continues to make extensive use of the excellent computing facilities offered by the Center for Computer Man/Machine Intelligence, Networking and Distributed Systems, the Department, the college, the University computer centers, the Center for Advanced Computation and Telecommunications. New directions in the Department include an increased emphasis on teaching and research in computer engineering.

Visit the UMass Lowell Electrical & Computer Engineering site for more information.

BSE/MSE Program

For its undergraduate students, the department offers a combined BSE/MSE program. This program is available to undergraduates with a minimum 3.0 cumulative g.p.a. at the end of their Junior year. Application for the BSE/MSE program should be made to the graduate coordinator by the eighth week of the second semester of the junior year. The graduate coordinator will hold the application until the grades for the complete junior year are obtained.

Benefits of the BSE/MSE Program:
- The graduate application fee is waived.
The university requirement that all graduate school applicants take the Graduate Record Examination (GRE) is waived.

Two graduate courses (500 level) are taken in the senior year and the six credits obtained are applied to the B.S. degree requirements. In addition, if a grade of B or better is obtained in these courses they may be applied to the M.S. degree requirements. Students may take more graduate courses as a BSME student. However, only six credits may be counted toward both degrees.

Any technical elective credits taken above the department minimum (9 credits) may be applied to the MS degree.

You end up with both a Bachelors and a Masters degree.

See more information on the bachelor's/master's degree program

Mechanical Engineering Major

The Bachelor of Science in Engineering (Mechanical Engineering) program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org, and provides its graduates with a very comprehensive engineering education. A major strength of the program is its emphasis on hands-on experience. Graduates are fully prepared to pursue work in industry, or to continue on for graduate education in engineering, business, and medicine. The curriculum is designed to graduate engineers who can apply fundamental principles of mechanical engineering with competence and sensitivity to the needs of society. To achieve this goal, students follow a sequence of courses beginning with basic mathematics and science, followed by their application to courses in engineering science and engineering design. Relevant clusters of studies in the humanities and social sciences are included within the context of engineering education.

Course of Study for Students Entering Fall 2011 and later (pdf)

Department of Mechanical Engineering

Policy

- Educational Objectives and Outcomes
- Industrial Advisory Board

Programs

- Course Listing
- Course of Study
- BSE/MSE in Mechanical Engineering Program

Mechanical Engineering offers a broad spectrum of career choices. Mechanical engineers can be found in every sector of our technologically complex society. There are jobs in manufacturing, power generation, materials processing, ship building, aircraft, automotive, and construction companies; as well as with government organizations and consulting firms, to name a few. Opportunities are available in the design of machinery, product design, plant design, system integration, testing, analysis, research and development. In addition to these traditional activities, mechanical engineers are deeply involved in problems of the future such as the development of new power systems, advanced composite materials, and new methods of productivity and quality enhancement in manufacturing. In view of this broadness, mechanical engineers as the general practitioners of the engineering profession have the flexibility to move into a wide variety of fields. The mechanical engineering program is structured to offer this flexibility.

There are three primary components to the mechanical engineering program. The first is comprised of the mathematical, physical, and engineering sciences. These form the permanent bedrock upon which the program is built and, provide the necessary basis for lifelong learning and adaptation to a changing technologically based society. The second component involves the application of these principals in conjunction with modern computer aided design tools, to the design, testing, and manufacture of products, systems, devices, etc. These technological tools change continually as a result of advances in computer software and hardware, and also as a result of changing demands from the marketplace (for example, there is more emphasis on manufacturing and commercialization and less emphasis on defense than there was only a few years ago). The third component is comprised of the humanities and social sciences that are so necessary for students to continue their growth as citizens and as professionals in a global economy. These subjects enhance the student's ability to communicate with and understand a diversity of individuals both on and off the job.

The curriculum is designed to graduate engineers who can apply fundamental principles of Mechanical Engineering with competence and sensitivity to meeting the needs of society and to continue a lifelong process of learning and growth in the profession. To achieve these goals, the program begins with a heavy concentration in mathematics, physics and chemistry. These courses form the foundation upon which the engineering curriculum is built. In addition the student is introduced to computational tools and to basic engineering practice. Subsequently, there is an emphasis on engineering science and design courses where the principles of mathematics, physics, and chemistry are applied and expanded upon in the context of engineering analysis, design, and practice. Students are exposed to experimental methods for testing and evaluation of materials, thermal/ fluid processes, and equipment. The senior year offers an introduction to the multiplicity of technical areas with which mechanical engineers are concerned. Through technical electives and the capstone design experience the student can explore various specialties according to their interest.

A unique feature of the program is the dispersion throughout the curriculum of the design-build-test process. Relatively simple team projects are executed in the freshman year. The complexity of the designs, the use of analytical tools, the fabrication methods, and testing techniques required, increase with each subsequent year. Students learn, hands-on, about different manufacturing techniques, about design methodologies, testing techniques, teamwork, and how to communicate
their designs and work. Additionally they learn the importance and the place of applying the principles of the engineering sciences in accomplishing successful designs.

Students take a number of courses in the humanities and social sciences. A considerable choice of subjects is allowed. These subjects broaden the student's outlook and serve to focus attention on the importance of non-technical knowledge in being successful professionally and as a person.

The program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org, which sets the standards for all engineering programs in the US.

### Mechanical Engineering Educational Objectives and Outcomes

#### Mechanical Engineering Educational Objectives

Objectives are defined as the expected accomplishments of graduates of the program in first few years after graduation.

Graduates of the BSE Mechanical Engineering program at the University of Massachusetts at Lowell will be able to:

- Pursue successful careers in mechanical engineering, or related engineering fields.
- Engage in lifelong learning and continued professional development in engineering or non-engineering fields.
- Engage in service activities related to their profession.

#### Mechanical Engineering Educational Outcomes

At graduation, students of the BSE Mechanical Engineering program at the University of Massachusetts at Lowell should:

- Be able to apply the principles of advanced engineering math, physics, and chemistry to the solution of problems in engineering science. These problems should be in the fields of mechanics, fluid flow, heat transfer, materials engineering, and vibrations.
- Be able to design, perform, and analyze experiments.
- Be able to design, build, and test a system, component, or process to meet specified requirements.
- Be able to seamlessly integrate the use of computers into engineering projects. This must include 3D computer aided design, spreadsheets, and a programming language.
- Be able to communicate technical information. This must include oral presentations, written reports, and an ability to work on and communicate with multi-disciplinary team members.
- Understand the need to assess the impact of engineering designs on society. This should include factors such as economics, ergonomics, the environment, and sustainability.
- Understand the concept of the engineering profession through an exposure to professional societies, professional registration, the need for lifelong learning, and professional ethics.

### Five-Year BS/MS in Plastics Engineering

The Plastics Engineering Department offers a program of accelerated study in order to encourage outstanding (GPA 3.0 and above) undergraduate students to continue their studies toward a Master of Science degree in Plastics Engineering. Interested students should file a Graduate Application prior to the last day of classes in the final semester as an undergraduate. Applicants for this program are not required to take the Graduate Record Examination.

The student will receive a Bachelor's degree at the end of the fourth year of study, if all course requirements have been met. Acceptance as a matriculated graduate student is contingent upon the further recommendation of the department graduate committee. Up to six credit(s) of the B.S. degree may be applied to the Graduate Program. As a result, the MS Degree credit requirement drops from 30 to 24 credits for BS/MS Plastics Engineering Thesis Option Students, and from 33 to 27 credits for BS/MS Plastics Engineering Non-Thesis Option Students.

In some cases, an undergraduate student may take additional graduate courses (up to an additional 6 graduate course credits), credits which are not applied to the Bachelor of Science in Plastics Engineering, and apply these to the Master of Science in Engineering. However, no student may transfer more than 12 credits into the Graduate Program.

During the summer preceding the fifth year, the student, if accepted as a matriculated student in the Master's program, may begin his or her thesis research if they are enrolled in the thesis option MS. Students taking full advantage of the combined program ordinarily may expect to finish the M.S. Engineering degree at the end of the fifth year of study. Actual completion will depend upon the student's progress in the program.

A student seeking a five-year BS/MS Plastics Engineering degree must also meet the requirements for a Plastics Engineering Certificate as their area of specialization. Approved graduate certificates include:

- plastics materials
- plastics processing
- plastics design
- elastomers
- medical plastics design & manufacturing
Refer to the Graduate Catalog for a detailed listing of the courses required for each graduate certificate.

A student may be eligible for financial assistance, i.e., fellowships and teaching assistantships, during the fifth year of study, but acceptance of such assistance and the attendant responsibilities may delay the completion of the program beyond the period specified in the preceding paragraph.

**Minor in Business Administration for Engineers**

The minor in business administration for engineers is offered by the College of Management (CoM) in conjunction with the College of Engineering.

**Courses in the Minor in Business Administration for Engineers**

*Required courses:*

- 49.201 Economics I (may count as Gen Ed course)
- 60.201 Accounting/Financial
- 61.301 Business Finance
- 62.201 Marketing Principles
- 66.301 Organizational Behavior

*Elective courses:*

Two courses from a selected list which is approved by the Engineering department and College of Management or 63.301 Management information Systems plus one additional course from a selected list which is approved by the Engineering department and CoM.

*For Civil & Environmental Engineering, these two additional courses are:*

- 14.372 Civil Engineering Systems (already core in CEE)
- One from the following list:
  - 14.475 Construction Management (*)
  - 22.576 Engineering Project Management (*)

Courses marked with * and 66.301 Organizational Behavior may be used as Technical Electives in CEE.

*For Plastics Engineering, these two additional courses are:*

- 26.537 Business Law for Engineers (†)
- One from the following list:
  - 26.507 Plastics Industry Organization (*)
  - 26.540 Commercial Development of Polymeric Systems (*)
  - 26.590 Survey of Intellectual Property (*)
  - 22.576 Engineering Project Management (*)

† Course 26.542 counts as a Design elective, and courses marked with * count as a Technical Elective in Plastics. In addition, Plastics students not taking 22.576 are encouraged to take 60.202 Accounting/Managerial or 14.470 Engineering Economics or 10.409 Economics & Process Analysis.

*For Chemical Engineering, these two additional courses are:*

- 10.409 Economics and Process Analysis
- One from the following list:
  - 14.372 Civil Engineering Systems (*)
  - 63.210 Operations Analysis Techniques
  - 22.576 Engineering Project Management (*)
  - 26.542 Business Law for Engineers (*)
  - 26.590 Survey of Intellectual Property (*)

Courses marked with * may count as a Technical Elective in ChE.

*For Mechanical Engineering, these two additional courses are:*

- 22.576 Engineering Project Management (*)
- 22.573 Manufacturing Systems (*)
- 14.372 Civil Engineering Systems or 63.210 Operations Analysis Techniques
- 14.470 Engineering Economics (*) or 10.409 Economics & Process Analysis (*)
- 26.542 Business Law for Engineers (*)
Courses marked with * may count as a Technical Elective in ME.

For Electrical and Computer Engineering, these two additional courses may be:

- 14.372 Civil Engineering Systems or 63.210 Operations Analysis Techniques
- 14.470 Engineering Economics or 10.409 Economics and Process Analysis
- 22.576 Engineering Project Management
- 26.542 Business Law for Engineers
- 26.590 Survey of Intellectual Property

Additional courses may be added by each Engineering Department to their list of elective courses, with the approval of the College of Management.

**Plastics Engineering Minor in Business Administration**

Most engineers become managers of people and projects. As a result, it is important for engineers to have an understanding of business practices. The Department of Plastics Engineering has worked closely with the College of Management to develop an optional, streamlined business program for undergraduate Plastics Engineering students. Plastics Engineering students can receive a minor in Business Administration by taking only four (4) extra courses.

These extra business courses can be taken during the normal school year or during the summer. Most can be taken online as well. A total of seven courses are actually required to obtain a Business Minor, but three of these seven courses count as credits towards the Plastics Engineering B.S. Degree. Therefore only four "additional" courses are required.

The course requirements for the Business Minor are:

- 49.201 Economics 1*
- 60.201 Accounting / Financial
- 60.202 Accounting / Managerial (optional but recommended)
- 61.301 Business Finance
- 62.201 Marketing Principles
- 66.301 Organizational Behavior
- 26.537 Business Law for Engineers**

and one of the following courses:***

- 26.507 Plastics Industry Organization
- 26.540 Commercial Development of Polymeric Systems
- 26.590 Survey of Intellectual Property
- 22.576 Engineering Project Management

* Already required for the Plastics Engineering Program.

** Counts as a “Design Elective” for Plastics Engineering

*** Counts as a “Technical Elective” for the Plastics Engineering.

**Course of Study for Plastics Engineering**

**Plastics Engineering Curriculum - Standard Track**

Undergraduate Plastics Engineering students who are not enrolled in the formal Cooperative Education Program should follow the Plastics Engineering "Undergraduate Curriculum: Standard Track". The standard track has a large number of required science, engineering and materials courses, along with a number of elective courses. The elective courses include both technical electives and general education electives (Arts and Humanities and Social Science courses).

Course of Study – Standard Track (pdf)
List of Technical, Materials and Design Electives
List of AH and SS General Education Electives

**Plastics Engineering – Summer Co-op Track**

Undergraduate Plastics Engineering students who are enrolled in the formal Summer Cooperative Education Program should follow the Plastics Engineering "Undergraduate Curriculum: Summer Co-op Track". Like the standard track, the summer co-op track has a large number of required science, engineering and materials courses, along with a number of elective courses. The elective courses include both technical electives and general education electives (Arts and Humanities and Social Science courses). In addition, co-op track students seek employment in the Plastics Engineering field in the summers following their junior and senior years. Students that successfully complete two rounds of co-op receive technical elective credits (3 credits). Students that do not complete two rounds of co-op in a satisfactory manner must complete a technical elective in order to satisfy the program credit requirement. Students also have the option to do semester long co-ops but the specific course sequence to be followed by the semester co-op student will be developed on a case by case...
The Plastics Engineering Department offers electives that have a technical focus, a materials focus, or a design focus. Please use the links below to see what courses satisfy the requirements for each.

**Technical Electives**

**Materials Electives**

**Design Electives**

### Technical Electives

During the senior year, Plastics Engineering students are required to take a "Technical" Elective. Students can select a course from the course list below. Some courses are available only when there is sufficient demand. Students may also take an upper level technical course offered by another College of Engineering Department if it is approved by the Plastics Engineering Chairperson or Executive Officer. The Technical Elective is waived for students enrolled in the Co-op Program who have successfully completed both 26.310 Co-op Assessment I and 26.410 Co-op Assessment II. Plastics Engineering students doing a Minor in Business Administration should take either 26.507, 26.540, 26.590 or 22.576 for their technical elective.

- 26.409 Senior Research in Plastics I (3 credits)
- 26.502 New Plastics Processing Techniques (3 credits)
- 26.504 Mechanical Behavior of Polymers II (3 credits)
- 26.505 Polymer Structure II (3 credits)
- 26.507 Plastics Industry Organization (3 credits)
- 26.509 Plastics Processing Theory I (3 credits)
- 25.510 Plastics Processing Theory II (3 credits)
- 26.511 Polymer Blends and Multiphase Systems (3 credits)
- 26.512 Porous Polymers (3 credits)
- 26.513 New Plastics Materials (3 credits)
- 26.514 Statistics for Six Sigma (3 credits)
- 26.515 Lean Plastics Manufacturing (3 credits)
- 26.523 Screw Design Principles (3 credits)
- 26.524 Process Analysis, Instrumentation, and Control (3 credits)
- 26.526 Nanoscale Plastics Processing (3 credits)
- 26.531 Design of Automated Assembly Systems (3 credits)
- 26.532 Adhesives and Adhesion (3 credits)
- 26.533 Coatings Science and Technology I (3 credits)
- 26.534 Coatings Science and Technology II (3 credits)
- 26.535 Rubber Technology (3 credits)
- 26.536 Rheology of Coatings (3 credits)
- 26.537 Business Law for Engineers (3 credits)
- 26.540 Commercial Development of Plastics (3 credits)
- 26.541 Computer Applications in Plastics (3 credits)
- 26.542 Colloidal Nanoscience and Nanoscale Engineering (3 credits)
- 26.545 Additives for Polymer Materials (3 credits)
- 26.546 Mixing in Plastics Processing (3 credits)
- 26.547 Materials for Renewable Energy and Sustainability (3 credits)
- 26.548 Analytical and Numerical Methods in Plastics Processing (3 credits)
- 26.549 Product Design for Elastomers (3 credits)
- 26.550 Processing with Elastomers (3 credits)
- 26.551 Extrusion Die Design (3 credits)
- 26.552 Machine Design (3 credits)
- 26.553 Medical Device Design I (3 credits)
- 26.554 Medical Device Design II (3 credits)
- 26.559 Elements of Packaging (3 credits)
- 26.565 Thermosets (3 credits)
- 26.566 Polymer Material Systems Selection (3 credits)
- 26.567 Dynamic Mechanical Properties I (3 credits)
- 26.568 Dynamic Mechanical Properties II (3 credits)
- 26.575 Biomaterials I (3 credits)
- 26.576 Advanced Mold Design (3 credits)
- 26.579 Problems in Biomaterials Directed Studies (3 credits)
- 26.585 Computer Aided Engineering I (3 credits)
- 26.586 Computer Aided Engineering II (3 credits)
- 26.588 Injection Molding (3 credits)
- 26.589 Polymer Nanocomposites (3 credits)
- 26.590 Survey of Intellectual Property (3 credits)
- 26.595 Thermoplastic Elastomers (3 credits)
- 26.596 Plastics, Elastomers, and Additives from Renewable Resources (3 credits)
- 26.606 Plastics Manufacturing Systems Engineering (3 credits)
- 26.607 Supply Chain Management (3 credits)
- 26.618 Structural Product Design (3 credits)
- 26.675 Biomaterials II (3 credits)
- 22.576 Engineering Project Management (3 credits)

**Materials Electives**

Materials Engineering students are also required to take a “Materials” Elective. Students can select a course from the materials elective course list below. Some courses are available only when there is sufficient demand. Students can take an upper level design course offered by another College of Engineering Department (e.g. material science, composites….) if it is approved by the Plastics Engineering Chairperson or Executive Officer.

- 26.511 Polymer Blends (3 credits)
- 26.512 Porous Polymers (3 credits)
- 26.513 New Plastics Materials (3 credits)
- 26.516 Composite Materials (3 credits)
- 26.532 Adhesives and Adhesion (3 credits)
- 26.533 Coatings Science and Technology I (3 credits)
- 26.535 Rubber Technology (3 credits)
- 26.540 Commercial Development of Plastics (3 credits)
- 26.542 Colloidal Nanoscience and Nanoscale Engineering (3 credits)
- 26.544 Advanced Plastics Materials (3 credits)
- 26.545 Additives for Polymer Materials (3 credits)
- 26.547 Materials for Renewable Energy and Sustainability (3 credits)
- 26.559 Elements of Packaging (3 credits)
- 26.565 Thermosets (3 credits)
- 26.566 Polymer Materials Systems Solution (3 credits)
- 26.575 Biomaterials I (3 credits)
- 26.579 Problems in Biomaterials Directed Studies (3 credits)
- 26.589 Polymer Nanocomposites (3 credits)
- 26.595 Thermoplastic Elastomers (3 credits)
- 26.596 Plastics, Elastomers, and Additives from Renewable Resources (3 credits)
- 26.610 Plastics Industry Development (3 credits)
- 26.675 Biomaterials II (3 credits)

**Design Electives**

Plastics Engineering students are also required to take a “Design” Elective. Students can select a course from the design elective course list below. Some courses are available only when there is sufficient demand. Students can take an upper level design course offered by another College of Engineering Department if it is approved by the Plastics Engineering Chairperson or Executive Officer. Plastics Engineering students doing a Minor in Business Administration should take 26.537 for their design elective.

- 26.515 Lean Plastics Manufacturing (3 credits)
- 26.523 Screw Design Principles (3 credits)
- 26.531 Design of Automated Assembly Systems (3 credits)
- 26.537 Business Law for Engineers (3 credits)
- 26.541 Computer Applications in Plastics (3 credits)
- 26.549 Product Design for Elastomers (3 credits)
- 26.551 Extrusion Die Design (3 credits)
- 26.552 Machine Design (3 credits)
- 26.553 Medical Device Design I (3 credits)
- 26.554 Medical Device Design II (3 credits)
- 26.576 Advanced Mold Design (3 credits)
- 26.585 Computer Aided Engineering I (3 credits)
- 26.586 Computer Aided Engineering II (3 credits)
- 26.618 Structural Product Design (3 credits)

**Department of Plastics Engineering**

Programs
This program is designed to prepare the graduate for a professional career in the polymer industries of which plastics is the largest. Other segments include rubber, coatings and adhesives.

The Plastics Engineering B.S. Program has been designed to provide a well-rounded and comprehensive level of engineering education, with a curriculum offering a solid foundation in the basic sciences, engineering fundamentals, plastics materials science, processing, mold design, die design, product design testing and characterization. In addition, the program has emphasized interaction and communication skills and laboratory experiences related to plastics materials, properties, processing and design. The program also puts special emphasis on engineering ethics and safety. A list of program outcomes that have been established for the Plastics Engineering program appears below. As a result of such a multi-faceted emphasis students are expected to possess the following skills at graduation:

1. The ability to apply principles of engineering, math, physics, and chemistry to the solution of problems related to: plastics engineering, plastics materials, plastics manufacturing, plastics/polymer characterization, plastics machine design/optimization, plastics mold design/optimization, die design and product design.
2. The ability to critically design, perform and analyze experiments related to plastics processing and testing of plastics materials or products.
3. The ability to design, select materials, and manufacture a given plastics product, or the ability to design and modify manufacturing systems and parameters to meet specified requirements.
4. The ability to use computers in engineering practice, including spreadsheets, graphing programs, and computer aided design or analysis software.
5. The ability to communicate technical information. This includes oral and written reports and an ability to communicate with multi-disciplinary team members.
6. The ability to understand and appreciate the impact of changes in engineering practices on society. This includes issues such as economics, environmental impact, sustainability, ethics and global outsourcing.
7. The ability to understand and appreciate the responsibility of the engineering profession via exposure and interaction with professional societies and the need for continuing and on-going education in the field of plastics engineering.
8. Plastics Engineering graduates shall satisfy the outcome requirements of ABET* Criterion 3:
   - an ability to apply knowledge of mathematics, science and engineering
   - an ability to design and conduct experiments, as well as to analyze and interpret data
   - an ability to design a system, component, or process to meet desired needs
   - an ability to function on multi-disciplinary teams
   - an ability to identify, formulate, and solve engineering problems
   - an understanding of professional and ethical responsibility
   - an ability to communicate effectively
   - the broad education necessary to understand the impact of engineering solutions in a global and societal context
   - a recognition of the need for, and an ability to engage in life-long learning
   - a knowledge of contemporary issues
   - an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

*Accreditation Board for Engineering and Technology

The Bachelor of Science in Engineering (Plastics Engineering) program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org

The program includes sufficient flexibility for further specialization in areas of individual interest. Undergraduates may join the nation's first student chapter of the Society of Plastics Engineers (SPE). The Plastics Engineering Department also has student chapters of the Institute of Packaging Professionals (IoPP), the American Chemical (ACS) Society Rubber Group, and SAMPE.

Since the program started in 1954, approximately 2000 graduates have been employed by polymer industries throughout the United States, South America, Europe, and Asia. Major plastics producers and users recruit annually on campus. While most job openings are in product and process development, plastics materials development, technical service, medical device design and manufacturing, or marketing, some graduates go into research, consulting, or teaching.

**Plastics Engineering Industrial Advisory Board**

Each semester, the faculty and student representatives in the Department of Plastics Engineering meet with a Plastics Industry Advisory Board (PAB). The PAB is comprised of engineers working in leadership positions at their respective companies. The group provides advice on changing industry trends so that the faculty can keep the Plastics Engineering program relevant to industry's needs.

Larry Acquarulo, Jr.
Foster Corporation
Dayville, CT 06241
Erik Bates  
BioProcessors  
Woburn, MA 01801

Charles Burke  
Entec Engineered Resins  
Manchester, TN 37355

Fred Charpentier  
Ferromatik Milacron  
Leominster, MA 01453

Paul Colby  
Spirex Corporation  
Youngstown, OH 44513

Jim Culhane  
Boston Scientific Corp.  
Watertown, MA 02472

John Cuneo  
Rehrig Pacific Corp.  
Raymond, NH 03077

Jim Dandeneau  
Putnam Plastics Corporation  
Dayville, CT 06241

Richard J. Donahue  
Integra Companies, Inc.  
Devens, MA 01432

Nick Fountas  
JLI-Boston  
Boston, MA 02109

Michael V. Gionfriddo  
Quabaug Corporation  
North Brookfield, MA 01535

Kara Goeken  
Boston Scientific  
Natick, MA 01760

Paul Hailey  
Freudenberg-NOK  
Manchester, NH 03103-3388

Mark Hamilton  
Complete Systems Co.  
Warwick, RI 02886

William Hellmuth  
Battenfeld Gloucester Eng.  
Gloucester, MA 01931-0900

Joe Hennessey  
RTP Company  
Chelmsford, MA 01824

Gail Bristol  
Society of Plastics Engineers  
Brookfield, CT 06804

John Hudson  
Keller Products, Inc.  
Manchester, NH 03108-4105

Vishal Kadakia  
Teknor Apex  
Pawtucket, RI 02861

Nickolas Latorre
Policies

Please review the following policies:

- Change of Program
- College of Engineering Faculty (pdf)
- Declaration of Second Major
- Degree Requirements
- Transfer Policies
International Business

The International Business Concentration provides you with the broad range of skills you’ll need for an international career in a rapidly evolving global workplace. Concentration coursework will assist you to:

- Develop an awareness of management concepts, systems and practices in different countries and institutional settings.
- Understand cultural dynamics, economics and political constraints as they affect the marketing and sales aspect of international business.
- Assess and evaluate the financial risks associated with multi-national firms, and address global sourcing strategies. This includes; managing supply and demand uncertainties, distribution strategies for global operations, and managing strategic alliances.
- Learn more about the role that information technology and Enterprise Resource Planning (ERP) plays in managing global supply chains.
- Enhance your understanding of the details and nuances of international trade.

Robotics Minor

To enroll in the minor, fill out a Declaration of Minor form (pdf) and bring it to your department chair.

Robotics Minor Required Courses (7 courses, 21 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>16.265</td>
<td>Logic Design</td>
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<tr>
<td>16.317</td>
<td>Microprocessors Systems Design I</td>
</tr>
<tr>
<td>22.211</td>
<td>Statics</td>
</tr>
<tr>
<td>22.213</td>
<td>Dynamics</td>
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<tr>
<td>22.579</td>
<td>Robotics (to be renamed Dynamics of Robots)</td>
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<tr>
<td>91.450</td>
<td>Robotics I (to be renamed Mobile Robots I)</td>
</tr>
<tr>
<td>91.101</td>
<td>Computing I</td>
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<tr>
<td>OR</td>
<td></td>
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<tr>
<td>16.216</td>
<td>ECE Application Programming</td>
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</tbody>
</table>

Robotics Minor Elective Course (1 course, 3 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.480</td>
<td>Microprocessor Systems II &amp; Embedded Systems</td>
</tr>
<tr>
<td>22.453</td>
<td>Mechatronics</td>
</tr>
<tr>
<td>91.451</td>
<td>Robotics II (to be renamed Mobile Robots II)</td>
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<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>16.216</td>
<td>ECE Application Programming</td>
</tr>
</tbody>
</table>

Robotics

Truly interdisciplinary, Robotics combines computer science, electrical engineering, mechanical engineering, and many other STEM (science, technology, engineering, and math)-related disciplines. UMass Lowell's robotics minor allows students majoring in engineering, computer science, or another science to get the education they need to work in this exciting, ever-evolving field.

- Robotics Minor
- For Computer Science Majors
- For Electrical and Computer Engineering Majors
- For Mechanical Engineering Majors
- For Other Majors

Robotics for Computer Science Majors

The CS curriculum has three free and two technical electives. Students may use these electives to incorporate the courses. Thus, no course overload is required.

Computer Science (CS) majors are required to take Physics I + Lab to satisfy four of their twelve Natural Science Elective units. We also urge CS majors to take Physics II + Lab for another four Natural Science units. CS majors take two courses in Mechanical Engineering, and three in Electrical Engineering.

The course package for CS students is as follows (for full curriculum, scroll down):
1. 91.101 Computing I (Major)
2. 16.265 Logic Design (Major)
3. 16.317 Microprocessors Systems Design I (or 91.203 Assembly Language Programming, Major)
4. 22.211/26.211 Statics (FE)
5. 22.213 Dynamics (FE)
6. 91.450 Mobile Robots I (Major)
7. 22.579 Dynamics of Robots (TE)
8. Robotics Elective (TE)

Important note: 91.450 and 22.579 are not offered every semester. Please contact the Robotics coordinators in Computer Science and Mechanical Engineering (respectively) to help plan your minor.

Summary:
- No extra courses required
- Five out of department courses

Please note:
- "TE" indicates that you may use a department Technical Elective to fulfill this requirement.
- "FE" indicates that you may use a department Free Elective to fulfill this requirement.
- "Extra" indicates that you must fulfill the requirement with an extra course.
- "Major" indicates a course that is already part of the department's degree requirements.

Full Curriculum
- 4-year plan for Computer Science majors

Robotics for Electrical and Computer Engineering Majors
For ECE students, three of the seven core courses are already requirements in their major. An additional two courses can be satisfied as technical electives. Students are required to add two or three additional courses to their program of study (two if they choose Microprocessor Systems II & Embedded Systems as their Robotics Elective).

The course package for ECE students is as follows:
1. 16.216 Application Programming (Major)
2. 16.265 Logic Design (Major)
3. 16.317 Microprocessors Systems Design I (Major)
4. 22.211/26.211 Statics (Extra)
5. 22.213 Dynamics (Extra)
6. 91.450 Mobile Robots I
7. 22.579 Dynamics of Robots (TE)
8. Robotics Elective

Important note: 91.450 and 22.579 are not offered every semester. Please contact the Robotics coordinators in Computer Science and Mechanical Engineering (respectively) to help plan your minor.

Summary:
- Two or three extra courses
- Four out of department courses

Please note:
- "TE" indicates that you may use a department Technical Elective to fulfill this requirement.
- "FE" indicates that you may use a department Free Elective to fulfill this requirement.
- "Extra" indicates that you must fulfill the requirement with an extra course.
- "Major" indicates a course that is already part of the department's degree requirements.

Robotics for Mechanical Engineering Majors
Mechanical Engineering (ME) students take foundational courses in computing and computer engineering to prepare for the upper level courses that comprise the minor.

The course package for ME students is as follows:
1. 16.216 Application Programming or 91.101 Computing I (Extra)
2. 16.265 Logic Design (Extra)
3. 16.317 Microprocessors Systems Design I (Extra)
4. 22.211 Statics (Major)
5. 22.213 Dynamics (Major)
6. 91.450 Mobile Robots I (TE)
7. 22.579 Dynamics of Robots (TE)
8. Robotics Elective (TE)

Important note: 91.450 and 22.579 are not offered every semester. Please contact the Robotics coordinators in Computer Science and Mechanical Engineering (respectively) to help plan your minor.

Summary:
- Three extra courses
- Four out of department courses

Please note:
- “TE” indicates that you may use a department Technical Elective to fulfill this requirement.
- “Extra” indicates that you must fulfill the requirement with an extra course.
- “Major” indicates a course that is already part of the department's degree requirements.

Robotics for Other Majors

In addition to the package of seven core courses and one elective below, you are required to take Calculus I and II, Physics I and II (the calculus-based versions, with labs), and a math course that includes linear algebra.

Students from any appropriate science or engineering major are eligible to enroll in this minor. The Robotics Minor provides you with a true interdisciplinary program in robotics, while allowing you to receive an undergraduate degree in the major of your choice.

Robotics Minor Required Courses (7 courses, 21 credits)

1. 91.101 Computing I or 16.216 ECE Application Programming
2. 16.265 Logic Design
3. 16.317 Microprocessors Systems Design I
4. 22.211 Statics
5. 22.213 Dynamics
6. 91.450 Robotics I (to be renamed Mobile Robots I)
7. 22.579 Robotics (to be renamed Dynamics of Robots)

Important note: 91.450 and 22.579 are not offered every semester. Please contact the Robotics coordinators in Computer Science and Mechanical Engineering (respectively) to help plan your minor.

Robotics Minor Elective Course (1 course, 3 credits)

1. 16.480 Microprocessor Systems II & Embedded Systems
2. 22.453 Mechatronics
3. 91.451 Robotics II (to be renamed Mobile Robots II)
4. Department-specific Capstone or Senior Project course
5. Other course with prior approval of Robotics Minor Committee

Important note: These elective courses are not offered every semester. Please contact the Robotics coordinator in the respective department to help plan your minor.

Policies

Please refer to the following policies:

- Academic Advising
- Academic Requirements
- Appeals Procedure for Reinstatement
- Declaration of Change of Program
- Organization and Governance
- Requirements for Continued Matriculation
- Retention and Continuance
- Special School Requirements
- Transfer Policies

Online Graduate & Undergraduate Degrees & Part-Time Programs

UMass Lowell offers a number of graduate degrees and certificates and part-time undergraduate degrees and certificates entirely online, or as a mix of online and on-campus courses through its Division of Online and Continuing Education. By
making the courses available online - during the evening and on weekends - the University makes it easier for busy professionals to fit education into their lives.

**General Biology Option**

This option provides the student with a broad depth in the Biological sciences. All the requirements needed for students pursuing health professions (MD, PA, DVM, DDS, etc...) are included in this option.

Option Requirements (in addition to the core requirements listed above)

Required courses – 14 to 16 credits

In addition to the core requirements listed above, the student must complete four (4) additional 300-400 level biology courses selected from among all biology listings (“81” prefix), two (2) of which must contain the corresponding laboratory component. The two courses with a laboratory component may be replaced by completing two semesters of senior research (81.411 and 81.412).

Although Calculus for Life Sciences II (92.139) is not required, students pursuing post-graduate studies are strongly encouraged to take this course as a free elective. Consult with your advisor.

View the complete [General Biology Option Curriculum Checksheet](#) (pdf).

**Technical Standards**

**Clinical Laboratory and Nutritional Sciences Admission, Continuation and Graduation**

The goal of the University of Massachusetts Lowell, Department of Clinical Laboratory & Nutritional Sciences is to prepare entry level practitioners in Clinical Laboratory and Nutritional Sciences. This preparation specifically requires the accumulation of scientific knowledge and essential skills necessary to accurately and safely work in a variety of clinical, industrial, research and academic settings.

The faculty of the Department of Clinical Laboratory and Nutritional Sciences has the responsibility to accept and graduate students who are well educated and possess the qualities of critical thinking, sound judgment, emotional stability, maturity, mental stamina, and empathy. In order to fulfill this responsibility, the faculty of the department maintains that certain minimal essential functions must be met in a timely manner by every applicant, with or without reasonable accommodations or academic adjustments consistent with the Americans with Disabilities Act. Students who feel they may not be able to meet one or more of the Essential Functions described below should contact their faculty adviser or Program Director for clarification.

**Communication skills**

- Communicate effectively in written and spoken English
- Comprehend and respond to both formal and colloquial English person to person, by telephone, and in writing
- Appropriately assess nonverbal and verbal communication
- Maintain body language that portrays alertness, confidence, interest and a professional demeanor
- Relate to students, instructors, patients, and members of the healthcare team, demonstrating calmness and reasoned judgment

**Large and small motor skills**

- Move freely from one location to another in physical settings such as clinical laboratories, patient care areas, schools, corridors, and elevators
- Use computers in data entry, administration, and education with facility
- Perform delicate manipulations of specimens, instruments, and tools with facility and accuracy
- Grasp and release small objects (e.g. test tubes, pipette tips, microscope slides and coverslips); twist and turn
- dials/knobs (e.g. on microscopes, balances, centrifuges, spectrophotometers)
- Manipulate other laboratory materials (e.g. reagents and automated pipettes)

**Professional and application skills**

- Follow written and verbal directions
- Apply mathematical skills necessary in job related problems
- Work independently and with others under time constraints
- Prioritize requests and work concurrently on at least two different tasks and react to changing roles quickly
- Maintain alertness and concentration during a normal work period
- Apply knowledge, skills, and values learned from course work and life experiences to new situations
- Exercise good judgment, function effectively and display flexibility under stress, (e.g. frequent interruptions, noise levels and unexpected situations)
- Recall, interpret, analyze, synthesize, evaluate and then apply the information obtained from reading, lecture, and discussion materials
- Show respect for self and others
- Project an image of professionalism including appearance, dress, and confidence
- Function effectively using all necessary skills under normal working conditions
- Recognize emergency situations and take appropriate actions
- Work safely with potential chemical, radiological, and biological hazards using the standards established in the department chemical hygiene plan, safety manual, and the blood-borne pathogen policy
- Problem solve and comprehend spatial relationships of structures
- Follow all institutional, local, state and federal regulations related to the medical laboratory
- Students must have the ability to complete reading assignments and search and evaluate the literature
- Maintain student and patient confidentiality

**Other physical requirements**

- Identify and distinguish objects macroscopically and microscopically, including color and clarity
- Read charts, graphs, and instrument scales/readout devices accurately
- Lift and move objects of at least 20 pounds
- Distinguish objects by touch and temperature

Essential Functions adapted from: Body of Knowledge, American Society of Clinical Laboratory Sciences, 1998.

No applicant with a disability is required to disclose that disability as part of the application process. If reasonable accommodations and/or academic adjustments are required based on a documented disability it is the student’s responsibility to contact Disability Services.

Phone: 978-934-4574
Email: Disability@uml.edu

**Academic Progression Policy**

As part of the College of Health Sciences, the Clinical Laboratory Sciences (Clinical Science and Medical Laboratory Science Options) and Nutritional Science Programs have the following academic policies for students to successfully progress in and complete the baccalaureate program.

Freshmen students not meeting the below criteria will be sent a warning letter. First semester transfer students not meeting the below criteria will also be sent a warning letter.

First semester sophomore year students and higher and second semester transfer students and higher not meeting the below criteria will be sent a letter dropping them from the program. Students may send a letter to petition for their reinstatement. The Department Professional Review Committee will review the petition and decide to either reinstate the student with conditions to be met by a certain deadline or to drop the student from the program with no further appeal. Students that are reinstated and do not meet the criteria will be dropped from the program with no further appeal.

**Department Academic Policies**

1. Overall cumulative GPA must be a 2.5 or greater
2. Semester GPA must be a 2.5 or greater
3. No grade lower than C in courses listed as Designated Professional Courses*
4. No withdrawal from a Designated Professional Course.*
5. Medical Laboratory Science option only
   - Basic science GPA must be a 2.5 or greater
   - Anatomy and Physiology I & II Lecture and Lab
   - Physiological Chemistry I & II Lecture and Lab
   - Basic Clinical Microbiology Lecture and Lab
   - Organic Chemistry Lecture and Lab
   - Clinical Laboratory Theory Lecture and Lab
6. Clinical Science option
   - Must have a grade of at least a C in a course to be used to meet the Science Specialization requirement

*List of “Designated Professional Courses” will be supplied by the department.
German Studies Minor

Contact: Department of Cultural Studies
Phone: 978-934-4701
Office: Coburn Hall 113

A minor in German Studies consists of 18 to 24 credits (6 to 8) courses, at least two courses at the 300 level from the section of electives, including the following requirements:

Language Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>51.101</td>
<td>German 1 and Culture</td>
</tr>
<tr>
<td>51.102</td>
<td>German 2 and Culture</td>
</tr>
<tr>
<td>51.211</td>
<td>German 3 and Culture</td>
</tr>
<tr>
<td>51.212</td>
<td>German 4 and Culture</td>
</tr>
</tbody>
</table>

Selection of Electives:

Students may take 2 to 4 courses from the list below, two of which (6 credits) must be at the 300 level or above:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.231</td>
<td>Renaissance &amp; Reformation</td>
</tr>
<tr>
<td>43.242</td>
<td>World War II</td>
</tr>
<tr>
<td>43.304</td>
<td>European Economic &amp; Social History</td>
</tr>
<tr>
<td>43.337</td>
<td>Germany since 1871</td>
</tr>
<tr>
<td>45.323</td>
<td>Phil. Classics: Nietzsche</td>
</tr>
<tr>
<td>45.352/59.352</td>
<td>Existence and Society</td>
</tr>
<tr>
<td>46.384</td>
<td>Int. Politics of Human Rights</td>
</tr>
<tr>
<td>46.445</td>
<td>Politics/Repression &amp; Dissent</td>
</tr>
<tr>
<td>48.317</td>
<td>Sociology of Genocide</td>
</tr>
<tr>
<td>51.492</td>
<td>Directed Study in German Composition</td>
</tr>
<tr>
<td>51.495</td>
<td>Advanced German Tutorial</td>
</tr>
<tr>
<td>PCS.545</td>
<td>Politics/Repression &amp; Dissent</td>
</tr>
</tbody>
</table>

Art History Minor

Contact: Department of Cultural Studies
Phone: 978-934-4701
Office: Coburn Hall 113

A minor in Art History consists of 18 to 24 credits (6 to 8) courses, at least two courses at the 300 level from the section of electives, including the following requirements:

Selection of Art History Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>58.101</td>
<td>Art Appreciation</td>
</tr>
<tr>
<td>58.105</td>
<td>Comparative Arts</td>
</tr>
<tr>
<td>58.302</td>
<td>History of Art I: Prehistoric to Medieval Art</td>
</tr>
<tr>
<td>58.204</td>
<td>History of Art II: Renaissance to Modern Art</td>
</tr>
<tr>
<td>58.206</td>
<td>History of Architecture</td>
</tr>
<tr>
<td>58.211</td>
<td>19th Century Art</td>
</tr>
<tr>
<td>58.221</td>
<td>20th Century Art</td>
</tr>
<tr>
<td>58.225</td>
<td>History of Picturing</td>
</tr>
<tr>
<td>58.231</td>
<td>Greek and Roman Art</td>
</tr>
<tr>
<td>58.300</td>
<td>Art History, Music and Culture</td>
</tr>
<tr>
<td>58.313</td>
<td>American Art</td>
</tr>
<tr>
<td>58.314</td>
<td>American Architecture</td>
</tr>
<tr>
<td>58.315</td>
<td>Modern Architecture</td>
</tr>
<tr>
<td>58.321</td>
<td>Italian Renaissance Art</td>
</tr>
<tr>
<td>58.330</td>
<td>Italian Mannerism</td>
</tr>
</tbody>
</table>
Clinical Laboratory Sciences

The Clinical Laboratory Sciences degree provides students with a quality education in the biomedical sciences and life long laboratory skills. Students take a core of laboratory science courses including Clinical Chemistry, Clinical Hematology, Clinical Immunology and Medical Bacteriology.

The academic program includes scientific and clinical knowledge using current methodology, instrumentation and techniques relevant to the biomedical laboratory. Students can elect to enroll in the five-year BS/MS program and take courses in their senior year that will count toward the Master’s degree.

The Clinical Laboratory Sciences degree offers two options:

Clinical Science option

Student pursuing the Clinical Science option obtain advanced coursework and independent research experiences under department faculty supervision. During Directed Study and Senior Research courses, emphasis is placed on the theories and techniques utilized in clinical laboratory research. Many students have presented their research results at state, regional, and national science meetings, and have been co-authors of papers published in respected science journals.

The Clinical Science Option allows students to select science specialization courses according to their interest. The choice of up to sixteen credits of free electives allows students planning to pursue specific graduate programs the ability to fulfill required prerequisites.

For more information see Clinical Science option.

Medical Laboratory Science option

Medical Laboratory Science combines the challenges and rewards of both medicine and science. The Medical Laboratory Science option is a science based program that will prepare students for entry-level laboratory positions and a future in a constantly growing area of health care. Students pursuing the Medical Laboratory Science option will acquire the clinical laboratory technical skills as well as the medical knowledge required to provide physicians and other health care professionals essential information about the diagnosis, treatment and monitoring of disease.

The curriculum consists of classroom lectures and on-campus student laboratory experiences in each of the clinical laboratory disciplines. These sessions provide the foundation for subsequent hands-on clinical practice in off-campus clinical laboratories of affiliated hospitals and reference laboratories.

After completing their degree, students are qualified to sit for the Board of Certification examination for Medical Laboratory Scientists offered by the American Society of Clinical Pathology (ASCP).

This program is fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N. River Rd. Suite 720 Rosemont, IL 60018-5119, Phone: 847-939-3597 or 773-714-8880, e-mail: info@naacls.org, and the National Accrediting Agency for Clinical Laboratory Sciences website.

For more information see Medical Laboratory Science option.

Criminal Justice Minor

A minor in Criminal Justice will provide students with knowledge of the different components of the criminal justice system (the police, the courts, and corrections), and about the different stages in the criminal justice process. Students will also develop an understanding of the different etiological bases and patterns of crime and the relationship between the causes of crime and the social control apparatus. All criminal justice courses seek to instill critical thinking, the importance of ethical
decision making and an understanding of diversity.

Requirements

The minor in Criminal justice requires six (6) courses (18 credits), including four (4) lower-level courses which are also required for majors.

Required Courses (12 credits)

- 44.101 The Criminal Justice System
- 44.141 Police Process
- 44.151 Introduction to Corrections
- 44.221 Criminology

Criminal Justice Minor Electives – Choose two (2) of the following upper-level course (6 credits)

- 44.323 White Collar and Elite Deviance
  Pre-Req: 44.101 The Criminal Justice System and 44.221 Criminology
- 44.326 Hate Crime
  Pre-Req: 44.101 The Criminal Justice System
- 44.327 Violence in America
  Pre-Req: 44.101 The Criminal Justice System or 44.221 Criminology
- 44.341 International Perspectives on Crime and Crime Control
  Pre-Req: 44.101 The Criminal Justice System
- 44.342 Criminal Profiling
- 44.343 Forensic Psychology
- 44.360 Gender, Race, and Crime
- 44.370 Criminal Justice Management
  Pre-Req: 44.101 The Criminal Justice System
- 44.385 Crime and Mental Illness
  Pre-Req: 44.101 The Criminal Justice System or 44.221 Criminology
- 44.387 Criminal Mind and Behavior
  Pre-Req: 44.101 The Criminal Justice System or 44.221 Criminology
- 44.401 Substance Abuse and Crime
  Pre-Req: 44.101 The Criminal Justice System or 44.221 Criminology, Junior/Senior standing only
- 44.422 Victimology
  Pre-Req: 44.101 The Criminal Justice System or 44.221 Criminology, Junior/Senior standing only
- 44.425 Law and Public Policy
  Pre-Req: 44.221 Criminology, Junior/Senior standing only
- 44.477 Intimate Partner Violence
  Pre-Req: Junior/Senior standing only
- 44.478 Child Maltreatment
  Pre-Req: Junior/Senior standing only

Learning Outcomes

The Undergraduate (BSBA) Learning Goals and Objectives:

GOAL 1: Our students shall have oral and written communication skills regarding business-related information.

In written communication our students will be able to:

- Identify and adapt to audience needs
- Have a clear purpose
- Convey an effective introduction
- Develop a sequential series of logical arguments
- Use factual support effectively and correctly
- Convey an effective conclusion
- Use proper grammar and punctuation

In oral communication our students will be able to:

- Identify and adapt to audience needs
- Have a clear purpose
- Convey an effective introduction
- Develop a sequential series of logical arguments
- Use factual support effectively and correctly
- Convey an effective conclusion
- Engage the audience by using a fluent conversational style
- Integrate visual support and presentational technologies effectively

GOAL 2: Our students shall have quantitative and qualitative functional area knowledge and skills.

Students will show their ability to make data-driven decisions demonstrating:
Students will show their ability to make data-driven decisions demonstrating:

- Knowledge of principles and techniques
- Basic application to simple problems
- More advanced application to more complex problems
- Effective decision-making requiring all levels of knowledge and application

**GOAL 3: Our students shall have team membership skills.**

Successful students will demonstrate these skills by:

- Participating in the development of a workable communication system among team members outside of class
- Contributing to the creation of positive performance expectations/encouraging the team as a whole when necessary
- Respecting the time of others and showing up promptly to meetings
- Being a good teammate by ensuring that everyone has an appropriate amount of “air time” to let their ideas be heard
- Being tolerant of minority points of view
- Completing assigned tasks in a timely fashion

**GOAL 4: Our students shall have skills in the use of information and communication technologies**

Students are measured on their ability to analyze a business problem situation and apply software skills to provide a technical solution using software.

Successful students will demonstrate their knowledge by showing:

- An understanding of the critical issues in a problem the by decomposing the main issue into sub-problems
- An awareness of the software features to solve the related problem
- The final software solution as required to solve the problem

**GOAL 5: Our students shall have an awareness of global changes affecting business and the ability to use this knowledge in business decision-making**

Successful students will provide evidence of their global awareness by:

- Identifying, comparing and contrasting cultural differences and how these differences affect best practice
- Displaying an understanding of global practices normally considered in business decision-making

**The Concentration in Education**

The BLA concentration in Education provides students with knowledge of the field of elementary education. The concentration includes courses in the language arts, elementary mathematics, and educational psychology. Students will develop knowledge of issues, theories and practices in elementary education, an understanding of the diversity of learners, and the ability to assess and account for cultural and language influences, as well as the impact of learning disabilities, on learning. Students will be called on to demonstrate effective communication skills, professional collaboration and enthusiasm for developing lifelong habits that facilitate reflection, clear thinking, critical judgment, innovation and problem-solving. As students in this concentration may consider elementary education as a career, appropriate types of professional behaviors are required at all times.

**Requirements**

A minimum of 8 courses:

*Three required foundations courses:*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.371</td>
<td>Educational Psychology</td>
</tr>
<tr>
<td>01.403</td>
<td>Child Development and Diversity</td>
</tr>
<tr>
<td>01.405</td>
<td>Children with Disabilities</td>
</tr>
</tbody>
</table>

*Five required courses in language arts and mathematics:*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.384</td>
<td>Language, Literacy &amp; Culture</td>
</tr>
<tr>
<td>42.298</td>
<td>Children's Literature</td>
</tr>
<tr>
<td>92.227</td>
<td>Elementary Math for Teaching: Geometry</td>
</tr>
<tr>
<td>92.107</td>
<td>Elementary Math for Teaching: Numbers &amp; Operations</td>
</tr>
</tbody>
</table>

**NOTE:** Students may apply to the BLA/M.Ed. fast track in Elementary Education the Fall semester of their senior year. If admitted, students will take two graduate courses, in addition to the BLA concentration courses, in their senior year. Upon graduation from the BLA, students in the fast track can then complete the M.Ed. in elementary education in three semesters: Summer - Fall - Spring.

**01.371 Educational Psychology**
Course ID: 2310

Course Details: An introduction to the study of human learning, this course covers topics such as efficiency in learning, testing, the psychology of learning, and theories of learning. For undergraduates only.

Max Credits: 3
Min Credits: 3

01.391 Understanding Education

Course ID: 2313

Course Details: The aim of the course is to assist students to build knowledge about educational structures and roles in diverse settings as they consider how education could figure as a calling. Using a broad range of inquiry methodologies and technologies, students will explore areas of self-selected interest in formal educational settings (K-12 or higher education) or informal educational settings (community or health settings, policy, etc.). These explorations will culminate in case presentations in the form of digital stories, in which students will share their findings and discuss future goals in the area of education.

Max Credits: 3
Min Credits: 3

26.001 Plastics Safety Lecture

Course ID: 4147

Course Details: All Plastics Engineering students enrolled in a plastics laboratory course are required to attend a one hour per week safety lecture for safety training.

Max Credits: 0
Min Credits: 0

26.002 Plastics Safety Lecture

Course ID: 4148

Course Details: All Plastics Engineering students enrolled in a plastics laboratory course are required to attend a one hour per week safety lecture for safety training. Continuation of 26.001.

Max Credits: 0
Min Credits: 0

46.337 Civil Liberties Law & Politics

Course ID: 5626

Course Details: A study of constitutional law focused on the evolution of the civil liberties decisions of the Supreme Court. The course will discuss the case law on freedom of religion, freedom of speech, freedom of the press, gun rights, search and seizure, rights of the accused, privacy, and other controversies that reflect the balance of liberty and authority in a free society.

Max Credits: 3
Min Credits: 3

46.338 Political Participation

Course ID: 5627

Course Details: Political movements; voting and elections, parties and interest groups; civil disobedience in American politics. Consideration of causes, fluctuations and trends.

Max Credits: 3
Min Credits: 3
46.340 American Politics And Law

Course ID: 5628

Course Details: Perspectives on American Politics and Law. Advanced study involving extensive reading, writing and discussion seeking understanding of the major transformations impacting contemporary American Society, Politics, Law, Economics and Culture; consideration of different interpretations of these changes, and the ways in which they are manifested in shifting political attitudes and coalitions, and new problems and conflicts.

Max Credits: 3
Min Credits: 3

46.341 Equal Rights

Course ID: 5629

Course Details: Advanced study in law and politics involving extensive reading, writing and discussion of the complex interrelationship between social change and the development of constitutional doctrine focusing upon the area of Equal Rights.

Max Credits: 3
Min Credits: 3

46.343 Congress

Course ID: 5631

Course Details: Legislative Politics. An advanced study of representation, campaigns and elections, and the functioning of the American national congress within the American political system.

Max Credits: 3
Min Credits: 3

46.344 American Presidency

Course ID: 5632

Course Details: An examination of the nature of the American presidency and its functioning within the American political system. Specific attention is given to the problems and evolution of the presidency since World War I.

Max Credits: 3
Min Credits: 3

46.350 Urban Politics and Policy

Course ID: 5637

Course Details: A study of political power in, and the political structures of urban areas and the major issues and conflicts currently confronting them.

Max Credits: 3
Min Credits: 3

46.351 Irish Politics

Course ID: 35710

Course Details: For students of Politics, Ireland is perhaps one of the most fascinating examples of a territory that has undergone, and continues to undergo dramatic transformations in its governing structures, its passionate struggles for freedom, civil wars, colonial resistance and modern nationalism. This class will study the political history of Ireland before and during its time as a part of the United Kingdom, through the partition of the island into two states, and up to the modern politics of both the Republic of Ireland and the British state of Northern Ireland. We will examine the results of the 1998 "Good Friday Agreement". Then we will dissect and evaluate modern Irish institutions of government, in the Republic and in the North. Students will research the competing ideologies and present arguments supporting the parties and organizations that propound these ideologies, like Sinn Fein, the IRA, the Uster Unionist Party and Unionist paramilitaries in the North; the Fine
Gael and Fianna Fail in the South.

Max Credits: 3
Min Credits: 3

**46.353 Public Policy and Administration**

Course ID: 5639

Course Details: An examination of the little studied fourth branch of government. Bureaucratic power in the American political system is reconsidered.

Max Credits: 3
Min Credits: 3

**46.355 Government Fiscal Policy**

Course ID: 5641

Course Details: An examination of government's budgetary, taxation and expenditure decisions and activities.

Max Credits: 3
Min Credits: 3

**46.357 Thoreau in Our Time**

Course ID: 5643

Course Details: This course traces Henry David Thoreau's influence on major social and political transformations in American history from the abolitionist movement to the present day. We will focus first on Thoreau's writings on slavery, commercial development, environmental history, and individual liberty. Then we will study his formative role in the civil rights and environmental movements of the twentieth century. Finally, through a mix of outside speakers and student presentations, we will explore how his writings continue to shape ongoing struggles to contend with climate change, advance social justice, and promote a greater sense of fairness in American life. The course will involve at least one trip to Walden Pond and a tour of Thoreau's birthplace in Concord, Massachusetts. Course page: http://faculty.uml.edu/sgallagher/Thoreau_in_Our_Time.html.

Max Credits: 3
Min Credits: 3

**46.358 Global Environmental Policy**

Course ID: 5644

Course Details: This course explores contemporary international environmental issues from both theoretical and policy perspectives; consideration too of broader forces impacting international environmental politics.

Max Credits: 3
Min Credits: 3

**46.359 British Politics**

Course ID: 5645

Course Details: The context, background and forces shaping the contemporary politics of Great Britain.

Max Credits: 3
Min Credits: 3

**46.360 European Politics**

Course ID: 5646

Course Details: An analytical examination of selected modern European political systems, emphasizing similarities and differences in political culture, behavior, institutions, and performance.
Max Credits: 3
Min Credits: 3

46.363 Politics of China
Course ID: 5649
Course Details: A study of the recent development of governmental institutions, parties, and ideology in China. Emphasis is placed on the processes of nation-building in the post World War II period.
Max Credits: 3
Min Credits: 3

46.366 Russian Politics
Course ID: 5652
Course Details: Conflict and Change in the former Soviet Union. An examination of the relationship of politics to the functioning of post-Soviet societies. The influence of politics on economy, education, family life, religion, etc.
Max Credits: 3
Min Credits: 3

46.368 Middle Eastern Politics
Course ID: 5654
Course Details: Utilizes an appreciation of Middle Eastern attitudes and values in developing insight into the tensions within the Middle East and between the Middle East and the western world.
Max Credits: 3
Min Credits: 3

46.370 Latin American Politics
Course ID: 5656
Course Details: The context, background and forces shaping the contemporary politics of the Latin American region.
Max Credits: 3
Min Credits: 3

46.371 Caribbean Politics
Course ID: 5657
Course Details: A comparative study of the political, social, cultural and economic forces that have led to the current situations in the countries of the Caribbean area (Mexico, Central America and the islands).
Max Credits: 3
Min Credits: 3

THEA.201 Introduction to Theatre
Course ID: 37380
Course Details: This course explores the arts and practices of theatre from classical to contemporary times. Students are introduced to the basic concepts and forms of theatre as well as to theories of its origins and purposes. Replaces 42.219 and 59.219; credit may not be earned for both 42/59.219 and THEA 201.
Max Credits: 3
Min Credits: 3
THEA.261 Acting 1

Course ID: 37383

Course Details: Theory and practice of acting including exercises in the elements and methods of acting and the preparation of a public performance. Replaces 42.261 and 59.261; credits may not be earned for both 42/59.261 and THEA 261.

Max Credits: 3
Min Credits: 3

THEA.262 Acting 2

Course ID: 37384

Course Details: A continuation of THEA 261 emphasizing techniques of scene study and characterization. Pre-requisite THEA 261 or the equivalent. Replaces 42/59.262; credits may not be earned for both 42/59.262 and THEA 262.

Max Credits: 3
Min Credits: 3

THEA.265 Voice and Movement

Course ID: 37534

Course Details: To discover the possibilities of your unique voice and physicality, to gain techniques to free up tension, release habitual blocks and inhibitions, and to explore creative expression through the voice and body, ultimately applying all of these elements to performance. This course uses techniques designed for voice, movement, and physical acting including Linklater, Alexander, Viewpoints, Grotowski, Yakim and others.

Max Credits: 3
Min Credits: 3

THEA.311 Play Production

Course ID: 37386

Course Details: Introduction to the design and technical aspects of theatre through hands-on experience working on campus productions. Focus on basic principles of set, lighting, props, costume, makeup, and sound production. May be repeated for credit.

Max Credits: 3
Min Credits: 3

THEA.340 Directing Workshop

Course ID: 37385

Course Details: Study of the process of directing plays of different styles. Students will direct scenes with other members of the workshop and their work will be analyzed by the instructor and fellow students. Replaces 42.343 and 59/343; credits may not be earned for both 42/59.343 and THEA 340.

Max Credits: 3
Min Credits: 3

THEA.401 Topics in Theatre

Course ID: 37389

Course Details: Advanced study of a selected area of theatrical production, history, texts, or theory. Repeatable for credit when topics differ. Replaces 42.414 and 59.414; repeated credit may only be earned when topics differ.

Max Credits: 3
Min Credits: 3
THEA.490 Performance Practicum

Course ID: 37388

Course Details:
Max Credits: 1
Min Credits: 1

THEA.493 Practicum in Theatre

Course ID: 37391

Course Details: Part-time, full-semester internship at a professional theatre. Program director's permission required. Replaces 42.495 and 59.495; may be repeated for credit with permission.
Max Credits: 3
Min Credits: 3

THEA.495 Senior Seminar in Theatre

Course ID: 37753

Course Details: Capstone-experience seminar focusing on advanced projects (in performance, dramaturgy, or design/tech) in the service of portfolio building and preparation for graduate study and/or work in the professional world of theatre. To be taken during the student's final year in the program. Instructors Consent required.
Max Credits: 1
Min Credits: 1

UTL.101 STEP 1: Inquiry Approaches to Teaching

Course ID: 37449

Course Details: This course provides students with an introduction to teaching in order for them to explore a career as a middle or high school math or science teacher. During the courses, students pairs teach math and/or science lessons in a local elementary school classroom and receive feedback from a mentor teacher. Additionally, students are introduced to the theory and practice that is necessary to design and deliver excellent instruction. This course is the first step for those students interested in exploring the STEM TEACHING MINOR with UTeach UMass Lowell.
Max Credits: 1
Min Credits: 1

UTL.102 STEP 2: Inquiry Based Lesson Design

Course ID: 37450

Course Details: Students who are exploring teaching as a career become familiar with the middle school setting by observing and discussing the middle school environment, and by teaching several lessons in a middle school classroom. They build upon and practice lesson design skills that were developed in Step 1 and also become familiar with excellent science and mathematics curricula for the middle school setting.
Max Credits: 1
Min Credits: 1

UTL.201 Knowing and Learning in Math and Science

Course ID: 37642

Course Details: The course starts by imparting the understanding that there is a science to learning and by having students examine ideas of what it means for an individual to know or understand something. This course focuses on several essential questions which enable students to explore how knowing and learning are structured with specific emphasis on mathematics and science. Students will come to understand what it means to know something, how we can understand student thinking and how theories of learning inform instructional decisions; in particular students will explore the idea that learning is a social activity. Students are prompted to reflect on their own ways of looking at various ideas and concepts and to consider...
alternative perspectives. Students will conduct an analysis of reasoning processes through a clinical interview process, one-on-one with learners engaging in problem solving. This course is required for the STEM TEACHING MINOR.

Max Credits: 3  
Min Credits: 3

**WLS.240 Work, Labor and Society**

Course ID: 37049

Course Details: This foundational course has two overarching learning objectives: (1) to give students basic empirical knowledge and analytical tools to understand the context of work in the United States at the dawn of the twenty-first century and (2) to give students an understanding of how labor unions work, what has been their impact historically, and what their role is in contemporary society. Lowell and the Merrimack Valley will be used as a lens through which to examine these larger work and labor issues. The course will be explicitly interdisciplinary, drawing on readings from history, sociology, economics, political science, and psychology to offer an introduction to understanding work and labor through and analytic lens. In addition, the course will include a service-learning component in collaboration with the UML Labor Extension Program.

Max Credits: 3  
Min Credits: 3

**WLS.410 Internship in Work, Labor and Society**

Course ID: 37051

Course Details: This internship option allows students to take full advantage of the substantial links to the community that the UML Labor Extension program has built over many years of work in this region. The internship provides opportunities for students to learn through thoughtful engagement in community service, applying knowledge of work/labor issues gained in the classroom to the world outside the classroom. Students will be expected to spend a minimum of 100 hours during the semester at the internship site, and to have a designated supervisor on site as well as a faculty supervisor overseeing their work and ensuring it is a meaningful learning experience.

Max Credits: 3  
Min Credits: 3

**01.373 Teaching and Learning with Technology**

Course ID: 2311

Course Details:

Max Credits: 3  
Min Credits: 3

**02.301 Early Literacy Community Experience I**

Course ID: 37208

Course Details: This is Part One of a two semester course that focuses on experiential learning associated with the Jumpstart Program. The course provides students in the education minor with the necessary skills for working with children in early childhood community agencies. Topics based on the National Association for the Education of Young Children (NAEYC) Standards which include child development, family and community, assessment, teaching and learning, literacy development, and professionalism will be the focus of the course.

Max Credits: 3  
Min Credits: 3

**02.302 Early Literacy Community Experience II**

Course ID: 37209

Course Details: This is Part Two of a two semester course that enhances the experiential learning of students in the education minor participating in the Jumpstart Program. Building on the knowledge base of the first semester, the course allows students to deepen their understanding of the social, emotional and behavioral needs of children in early childhood settings and reflect on how they have integrated what they learned during the experience.
02.401 Exploring Teaching

Course ID: 31976

Course Details: This course is for third and fourth year undergraduates who are considering teaching as a career. Focusing on students, teachers, classrooms and schools, the course will provide an overview of the historical, philosophical, legal and societal influences that shape education today. Field work in an elementary, middle or high school will be an integral component of the course.

Max Credits: 3
Min Credits: 3

02.420 Elementary Mathematics for Teaching: Numbers and Operations

Course ID: 2374

Course Details: This course examines the topic of Number and Operations for teaching mathematics to Elementary School students. The philosophy and content of this course reflect the National Council of Teachers of Mathematics Curriculum Focal Points for Pre-Kindergarten through Grade 8 Mathematics, as well as the Massachusetts Mathematics Curriculum Frameworks and the Common Core State Standards.

Max Credits: 3
Min Credits: 3

02.443 Methods of Teaching

Course ID: 33179

Course Details: Examines the methods of teaching students with moderate disabilities. Topics include curriculum (including the Massachusetts frameworks), IEPs, and instructional modifications appropriate for students with special needs.

Max Credits: 3
Min Credits: 3

10.101 Technology and Human Built World

Course ID: 30309

Course Details:

Max Credits: 3
Min Credits: 3

10.201 Material Balances

Course ID: 30311

Course Details: Introduction to the field of chemical engineering and solution of problems involving units and dimensions, mass balances, flow sheets and gas relationships.

Max Credits: 3
Min Credits: 3

10.202 Energy Balance & Introduction to Thermodynamics

Course ID: 30312

Course Details: Continuation of Chemical Engineering Calculations I including real gas relationships, humidity, energy balances, and the combined mass-energy balance systems. Introduction to the first law of thermodynamics.

Max Credits: 3
Min Credits: 3

10.303 Fluid Mechanics

Course ID: 32001

Course Details: This course introduces the student to several fundamental concepts and applications of fluid mechanics. It overviews the basic properties of fluids, the study of fluid statics and fluid flow systems, and the development and application of the appropriate mass, momentum, and energy balance relationships needed to solve a variety of practical problems, with a particular focus on the macroscopic view. Emphasis is on the ability to apply the basic principles to the design and analysis of engineering systems involving applications in hydrostatics, internal, open-channel, and external flows, pump selection, flow measurement, etc. The course also focuses on proper problem solving strategy and on the correct use of units in engineering analysis.

Max Credits: 3

Min Credits: 3

10.304 Heat Transfer

Course ID: 33342

Course Details: Fundamental principles of heat transmission by conduction, convection, radiation and evaporation. Applications of these principles to the solution of industrial heat transfer problems and to the design calculations for heat exchange situations.

Max Credits: 3

Min Credits: 3

10.308 Introduction to Material Science and Engineering

Course ID: 2866

Course Details: A general overview of solid materials which are likely to be considered for engineering applications in, or be produced by the chemical process industries. They will be discussed from the viewpoints of their units structures, appropriate phase diagrams, their chemical and physical attributes, and the association of these to end use applications. Discussion of metals, ceramics, polymers, and to a limited degree, composites.

Max Credits: 3

Min Credits: 3

10.310 Separation Processes with Mass Transfer

Course ID: 2867

Course Details: Introduction to equilibrium staged and other separations, including distillation, adsorption, absorption, membrane and chromatographic based separations. Unifying fundamental relations and concepts are emphasized.

Max Credits: 3

Min Credits: 3

10.311 Chemical Engineering Thermodynamics

Course ID: 2868

Course Details: The first and second laws of thermodynamics, P-V-T relations, mathematics of property changes, generalized correlation's of thermodynamic properties, application of thermodynamics to problems of phase and chemical equilibria.

Max Credits: 3

Min Credits: 3

10.316 Unit Operations Laboratory II

Course ID: 2870
Course Details: Experimental projects treat heat and mass transfer, including staged operations, in a unit operations format. Process measurement and calibration emphasised. Written reports required.

Max Credits: 2
Min Credits: 2

10.317 Applied Mathematics with Matlab

Course ID: 2871

Course Details: The focus of this course will be to develop the students' problem solving skills for a broad range of technical applications. Matlab will be used as the programming environment. The course will be applications oriented with the appropriate level of mathematics and theory to support the use of the software to formulate, solve, and analyze technical problems. Applied numerical methods will be introduced as a means for solving a wide variety of problems.

Max Credits: 3
Min Credits: 3

10.331 Introduction to Nuclear Engineering I

Course ID: 1263

Course Details: Review of relevant nuclear physics topics including nuclear stability, various forms of radiation, radioactive decay, and the interaction of radiation with matter (including health effects). Emphasis placed on neutron reactions in various core and structure materials, neutron cross sections, and the development and analysis of the neutron balance equation for various reactor types. Key aspects of nuclear reactor core physics and shielding design (criticality, power generation, reactor kinetics, reactivity control, fuel depletion, fission product poisoning, etc.) are treated. (10.331 and 24.331 are the same)

Max Credits: 3
Min Credits: 3

10.347 Elements of Thermodynamics and Heat Transfer

Course ID: 2874


Max Credits: 3
Min Credits: 3

10.403 Chemical Reaction Engineering

Course ID: 2876

Course Details: Review of principles underlying rates of transformation of matter and energy; effect of temperature and catalysis on chemical reactions. Introduction to the basic ideas underlying chemical reaction engineering. May be taken for graduate credit.

Max Credits: 3
Min Credits: 3

10.405 Design Of Papers

Course ID: 2877

Course Details: Fundamentals of the mechanical and optical testing of paper and allied products. Discussion of engineering mechanics involved in various testing procedures. Statistical analysis of test data. Structure of materials revealed by physical tests. Laboratory projects designed to illustrate problems in development of paper products and associated required processes.

Max Credits: 3
10.409 Engineering Economics and Process Analysis

Course ID: 2879

Course Details: This course brings together all the Chemical Engineering core principles applied to the development of economic process designs. Economic evaluations of manufacturing operations and projects including essential concepts in accounting, depreciation, time value of money, and the evaluation of investment alternatives are applied for process analysis and design objectives. The impact of management and production costs, product markets, regulatory, environmental and safe production practices, the analysis of corporate annual reports including balance sheets and income statements, and capital and operating costs are all considered in regard to efficient and economic processes. In addition to lecture materials students are required to complete comprehensive projects.

Max Credits: 3
Min Credits: 3

10.410 Chemical Plant Design

Course ID: 2880

Course Details: This course is the logical continuation of 10.409. The principles of technical and economic evaluation are applied to a chemical engineering problem. A group of students is given a statement of the problem. They are required to find information on raw materials, products, thermodynamic parameters and plant practices in order to develop the assumptions required to carry out an examination of technical and economic feasibility. Each group generates a final report for the problem. Homework is also assigned to assist the student in the specifics of the problems.

Max Credits: 3
Min Credits: 3

10.413 Process Dynamics & Control

Course ID: 2881

Course Details: An introduction to chemical process control. Description of processes and equipment by differential equations and the Laplace transform. Development of block diagrams. System stability is studied by both root locus and frequency response methods. May be taken for graduate credit.

Max Credits: 3
Min Credits: 3

10.415 Processes and Controls Laboratory

Course ID: 33359

Course Details: Experimental projects dealing with heat and mass transfer, separations and process control. Written and oral reports required.

Max Credits: 2
Min Credits: 2

10.420 Special Senior Projects

Course ID: 2884

Course Details: Original research projects primarily in the chemical engineering field and supervised by a staff member of the department. Written reports required.

Max Credits: 3
Min Credits: 3

10.434 Introduction to Nuclear Engineering II

Course ID: 36717
Course Details: A continuation of 10.331/24.331 with further discussion of basic nuclear reactor theory and reactor operations. The 2nd half of the semester focuses on heat removal and energy conversion in pressurized and boiling water reactors, including heat transfer in fuel elements and shields and the heat transfer characteristics of boiling and non-boiling liquids. Engineered safety and overall reactor core and plant design considerations are also discussed. (10.434 and 24.434 are the same)

Max Credits: 3
Min Credits: 3

10.450 Nanoscale Transport Phenomena for Manufacturing Nanodevices

Course ID: 36698

Course Details: An interdisciplinary course taught by faculty from the Chemical, Mechanical and Plastics Engineering Departments, who have special knowledge in nanoscale fluid mechanics and heat transfer. The course on nanoscale transport phenomena constitutes a bridge between existing fluid and heat transfer courses in multiple disciplines and emerging nanoscale science and engineering concepts to reflect the forefront of nanomanufacturing. The course is designed to incorporate recent advances in manufacturing polymer based nanodevices. Key issues of the implementation and maintenance costs for fabrication will be addressed. Hands-on laboratory experiments will be performed to complement the lectures with the ultimate goal of designing and building a complete nanodevice at the end of the course. The course will prepare graduates for employment focused on designing and manufacturing nano/microfluidic systems, lab on ship devices, electronic devices, medical devices and other emerging technologies.

Max Credits: 3
Min Credits: 3

10.491 Industrial Experience I

Course ID: 2891

Course Details: Projects performed by students in the Cooperative Education Program at their place of employment and supervised by the employer and advisor from the department. Reports required upon completion of the project.

Max Credits: 12
Min Credits: 0

10.492 Industrial Experience II

Course ID: 2892

Course Details: Projects performed by students in the Cooperative Education Program at their place of employment and supervised by the employer and advisor from the department. Reports required upon completion of the project.

Max Credits: 9
Min Credits: 1

10.493 Industrial Experience III

Course ID: 2893

Course Details: Projects performed by students in the Cooperative Education Program at their place of employment and supervised by the employer and advisor from the department. Reports required upon completion of the project.

Max Credits: 9
Min Credits: 1

10.494 Select Topics: Paper Engineering

Course ID: 2894

Course Details: Topics in paper engineering. Content may vary from year to year to reflect contemporary applications of paper engineering.

Max Credits: 3
Min Credits: 3
**10.496 Selected Topics: Paper Engineering**

Course ID: 2895

Course Details: Topics in paper engineering. Content may vary from year to year to reflect contemporary applications of paper engineering.

Max Credits: 3

Min Credits: 3

**14.203 Statics (alternate 22.211)**

Course ID: 2964

Course Details: Discusses vector concepts of forces and moments of forces. Static equilibrium of particles, rigid bodies and simple structures. Static friction forces. Geometric properties of sections.

Max Credits: 3

Min Credits: 3

**14.204 Strength of Materials (alternate 22.212)**

Course ID: 2965

Course Details: Introduces the concept of stress and strain at a point, stress-temperature relationships, force and deformation analyses of bodies under axial, shearing, flexural, torsional and combined loadings, shear and bending moment diagrams, and Euler Columns.

Max Credits: 3

Min Credits: 3

**14.205 Dynamics (alternate 22.213)**

Course ID: 2966

Course Details: Vector development of kinematics of particles and rigid bodies with respect to fixed and moving coordinate systems of one, two, and three dimensions. The dynamics of particles, systems of particles, and rigid bodies. Angular momentum and the inertial properties of rigid bodies. Energy, impulse and momentum methods.

Max Credits: 3

Min Credits: 3

**14.225 Surveying I**

Course ID: 2970

Course Details: A presentation of the basic instruments used in survey processes including distance, angle and level measurements. Analysis and adjustment of random errors. Principles of closed and open traverses. Fieldwork practice in instrument use and office-type projects in contour mapping and the application of contoured topography to highway and water-control projects.

Max Credits: 3

Min Credits: 3

**14.226 Geomatics**

Course ID: 2971

Course Details: Principles and practice of route surveys and designs. Topics include simple and compound circular curves, intersections of straight and curved baselines, vertical alignment principles including parabolic easement curves, earthwork operations and determination of volumes. Includes office-type projects illustrative of the application of surveying information to Civil Engineering projects such as water resources, sanitary sewers and property subdivision. Fieldwork instruction in basic traverse surveys, gathering of topographic information, and the staking-out of buildings and circular curves.

Max Credits: 3
14.286 Probability and Statistics for Engineers

Course ID: 2972

Course Details: Probability, statistics, reliability and decision with applications in engineering. Probability of events, discrete and continuous random variables, probability density functions and distributions, estimation, regression and correlation techniques, risk and reliability concepts.

Max Credits: 3
Min Credits: 3

14.301 Fluid Mechanics

Course ID: 2973

Course Details: Fluid properties, fluid statics, fluid dynamics including continuity, impulse-momentum and energy equations. Pipe flow, turbomachinery, similitude and modeling, laminar and turbulent flow, boundary layer and closed conduit design.

Max Credits: 3
Min Credits: 3

14.310 Engineering Materials

Course ID: 2975

Course Details: A treatment of the properties of engineering materials that influence the design, construction and maintenance of Civil Engineering works. Included are such materials as ferrous and non-ferrous metals, timber, asphalt, and cementitious materials. Supplemented by laboratory testing of various engineering materials.

Max Credits: 3
Min Credits: 3

14.311 Engineering Materials Laboratory

Course ID: 2976

Course Details: Experiments and written reports. Testing and measurement techniques and material standards illustrating behavior of materials, including metals, wood, and Portland cement concrete.

Max Credits: 1
Min Credits: 1

14.330 Soil Mechanics

Course ID: 2977

Course Details: Development of the fundamental principles of soil mechanics as utilized in soil and foundation engineering. Topics include: classification, index properties, strength and stress-strain behavior, effective stress principle, permeability, flow and consolidation. Introduction to basic soil mechanics laboratory practice.

Max Credits: 3
Min Credits: 3

14.332 Environmental Engineering Laboratory

Course ID: 2979

Course Details: Laboratory experiments to illustrate analysis of environmental samples and experimental techniques, normally used in support of water and wastewater treatment facilities. Course emphasizes data acquisition and analysis, and engineering report writing.

Max Credits: 1
**14.333 Geotechnical Laboratory**

Course ID: 2980

Course Details: Laboratory experience that illustrates soil mechanics and fluid flow theory. Experiments are conducted in the soils and hydraulics laboratories. Course emphasizes data acquisition and analysis and writing engineering reports.

Max Credits: 1

Min Credits: 1

**14.340 Transportation Engineering**

Course ID: 2981

Course Details: Development of the basic principles pertaining to the movement of people and goods by modern transportation systems. Techno-economic characteristics of the various transportation modes. Aspects of planning, design and operation of land, air and water transportation facilities. Development, structure and function of the U.S. transportation system.

Max Credits: 3

Min Credits: 3

**14.341 Transportation Engineering Laboratory**

Course ID: 2982

Course Details: Practice techniques of data collection, analysis and presentation that are commonly used in the planning, design and operation of transportation facilities with primary emphasis on highway systems.

Max Credits: 1

Min Credits: 1

**14.350 Structural Analysis I**

Course ID: 2983

Course Details: Principles of structural analysis applied to typical civil engineering structures as the initial step in the total design concept. Emphasis on the classical methods of analysis of statically determinate and indeterminate structures. The personal computer as an analytical tool.

Max Credits: 3

Min Credits: 3

**14.352 Reinforced Concrete**

Course ID: 2984

Course Details: Ultimate strength and elastic behavior of reinforced concrete structural members, continuity in building frames, deflections, shear reinforcement, development length and bar cutoffs, columns and footings.

Max Credits: 3

Min Credits: 3

**14.362 Environmental Engineering**

Course ID: 2985

Course Details: Physical, chemical and biological principles of the treatment of water and wastewater are considered along with their application to treatment systems. The system components of wastewater and water treatment plants are studied to provide a basic design capability. Hazardous waste site remediation is also discussed.

Max Credits: 3

Min Credits: 3
14.372 Civil Engineering Systems

Course ID: 2986

Course Details: Introduction to methods of operations research, management science and economic analysis used in the design, planning and managing of engineering systems. Main topics covered: systems modeling, optimization concepts, network analysis, mathematical programming, critical path analysis, decision analysis, economic consideration.

Max Credits: 3
Min Credits: 3

14.431 Foundation and Soil Engineering

Course ID: 2990

Course Details: The application of soil mechanics to the design and analysis of foundations and soil structures. Topics include: soil origin and deposition, subsurface exploration, bearing capacity and settlement analyses, design of shallow foundations, earth pressures, retaining structures, and slope stability.

Max Credits: 3
Min Credits: 3

14.452 Steel Design

Course ID: 2993

Course Details: An introduction to structural steel design with emphasis on use and interpretation of the AISC Manual and LRFD Specifications. Subjects include design of tension, compression, beams, and beam-column members, plus bolted and welded connections. Other topics may include composite beams, plate girders, building connections and plastic analysis and design.

Max Credits: 3
Min Credits: 3

14.460 Water Resources Engineering

Course ID: 2995

Course Details: This course is a continuation and extension of Fluid Mechanics, with a focus on engineering applications of hydraulic and hydrologic engineering. This course covers fundamental concepts of open-channel flow, hydraulic structures, design of open channels, surface-water hydrology, and groundwater hydrology.

Max Credits: 3
Min Credits: 3

14.466 Introduction to LEED

Course ID: 37656

Course Details: This course examines the principles of sustainability and how they are applied to engineering and the built environment. Areas covered include energy, water, materials, transportation, and green building principles. Issues of evaluation of sustainability, including life cycle analysis and rating systems, are also discussed. This course fulfills the educational requirements for eligibility to take the LEED (Leadership in Energy and Environmental Design) Green Associate exam.

Max Credits: 3
Min Credits: 3

14.470 Engineering Economics

Course ID: 2999

Course Details: Presentation of mathematical principles of economic analysis, with emphasis on defining alternatives and predicting consequences of proposed investments. Emphasis is placed on the economic, social and environmental impacts.
of proposed Civil Engineering projects. The attractiveness of investments is judged by present worth, annual worth, rate of return, and benefit-cost ratio techniques. Sensitivity analysis, depreciation and tax impacts in economic studies are also discussed.

Max Credits: 3
Min Credits: 3

**14.475 Construction Management I**

Course ID: 3000

Course Details: Development of management skills and techniques to plan, schedule, supervise, and control construction projects. Project estimating; labor costs and productivity; construction plans, specifications and contracts; labor relations; time, cost and quality control; construction equipment and project decision making and financing.

Max Credits: 3
Min Credits: 3

**14.480 Special Topics in Civil Engineering**

Course ID: 3002

Course Details: Contemporary topics in selected areas of study within civil engineering. Course content is chosen by the instructor to meet the interests of the students.

Max Credits: 3
Min Credits: 3

**14.481 Special Topics**

Course ID: 3003

Course Details: Contemporary topics in selected areas of study within civil engineering. Course content is chosen by the instructor to meet the interests of the students.

Max Credits: 3
Min Credits: 3

**14.483 Spec Topics: Civil Engineering**

Course ID: 3004

Course Details: Contemporary topics in selected areas of study within civil engineering. Course content is chosen by the instructor to meet the interests of the students.

Max Credits: 3
Min Credits: 3

**14.485 Capstone Design**

Course ID: 3005

Course Details: Introduction to the essentials of engineering design and a forum for practicing the design process. Integrates many elements of the curriculum through a comprehensive design project to professional standards. Projects includes the use of open-ended problems, feasibility analysis, complete design process, consideration of alternative solutions, and cost estimation. Students practice team effort, development of a system perspective, communication skills, reporting, and presentations.

Max Credits: 3
Min Credits: 3

**14.491 Industrial Experience I**

Course ID: 3007
Course Details: The new Cooperative Education program for undergraduates combines academic studies with work experience in appropriate positions in the public or private sectors. It permits students to participate in the flexible schedule of study and work that is related to their academic fields of study and to receive academic credit for the work experience. Requires 500 hours of cooperative education engineering experiences, on a full-time or part-time basis, during any academic semester or summer. All co-op work must be pre-approved by the Co-op Coordinator. (Effective with Class of 2001-02, students in CEE are able to earn three credits after the successful completion of both Industrial Experience I and II).

Max Credits: 12
Min Credits: 0

14.492 Industrial Experience II

Course ID: 3008

Course Details: The new Cooperative Education program for undergraduates combines academic studies with work experience in appropriate positions in the public or private sectors. It permits students to participate in the flexible schedule of study and work that is related to their academic fields of study and to receive academic credit for the work experience. Requires 500 hours of cooperative education engineering experiences, on a full-time or part-time basis, during any academic semester or summer. All co-op work must be pre-approved by the Co-op Coordinator. (Effective with Class of 2001-02, students in CEE are able to earn three credits after the successful completion of both Industrial Experience I and II).

Max Credits: 3
Min Credits: 3

14.493 Industrial Experience III

Course ID: 3009

Course Details:
Max Credits: 3
Min Credits: 3

15.113 Computer-Aided Design and Drafting

Course ID: 3096

Course Details: Demonstrates CAD concepts using both class discussion and laboratory work. Using interactive computer graphics workstations, students will create several civil/architectural drawings that involve the processes of inserting and modifying lines, arcs, text, dimensions, and other geometric entities. AutoCAD is used in this course.

Max Credits: 2
Min Credits: 2

15.123 Surveying I

Course ID: 3098

Course Details: Basic principles of surveying: use, care, and adjustments of tape, engineers transit, engineers level, theodolite and electronic distance measuring devices; introduction to surveying processes by means of traverse computations, development of topographic information, introduction to global positioning systems, elementary photogrammetry, the Internet, and the use of the electronic computer in land surveying. Problems are used to illustrate basic principles.

Max Credits: 4
Min Credits: 4

15.124 Surveying II

Course ID: 3099

Course Details: Basic principles of route designing and surveying. An introduction to the preparation of calculations and plans for the construction of all routes of transportation. Class topics include route geometry determination, curve geometry, economic analysis using cost to benefit rationale. Determination of earthwork quantities and the use of the electronic computer in route surveying. Problems are used to illustrate basic principles.
15.131 Environmental Chemistry I

Course ID: 3100

Course Details: Emphasizes basic chemical theory. Reactions and equations are presented, along with an introduction to the structure and character of water, its impurities, and the chemical treatment schemes that have been devised to deal with them.

Max Credits: 3
Min Credits: 3

15.152 Water Biology

Course ID: 3102

Course Details: Covers the following topics: uses of biology lab tools; microscope basic chemistry; water molecules; physical properties; biochemistry; life functions; features of life and the cell; classification; viruses and monerans; simple water animals; simple water plants; protists and fungi; methods of transport, osmosis, diffusion, etc.; photosynthesis, respiration, ecosystems, and biomes.

Max Credits: 3
Min Credits: 3

15.242 Steel Design I

Course ID: 3110

Course Details: Provides an introduction to the analysis and design of structural steel elements based on AISC LRFD code requirements. Structural elements covered include tension members, columns, beams, and beam columns. Types of structures considered include simple and continuous spans, and braced and unbraced frames. Strength, serviceability, design economy and good design practice principles are discussed. Use of computer software to perform routine analysis and design tasks is reviewed and examples provided.

Max Credits: 3
Min Credits: 3

15.246 Hydraulics

Course ID: 3111

Course Details: Presents the properties of fluids, principles of hydrostatic pressure, fluid flow with applications to orifices, tubes, wires, and pipes. Two demonstration laboratory sessions will be held during the semester.

Max Credits: 3
Min Credits: 3

15.263 Wastewater Operations Laboratory I

Course ID: 3121

Course Details: In this lab, fundamental principles of biological wastewater treatment are explained. Students perform basic wet chemistry tests for monitoring and operating a biological wastewater treatment system.

Max Credits: 1
Min Credits: 1

15.274 Water Works Operations Lab I

Course ID: 3123

Course Details: Introduces the students to fundamental laboratory equipment as applied to the operation of water treatment facilities. The following determinations will be conducted: odor, color, turbidity, jar tests, pH, chlorine residual, acidity,
alkalinity, hardness, chlorine, iron, manganese, phosphate, aluminum, nitrogen, cycle, coliform, microscopic analysis, heavy metals, and organics. Pre-Requisite: 15.131.

Max Credits: 1  
Min Credits: 1  

15.280 Industrial Waste Treatment

Course ID: 3124

Course Details: This course examines the state and federal regulations for industrial wastewater treatment. Basic chemistry is covered and physical-chemical treatment for neutralization, oxidation-reduction, metals removal, and cyanide destruction is reviewed in detail along with numerous sample problems. Common industrial waste treatment processes such as filtration, ion exchange, activated carbon, ultra filtration, reverse osmosis, and other membrane filtration techniques are presented. Chemical feed systems, polymer feed systems, chemical dosage calculations, jar testing, sludge handling, and dewatering methods and sludge calculations are also discussed.

Max Credits: 3  
Min Credits: 3

15.315 Land Development Desktop

Course ID: 30318

Course Details:  
Max Credits: 3  
Min Credits: 3

15.353 Forensic Engineering

Course ID: 32150

Course Details: This course is a survey of forensic engineering with particular emphasis on using engineering science and technology to investigate and reconstruct failures of engineered systems. Topics include qualifications of the forensic engineer, the scientific method, failure hypotheses, levels of confidence, physical evidence, field investigation techniques, examination and testing, codes and standards, and personnel safety. Other topics include ethics, the hired gun, junk science, the legal process, introduction to expert witness testimony, trial exhibits, Frye and Daubert decisions, bias, forensic engineering practice, and engineering reports.

Max Credits: 3  
Min Credits: 3

15.486 Transportation Elements

Course ID: 3151

Course Details: Transportation Elements is the study of a variety of issues associated with the planning, project evaluation, vehicle/driver/traffic characteristics, roadway capacity and social/economic/environmental impacts of transportation projects. Students will develop and retain a basic understanding of the environmental process and alternatives analysis as well as design considerations. Practical, real-world examples will be used to model the topics of each lecture. The concepts presented in this course directly relate to numerous other civil engineering fields.

Max Credits: 3  
Min Credits: 3

16.100 Introduction to Electrical and Computer Engineering

Course ID: 3154

Course Details: This introductory course is designed to expose students to many of the new developments in Electrical Engineering, especially those on-going in the Department. It will also provide information about co-op opportunities and career planning, while also allowing faculty in the Department to describe their courses and answer questions.

Max Credits: 1
16.201 Circuit Theory I

Course ID: 3159


Max Credits: 3
Min Credits: 3

16.202 Circuit Theory II

Course ID: 3160

Course Details: Discusses the sinusoidal forcing function, complex numbers, phasors, sinusoidal steady-state conditions, impedance, average real power, reactive power and rms values, exponential forcing function, poles and zeros in the s-plane, concept of the system function and its use in determining the forced response and resonance, reactance cancellation and concept of s-plane vectors. The course also covers Thevenin's and Norton's theorems, superposition, reciprocity, and maximum power in the frequency domain, impedance and admittance. Introduction to matrices and their use in circuit analysis, magnetic coupling, mutual inductance, and ideal transformer. Engineering Science (100%).

Max Credits: 3
Min Credits: 3

16.207 Basic Electrical Engineering Laboratory I

Course ID: 3161

Course Details: Experimental work designed to verify theory and to acquaint students with electrical measurement techniques: experiments on meters, bridges, and oscilloscopes. Experiments are correlated with course 16.201 and concern: resistive measurements, Kirchhoff's laws, network theorems, conservation of power and maximum power transfer, inductance and capacitance, and first and second-order transients, operational amplifiers.

Max Credits: 2
Min Credits: 2

16.208 Basic Electrical Engineering Lab II

Course ID: 3162

Course Details: Presents experimental work designed to emphasize electrical measurement techniques of linear systems with time-varying signals. Waveform measurements with dc and ac meters as well as advanced use of the oscilloscope are also discussed. Experiments are integrated with course 16.202. Experiments cover: Kirchhoff's laws for phasors, bode plots, magnitude and phase measurements of impedance, network theorems, frequency response, resonance, inductance, maximum power transfer, and MATLAB techniques. Engineering Science (50%); Engineering Design (50%).

Max Credits: 2
Min Credits: 2

16.211 Fundamentals of Electricity I

Course ID: 1269

Course Details: Serves as an introduction to direct current and alternating current analysis of electric circuits, with emphasis on energy and power. Covers design and use of multi-range voltmeters, ammeters, and ohmmeters, the use of bridges and oscilloscopes, phasor analysis of AC circuits, Trigonometric Fourier series, BODE plots, transformers, relays, solenoids, mechanical analogs and magnetic analogs with the application of Fourier and BODE techniques. Students will also be introduced to DC and AC motors and generators, residential circuits, equipment protection, and introduction to digital logic including minimization techniques. Availability and cost of instruments and components is stressed throughout this course. Not for EE majors. Engineering Science (100%).
16.212 Fundamentals of Electricity Laboratory

Course ID: 3163


Max Credits: 1
Min Credits: 1

16.213 Fundamentals of Electricity I

Course ID: 1269

Course Details: Serves as an introduction to direct current and alternating current analysis of electric circuits, with emphasis on energy and power. Covers design and use of multi-range voltmeters, ammeters, and ohmmeters, the use of bridges and oscilloscopes, phasor analysis of AC circuits, Trigonometric Fourier series, BODE plots, transformers, relays, solenoids, mechanical analogs and magnetic analogs with the application of Fourier and BODE techniques. Students will also be introduced to DC and AC motors and generators, residential circuits, equipment protection, and introduction to digital logic including minimization techniques. Availability and cost of instruments and components is stressed throughout this course. Not for EE majors. Engineering Science (100%).

Max Credits: 3
Min Credits: 3

16.214 Fundamentals of Sound Recording

Course ID: 3164

Course Details: Similar to 16.211 but tailored for Sound Recording Technology students only

Max Credits: 3
Min Credits: 3

16.216 ECE Application Programming

Course ID: 3165

Course Details: Introduces C programming for engineers. Covers fundamentals of procedural programming with applications in electrical and Computer engineering and embedded systems. Topics include variables, expressions and statements, console input/output, modularization and functions, arrays, pointers and strings algorithms, structures, and file input/output. Introduces working with C at the bit manipulation level. Laboratories include designing and programming engineering applications.

Max Credits: 3
Min Credits: 3

16.233 History of Radio

Course ID: 3171

Course Details: Intended primarily for students majoring in the liberal arts. The course develops the theory of electricity from an historical perspective. Sufficient background in circuit theory, resonance, field theory and radio waves is given to provide an understanding of the principles of radio from its antecedents in the nineteenth century through the invention of the transistor in the mid twentieth century. The fundamental contributions of, for example Volta, Oersted, Morse, Maxwell, Faraday, Hertz, Lodge, and Marconi are considered. In the present century the technical advances of such figures as de Forest, Fleming, Fessenden, Armstrong and Shockley are studied. The growth, regulation and culture of American broadcasting are also central to the course. Laboratory work is required and students may use this course toward fulfilling the General Education (science/experimental component) requirement of the University. Not open to students in the College of Engineering.

Max Credits: 3
16.265 Logic Design

Course ID: 3172


Max Credits: 3
Min Credits: 3

16.311 Electronics I Lab

Course ID: 3175


Max Credits: 2
Min Credits: 2

16.312 Electronics II Laboratory

Course ID: 3176


Max Credits: 2
Min Credits: 2

16.317 Microprocessors Systems Design I

Course ID: 3178

Course Details: Introduction to microprocessors. Uses assembly language to develop a foundation on the hardware which executes a program. Memory and I/O interface design and programming. Design and operation of computer systems. Study of microprocessor and its basic support components, including detailed schematics, timing and functional analysis of their interactions. Laboratories directly related to microprocessor functions and its interfaces (e.g. memory subsystem, I/O devices and coprocessors).

Max Credits: 3
Min Credits: 3

16.322 Data Structures

Course ID: 3179

Course Details: Covers algorithms and their performance analysis, data structures, abstraction, and encapsulation. Introduces structures and their physical storage representation. Studies stacks, queues, linked lists, trees, graphs, heaps, priority queues, and hashing. Discusses efficient sorting (quicksort and heapsort) and introduces experimental analysis of algorithms as applied to engineering applications. Examines several design issues, including selection of structures based on what operations need to be optimized (insertion, deletion, traversal, searching, sorting, evaluation), encapsulation of algorithms using class and template techniques, and how and when to use recursion (versus explicit stack-based techniques). Laboratories include programming of data structures in C++ and Java applied to Engineering.

Max Credits: 3
16.333 Chemistry and Engineering of Electronic Materials

Course ID: 3180

Course Details: The production and processing of materials into finished products constitute a large part of the present economy. To prepare students for the use of a variety of traditional and new materials, this course will cover: atomic structure and chemical bonding, crystal geometry and defects, mechanical properties and phase diagrams of metals and alloys, electrical and optical properties of semiconductors, ceramics, and polymers; brief description of electronic, quantum electronic and photonic devices; benefits and difficulties of materials design with decreasing dimensions from millimeters to micrometers and to nanometers.

Max Credits: 3
Min Credits: 3

16.355 Electromechanics

Course ID: 3183

Course Details: Alternating current circuits, three phase circuits, basics of electromagnetic field theory, magnetic circuits, inductance, electromechanical energy conversion. Ideal transformer, iron-core transformer, voltage regulation, efficiency equivalent circuits, and three phase transformers. Induction machine construction, equivalent circuit, torque speed characteristics, and single phase motors. Synchronous machine construction, equivalent circuits, power relationships phasor diagrams, and synchronous motors. Direct current machines construction, types, efficiency, power flow diagram, and external characteristics.

Max Credits: 3
Min Credits: 3

16.360 Engineering Electromagnetics I

Course ID: 3184

Course Details: Waves and Phasors, Transmission lines as Distributed Circuits, Smith Chart Calculations, Impedance Matching, Transients on Transmission Lines, Vector Analysis, Electrostatics and Capacitance, Steady current flow in conductors and Resistance, Magnetostatics and Inductance.

Max Credits: 3
Min Credits: 3

16.362 Signals and Systems I

Course ID: 3185

Course Details: A study of various continuous voltage/current time functions and their applications to linear time-invariant electrical systems. Review of pertinent topics from 16.202, such as system functions, S-plane concepts and complete responses. Step, ramp and impulse responses of linear circuits. Sifting integrals. Types of analog filter responses. Designs for Butterworth and Chebyshev filters. Fourier Analysis, Fourier Transforms, Convolution, Laplace Transforms, Parseval's Theorem. A large portion (30-40%) is devoted to teaching the students communication skills and the use of MATLAB for solving homework problems. A MATLAB based text is assigned to the course.

Max Credits: 3
Min Credits: 3

16.363 Introduction to Probability and Random Processes

Course ID: 3186

Course Details: This course employing probabilistic methods of signal and system analysis (an extension of 16.362) considers the random nature of the world faced by electrical engineers. The course addresses the issues of the nature and characterization of random events, especially noise and its effect on systems. The course is divided into three parts, 1) Introduction to discrete and continuous probability 2) Introduction to statistical methods and 3) random signals and noise and the response of linear systems to random signals. There will be frequent use of Monte-Carlo simulation techniques on the computer to allow students to verify theory and to learn the important technique of simulation. Applications of theory to manufacturing and reliability, noise analysis, spectral analysis, data communication, data collection, and system design will
be presented. Prerequisite: 16.362
Max Credits: 3
Min Credits: 3

16.364 Engineering Mathematics

Course ID: 3187

Course Details: Complex number, Argand plane, derivatives of complex numbers, limits and continuity, derivative and Cauchy Riemann conditions, analytic functions, integration in the complex plane, Cauchy's integral formula, infinite series for complex variables. Taylor series, Laurent series, residue theory, evaluation of integrals around indented contours. Linear vector spaces, matrices and determinants, eigenvalues and eigenvectors.
Max Credits: 3
Min Credits: 3

16.365 Electronics I

Course ID: 3188

Course Details: A brief introduction to solid-state physics, leading to discussion of physical characteristics of p-n junction diodes, bipolar junction transistors, and field-effect transistors: active, saturated, and cutoff models of bipolar transistors and triode, constant current, and cutoff models of MOSFETs. Circuit models for diodes, and diode applications. Circuit models for transistors, and transistor applications in bipolar and MOS digital circuits and low-frequency amplifier circuits. Analysis of digital circuits and linear circuits based on application of circuit models of devices and circuit theory.
Max Credits: 3
Min Credits: 3

16.366 Electronics II

Course ID: 3189

Course Details: A continuation of 16.365 with discussion of differential amplifiers, operation amplifiers and op amp applications, transistor amplifiers at very high frequencies; direct-coupled and band pass amplifiers; small and large signal amplifiers; feedback amplifiers and oscillators. Active filters, wave form generation circuits including Schmitt trigger, multiplexers, and A/D and D/A converters. Circuit design employing integrated circuit operational amplifiers and discrete devices. Circuit analysis using SPICE. An electronic design project constitutes a major part of the course.
Max Credits: 3
Min Credits: 3

16.399 Capstone Proposal

Course ID: 3195

Course Details: This course discusses and presents the non-technical tools and procedures for bringing a potential product from the idea or basic concept stage through final design and to market. Fundamentals of market research, product safety and liability concerns, necessary technical communication skills. Economic concerns, patent, application procedures, design procedures and people skills necessary to be part of an engineering team.
Max Credits: 3
Min Credits: 3

16.400 Engineering Topics

Course ID: 3196

Course Details: This course introduces to the seniors developing the capstone proposal important concepts such as economics, environmental, sustainability, manufacturability, ethical, health, safety, social and political constraints and how these are related to the overall engineering processes. These will be used as an integral part of their capstone projects.
Max Credits: 1
Min Credits: 1
16.403 Microwave Engineering

Course ID: 3198

Course Details: An introductory course in the analysis and design of passive microwave circuits beginning with a review of time-varying electromagnetic field concepts and transmission lines. Smith Chart problems; single and double stub matching; impedance transformer design; maximally flat and Chebyshev transformers; microstrip transmission lines, slot lines, coplanar lines; rectangular and circular waveguides; waveguide windows and their use in impedance matching; design of directional couplers; features of weak and strong couplings; microwave filter design; characteristics of low-pass, high-pass, band-pass, band-stop filter designs; two-port network representation of junctions; Z and Y parameters, ABCD parameters, scattering matrix; microwave measurements; measurement of VSWR, complex impedance, dielectric constant, attenuation, and power. A design project constitutes a major part of the course.

Max Credits: 3
Min Credits: 3

16.409 Directed Studies

Course ID: 3199

Course Details: Provides an opportunity for qualified Electrical Engineering students to investigate specific areas of interest. The actual project undertaken may be software or hardware oriented. The most important characteristics of the projects are that the end results represent independent study; that they are research and development oriented, and that they are accomplished in an engineering environment. Design reviews and progress reports are expected for each project. A final formal report to be permanently filed in the EE Department is required for each project. Engineering Design (100%).

Max Credits: 3
Min Credits: 3

16.410 Directed Studies

Course ID: 3200

Course Details: The purpose of this course is to provide an opportunity for qualified Electrical Engineering students to investigate specific areas of interest. The actual project undertaken may be software or hardware oriented. The most important characteristics of the projects are that the end results represent independent study and that they are research and development oriented, and that they are accomplished in an engineering environment. Design reviews and progress reports are expected for each project. A final formal report to be permanently filed in the EE Department is required for each project.

Max Credits: 3
Min Credits: 3

16.411 Medical Diagnostic Imaging

Course ID: 3201

Course Details: This course covers the physics and electrical engineering aspects of how signals are acquired from which images will be formed, and the principal methods by which the signals are processed to form useful medical diagnostic images. Modalities studied include: x-rays, ultra-sound, computed tomography, and magnetic resonance imaging. The principles of signal processing via Fourier transform will be reviewed. Noise and other artifacts that degrade the medical diagnostic of images are considered.

Max Credits: 3
Min Credits: 3

16.412 Directed Studies

Course ID: 3202

Course Details: The purpose of this course is to provide an opportunity for qualified Electrical Engineering students to investigate specific areas of interest. The actual project undertaken may be software or hardware oriented. The most important characteristics of the projects are that the end results represent independent study and that they are research and development oriented, and that they are accomplished in an engineering environment. Design reviews and progress reports are expected for each project. A final formal report to be permanently filed in the EE Department is required for each project.

Max Credits: 3
16.413 Linear Feedback System

Course ID: 3203


Max Credits: 3
Min Credits: 3

16.414 Integrated Power Systems

Course ID: 3227

Course Details: Power System Operations and Electricity Markets provide a comprehensive overview to understand and meet the challenges of the new competitive highly deregulated power industry. The course presents new methods for power systems operations in a unified integrated framework combining the business and technical aspects of the restructured power industry. An outlook on power policy models, regulation, reliability, and economics is attentively reviewed. The course lay the groundwork for the coming era of unbundling, open access, power marketing, self-generation, and regional transmission operations.

Max Credits: 3
Min Credits: 3

16.418 Wireless Communication

Course ID: 3206

Course Details: Cellular systems and design principles, co-channel and adjacent channel interference, mobile radio propagation and determination of large scale path loss, propagation mechanisms like reflection, diffraction and scattering, outdoor propagation models, Okumura and Hata models, small scale fading and multipath, Doppler shift and effects, statistical models for multipath, digital modulation techniques QPSK, DPSK, GMSK, multiple access techniques, TDMA, FDMA, CDMA, spread spectrum techniques, frequency hopped systems, wireless systems and worldwide standards.

Max Credits: 3
Min Credits: 3

16.421 Real Time Digital Signal Processing

Course ID: 3209

Course Details: This course provides an introduction to real-time digital signal processing techniques using the TMS320C3x floating point and TMS320C5x fixed point processors. The architecture, instruction set and software development tools for these processors will be studied via a series of C and assembly language computer projects where real-time adaptive filters, modems, digital control systems and speech recognition systems are implemented.

Max Credits: 3
Min Credits: 3

16.423 Introduction to Solid State Electronics

Course ID: 3211

16.427 Advanced VLSI Design Techniques

**Course Details:** This course builds on the previous experience with Cadence design tools and covers advanced VLSI design techniques for low power circuits. Topics covered include aspects of the design of low voltage and low power circuits including process technology, device modeling, CMOS circuit design, memory circuits and subsystem design. This will be a research-oriented course based on team projects.

Max Credits: 3
Min Credits: 3

16.428 Alternative Energy Sources

**Course Details:** PV conversion, cell efficiency, cell response, systems and applications. Wind Energy conversion systems: Wind and its characteristics; aerodynamic theory of windmills; wind turbines and generators; wind farms; siting of windmills. Other alternative energy sources: Tidal energy, wave energy, ocean thermal energy conversion, geothermal energy, solar thermal power, satellite power, biofuels. Energy storage: Batteries, fuel cells, hydro pump storage, flywheels, compressed air.

Max Credits: 3
Min Credits: 3

16.429 Electric Vehicle Technology

**Course Details:** Electric vehicle VS internal combustion engine vehicle. Electric vehicle (EV) saves the environment. EV design, EV motors, EV batteries, EV battery chargers and charging algorithms, EV instrumentation and EV wiring diagram. Hybrid electric vehicles. Fuel cells. Fuel cell electric vehicles. The course includes independent work.

Max Credits: 3
Min Credits: 3

16.431 RF Design

**Course Details:** Two-port network parameters, Smith chart applications for impedance matching, transmission line structures like stripline, microstrip line and coaxial line, filter designs for low-pass, high-pass and band-pass characteristics, amplifier design based on s-parameters, bias network designs, one port and two port oscillator circuits, noise in RF systems.

Max Credits: 3
Min Credits: 3

16.435 Computational Electromagnetics


Max Credits: 3
Min Credits: 3

16.441 Introduction to Biosensors
Course ID: 33545

Course Details: This course introduces the theory and design of biosensors and their applications for pathology, pharmacogenetics, public health, food safety, civil defense, and environmental monitoring. Optical, electrochemical, and mechanical sensing techniques will be discussed.

Max Credits: 3
Min Credits: 3

16.444 Power Distribution System

Course ID: 3228

Course Details: An intermediate course in analysis and operation of electrical power distribution systems using applied calculus and matrix algebra. Topics include electrical loads characteristics, modeling, metering, customer billing, voltage regulation, voltage levels, and power factor correction. The design and operation of the power distribution system components will be introduced: distribution transformers, distribution substation, distribution networks, and distribution equipment. Prerequisite: 16.355

Max Credits: 3
Min Credits: 3

16.445 Analog Devices and Techniques

Course ID: 1266

Course Details: A survey of analog devices and techniques, concentrating on operational amplifier design and applications. Operational amplifier design is studied to reveal the limitations of real opamps, and to develop a basis for interpreting their specifications. Representative applications are covered, including: simple amplifiers, differential and instrumentation amplifiers, summers, integrators, active filters, nonlinear circuits, and waveform generation circuits. A design project is required.

Max Credits: 3
Min Credits: 3

16.450 Advanced Digital System Design

Course ID: 30319

Course Details:

Max Credits: 3
Min Credits: 3

16.453 Software Engineering

Course ID: 3230

Course Details: Introduces software life cycle models, and engineering methods for software design and development. Design and implementation, testing, and maintenance of large software packages in a dynamic environment, and systematic approach to software design with emphasis on portability and ease of modification. Laboratories include a project where some of the software engineering methods (from modeling to testing) are applied in an engineering example.

Max Credits: 3
Min Credits: 3

16.460 Biomedical Instrumentation

Course ID: 3231

Course Details: Analysis and design of Biomedical Instrumentation systems that acquire and process biophysical signals. Properties of Biopotential signals and electrodes; Biopotential Amplifiers and Signal Processing; Basic Sensors and Principles; Medical Imaging Systems; Electrical Safety.

Max Credits: 3
16.461 Engineering Electromagnetics II

Course ID: 3232

Course Details: Continuation of Magnetostatics, Maxwell's Equations for Time-varying Fields, plane waves: time-harmonic fields, polarization, current flow in good conductors and skin effect, power density and Poynting vector, wave reflection and transmission; Snell's Law, fiber optics, Brewster angle, radiation and simple antennas, electromagnetic concepts involved in a topical technology in development.

Max Credits: 3
Min Credits: 3

16.462 Antenna Theory and Design

Course ID: 3233


Max Credits: 3
Min Credits: 3

16.467 Special Topics

Course ID: 3237

Course Details:
Max Credits: 3
Min Credits: 3

16.468 Electro-optics & Integrated Optics

Course ID: 3238

Course Details: An introduction to physical optics, electro-optics and integrated optics. Topics include: Waves and polarization, optical resonators, optical waveguides, coupling between waveguides, electro-optical properties of crystals, electro-optic modulators. Micro-Optical-Electro-Mechanical (MEMS) Devices and photonic and microwave wireless systems.

Max Credits: 3
Min Credits: 3

16.469 VLSI Design

Course ID: 1268

Course Details: Introduction to CMOS circuits including transmission gate, inverter, NAND, NOR gates, MUXES, latches and registers. MOS transistor theory including threshold voltage and design equations. CMOS inverter's DC and AC characteristics along with noise margins. Circuit characterization and performance estimation including resistance, capacitance, routing capacitance, multiple conductor capacitance, distributed RC capacitance, multiple conductor capacitance, distributed RC capacitance, switching characteristics incorporating analytic delay models, transistor sizing and power dissipation. CMOS circuit and logic design including fan-in, fan-out, gate delays, logic gate layout incorporating standard cell design, gate array layout, and single as well as two-phase clocking. CMOS test methodologies including stuck-at-0, stuck-at-1, fault models, fault coverage, ATPG, fault grading and simulation including scan-based and self test techniques with signature analysis. A project of modest complexity would be designed to be fabricated at MOSIS.

Max Credits: 3
Min Credits: 3
16.470 VLSI Fabrication

Course ID: 3239

Course Details: Fabrication of resistors, capacitors, p-n junction and Schottky barrier diodes, BJT's and MOS devices and integrated circuits. Topics include: silicon structure, wafer preparation, sequential techniques in microelectronic processing, testing and packaging, yield and clean room environments. MOS structures, crystal defects, Fick's laws of diffusion; oxidation of silicon, photolithography including photoresist, development and stripping. Metallization for conductors, ion implantation for depletion mode and CMOS transistors for better yield speed, low power dissipation and reliability. Students will fabricate circuits using the DSIP Laboratory.

Max Credits: 3
Min Credits: 3

16.472 Embedded Real Time Systems

Course ID: 3241

Course Details: Designing embedded real-time computer systems. Types of real-time systems, including foreground/background, non-preemptive multitasking, and priority-based pre-emptive multitasking systems. Soft vs. hard real time systems. Task scheduling algorithms and deterministic behavior. Ask synchronization: semaphores, mailboxes and message queues. Robust memory management schemes. Application and design of a real-time kernel. A project is required.

Max Credits: 3
Min Credits: 3

16.473 Power Electronics

Course ID: 1267

Course Details: A one-semester course with emphasis on the engineering design and performance analysis of power electronics converters. Topics include: power electronics devices (power MOSFETs, power transistors, diodes, silicon controlled rectifiers SCRs, TRIACs, DIACs and Power Darlington Transistors), rectifiers, inverters, ac voltage controllers, dc choppers, cycloconverters, and power supplies. The course includes a project, which requires that the student design and build one of the power electronics converters. A demonstrative laboratory to expose the students to all kinds of projects is part of the course.

Max Credits: 3
Min Credits: 3

16.474 Principles Of Solid State Devices

Course ID: 3242

Course Details: Principles of Solid State Devices: Crystal properties and growth of semi-conductors, atoms and electrons, Bohr's model, quantum mechanics, bonding forces and energy bands in solids, charge carriers in semiconductors, drift of carriers in electric and magnetic fields, carrier lifetime and photoconductivity, junctions, forward and reverse bias, reverse bias breakdown (Zener effect), tunnel diodes, photodiodes, LED, bipolar junction transistors, field effect transistors. A design project is included in the course.

Max Credits: 3
Min Credits: 3

16.480 Microprocessor Systems II & Embedded Systems

Course ID: 31985

Course Details: Continuation of 16.317. CPU architecture, memory interfaces and management, coprocessor interfaces, bus concepts, bus arbitration techniques, serial I/O devices, DMA, interrupt control devices. Including Design, construction, and testing of dedicated microprocessor systems (static and real-time). Hardware limitations of the single-chip system. Includes micro-controllers, programming for small systems, interfacing, communications, validating hardware and software, microprogramming of controller chips, design methods and testing of embedded systems.

Max Credits: 3
Min Credits: 3
16.481 Operating Systems

Course ID: 3246

Course Details: Covers the components, design, implementation, and internal operations of computer operating systems. Topics include basic structure of operating systems, Kernel, user interface, I/O device management, device drivers, process environment, concurrent processes and synchronization, inter-process communication, process scheduling, memory management, deadlock management and resolution, and file system structures. Laboratories include examples of components design of a real operating systems.

Max Credits: 3
Min Credits: 3

16.482 Computer Architecture and Design

Course ID: 3247


Max Credits: 3
Min Credits: 3

16.483 Network Design: Principles, Protocols & Applications

Course ID: 3248

Course Details: Covers design and implementation of network software that transforms raw hardware into a richly functional communication system. Real networks (such as the Internet, ATM, Ethernet, Token Ring) will be used as examples. Presents the different harmonizing functions needed for the interconnection of many heterogeneous computer networks. Internet protocols, such as UDP, TCP, IP, ARP, BGP and IGMP, are used as examples to demonstrate how internetworking is realized. Applications such as electronic mail and the WWW are studied.

Max Credits: 3
Min Credits: 3

16.484 Computer Vision and Digital Image Processing

Course ID: 3249

Course Details: Introduces the principles and the fundamental techniques for Image Processing and Computer Vision. Topics include programming aspects of vision, image formation and representation, multi-scale analysis, boundary detection, texture analysis, shape from shading, object modeling, stereo-vision, motion and optical flow, shape description and objects recognition (classification), and hardware design of video cards. AI techniques for Computer Vision are also covered. Laboratories include real applications from industry and the latest research areas.

Max Credits: 3
Min Credits: 3

16.490 Fiber Optic Communication

Course ID: 3252

Course Details: Optical fiber; waveguide modes, multimode vs single mode; bandwidth and data rates; fiber losses; splices, couplers, connectors, taps and gratings; optical transmitters; optical receivers; high speed optoelectronic devices; optical link design; broadband switching; single wavelength systems (FDDI, SONET, ATM); coherent transmission; wavelength division multiplexing and CDMA; fiber amplifiers.

Max Credits: 3
Min Credits: 3

16.491 Industrial Experience
Course ID: 3253

Course Details: This three credit course is for co-op or industrial experience. It may be taken three times and the co-op internship should be for at least 500 hours in order to be eligible for credit. Only 3 credits may be used toward the BSEng in CpE or EE degree. Registration for this course is conditional on the approval of the Department Co-op coordinator. A grade of Satisfactory or Unsatisfactory is given.

Max Credits: 12
Min Credits: 0

16.492 Industrial Experience II

Course ID: 3254

Course Details: Industrial work experience by permission of coordinator only.

Max Credits: 3
Min Credits: 3

16.493 Industrial Experience III

Course ID: 3255

Course Details: This three credit course is for co-op or industrial experience. It may be taken three times and the co-op internship should be for at least 500 hours in order to be eligible for credit. Only 3 credits may be used toward the BSEng in CpE or EE degree. Registration for this course is conditional on the approval of the Department Co-op coordinator. A grade of Satisfactory or Unsatisfactory is given. Prerequisite: Permission of Instructor

Max Credits: 3
Min Credits: 3

16.499 Capstone Project

Course ID: 3256

Course Details: The purpose of the Capstone Project is to provide the student with a design experience which resembles entry level engineering assignments. It is expected that the project encompass a minimum of three technical areas within the CpE or EE discipline, and include some aspects of each step in the development of a marketable product i.e. Research, Design & Development, Manufacture, Marketing & Service. A formal technical report must be submitted prior to the submission of a course grade. Prerequisite 16.399 and 16.400

Max Credits: 3
Min Credits: 3

17.130 Electrical Basics and Laboratory

Course ID: 3412

Course Details: This course introduces the basic principles of electrical engineering, including the concepts of voltage, current, resistance, inductance and capacitance. Ohm's Law, Kirchhoff's Laws, superposition, Thevenin's theorem, and Norton's theorem will be covered. Alternating current concepts, frequency response and filters are discussed. The use of laboratory power supplies and measuring instruments such as oscilloscopes, voltimeters, ammeters and ohmmeters are demonstrated. Written reports are required.

Max Credits: 2
Min Credits: 2

17.213 Electric Circuits I

Course ID: 3420

Course Details: Discusses: electrical circuits; voltage, current and resistance; energy, power and charge; Ohm's Law, Kirchhoff's Current Law and Kirchhoff's Voltage Law; simplification and conversion techniques for networks containing sources and/or resistance; Thevenin's and Norton's theorems; fundamentals of magnetism and magnetic circuits; properties of capacitance and inductance and associated transient behavior of circuits.
17.354 PSPICE Simulation

Course Details: OrCAD's Capture is used as the schematic entry tool to generate circuits that will be simulated using PSPICE. AC and DC independent and dependant sources and device models will be used in these circuits that will then be evaluated by various simulation methods using voltage, current and frequency sweeping as well as temperature and time sweeps. The graphical analysis tool, Probe, will be used to display the results of the simulations and Probe's mathematical functions will be used to further analyze the simulation results. All of these functions will be presented in a combination of lecture, homework, and hands-on PC lab environment. Applications learned in class will be reinforced by homework problems which will then be applied in the PC lab. Pre-Requisite: 17.355

Max Credits: 3
Min Credits: 3

17.361 Project Laboratory A

Course Details: The project lab runs for 14 weeks with design, fabrication, and testing of the project during the weeks one through twelve, and the last two weeks for presentation of the projects to the class. It is expected that all projects be presented operational and meeting the design performance requirements. There are exceptions to this. In the case of non-working projects the progress and final report will be heavily relied on for grading.

Max Credits: 2
Min Credits: 2

17.383 Microprocessors A

Course Details: Introduces the microprocessor and microprocessor programming through an integrated set of experiments and related lectures. Topics include: binary, decimal, and hexadecimal numbers; the microprocessor; memory devices; structure of microprocessor-based systems; programming and instruction sets; addressing modes; arithmetic, logical, and shift instructions; branch conditions and instructions; indexed addressing; the stack; subroutines; assembly language; floating-point routines; and software development techniques. Approximately one-half of the course time will be an associated laboratory, culminating with a programming project. Pre-Requisite: 17.341

Max Credits: 3
Min Credits: 3

17.384 Microprocessors B

Course Details: Extends the skills developed in 17.393 to interfacing the microprocessor to the outside world through an integrated set of experiments and related lectures. Topics include: architecture of microprocessor-based systems; microcontrollers; parallel I/O ports; interrupts; A/D and D/A converters; programmable timers; handshaking; and serial communications. The course will contain a three-week project applying the functions learned to a real world design. Approximately one-half of the course time will be an associated laboratory.

Max Credits: 2
Min Credits: 2

17.391 Project Laboratory B

Course Details: The project lab runs for 14 weeks with design, fabrication, and testing of the project during the weeks one through twelve, and the last two weeks for presentation of the projects to the class. It is expected that all projects be presented operational and meeting the design performance requirements. There are exceptions to this. In the case of non-working projects the progress and final report will be heavily relied on for grading. May do project at work (all requirements of reports, presentation, etc. still required). Pre-Requisites: 17.361, or 17.353 and 17.358 and 17.365
17.392 Project Laboratory C

Course ID: 3456

Course Details: The project lab runs for 14 weeks with design, fabrication, and testing of the project during the weeks one through twelve, and the last two weeks for presentation of the projects to the class. It is expected that all projects be presented operational and meeting the design performance requirements. There are exceptions to this. In the case of non-working projects the progress and final report will be heavily relied on for grading. May do project at work (all requirements of reports, presentation, etc. still required).

Max Credits: 2
Min Credits: 2

17.410 System Engineering and Analysis

Course ID: 37880

Course Details: This course describes the entire development of complex systems from needs and requirements analysis through the life cycle design process. Phases of system design from conceptual to detailed design are described. Program management and control techniques, including risk management and configuration management, are discussed. Analysis of alternatives and decision making under risk and uncertainty are covered. Mathematical tools for quantitative analysis are described. Costing issues are discussed and the “ilities” (i.e., reliability, maintainability, supportability, etc.) are introduced.

Max Credits: 3
Min Credits: 3

17.485 Fundamentals of Communication Systems

Course ID: 3481

Course Details: The course will provide an overview of various techniques and technologies used in communication systems. Signal analysis and linear system analysis will be discussed along with various nonlinear techniques. Various modulation techniques to be discussed will include linear modulation (AM), angle modulation (FM), and several types of digital modulation. Issues related to wireless systems as well as computer communication will be addressed.

Max Credits: 3
Min Credits: 3

20.314 Manufacturing Production

Course ID: 3717

Course Details:

Max Credits: 3
Min Credits: 3

20.402 Manufacturing Operations

Course ID: 3726

Course Details:

Max Credits: 3
Min Credits: 1

20.499 Industrial Technology Capstone Project

Course ID: 3751

Course Details:
Max Credits: 3  
Min Credits: 3  

22.200 Mechanical Engineering Project I  
Course ID: 32997  
Course Details: Students work on engineering design/build/test (DBT) projects under the supervision of a mechanical engineering faculty member. Projects can include student club based DBT projects.  
Max Credits: 1  
Min Credits: 1  

22.201 Mechanical Design Laboratory I  
Course ID: 3796  
Course Details: Course emphasis is on introducing the use of computer aided design tools in the engineering problem solving process. Assigned design projects require the use of both wire frame and solid modeling tools. Lecture and lab activities are used to support project requirements, and to provide more in-depth understanding of computer aided engineering design and drawing.  
Max Credits: 2  
Min Credits: 2  

22.202 Mechanical Design Laboratory II  
Course ID: 3797  
Course Details: This is an introductory course in manufacturing processes covering the basic machine tool practices utilized in the manufacturing of a product. The objective of the course is to develop a broad understanding of manufacturing operations and their relationship to engineering product design. Students manufacture, fabricate and measure the accuracy of a mechanical assembly from design drawings, using lathes, milling machines, drill presses and other conventional processes.  
Max Credits: 2  
Min Credits: 2  

22.211 Statics  
Course ID: 3798  
Course Details: The application of Newton's Laws to engineering problems in statics. The free-body diagram method is emphasized. Topics include vector algebra, force, moment of force, couples, static equilibrium of rigid bodies, trusses, friction, properties of areas, shear and moment diagrams, flexible cables, screws, bearings, and belts.  
Max Credits: 3  
Min Credits: 3  

22.212 Strength of Materials  
Course ID: 3799  
Course Details: Stress and deformation analysis of bodies subjected to uniaxial loading, thermal strain, torsion of circular cross-sections, shear flow in thin-walled sections, bending of beams, and combined loading. Application of equilibrium, compatibility and load-deformation relations to solve statically determinate and indeterminate systems.  
Max Credits: 3  
Min Credits: 3  

22.213 Dynamics (alternate 14.205)  
Course ID: 3800
Course Details: Calculus based vector development of the dynamics of points, particles, systems of particles, and rigid bodies in planar motion; kinematics of points in rotating and non-rotating frames of reference in one, two, and three dimensions; conservation of momentum, and angular momentum; principle of work and energy.

Max Credits: 3
Min Credits: 3

22.242 Thermodynamics

Course ID: 3803

Course Details: The first and second laws of thermodynamics are introduced and applied to the analysis of thermodynamic systems in terms of work, heat, energy transformation, and system efficiency. The use of tables, graphs, and equations of state is introduced to obtain various properties of pure substances. The concepts of work, heat and energy, as well as their relationships, are studied. The theory and application of reversible and irreversible thermodynamic process, Carnot cycles, and entropy are studied in relation to the energy analysis of engineering systems. Energy balances and ideal efficiencies of steady flow engineering systems are analyzed.

Max Credits: 3
Min Credits: 3

22.296 Mechanical Behavior of Materials

Course ID: 3810

Course Details: Properties and characterization of engineering materials. The behavior of engineering materials is studied experimentally to develop an understanding of properties important in materials selection and engineering design. Structure-property-processing relationships are discussed. Topics include stress, strain, strength, stiffness, thermal expansion, hardness, tensile and bending tests, strain gages, corrosion, microstructure of metals, polymers, ceramics and composites.

Max Credits: 3
Min Credits: 3

22.300 Mechanical Engineering Project II

Course ID: 32998

Course Details: Students work on engineering design/build/test (DBT) projects under the supervision of a mechanical engineering faculty member. Projects can include student club based DBT projects.

Max Credits: 1
Min Credits: 1

22.302 Mechanical Engineering Laboratory I: Instrumentation

Course ID: 3811

Course Details: Students set up and conduct specific experiments designed to study: 1) fundamental ME instrumentation systems; 2) fundamental experimental techniques and 3) basic physical principles of mechanical systems. Experiments are divided into two areas; solid-mechanical and thermo-fluids. Students develop models for use in validating and comparing with experimental results. Written communication techniques are emphasized.

Max Credits: 3
Min Credits: 3

22.311 Applied Strength of Materials

Course ID: 3812

Course Details: Strength of materials principles are applied to the stress analysis of machine components and structures. The effects of buckling and combined bending, torsion, and axial loadings are studied together with the effects of stress risers due to geometrical complexities. Topics include: 3D stress transformations; principal stresses; Mohr's circle; failure criteria; stress concentration factors; equilibrium and energy methods; plates; global, local and inelastic buckling; finite elements; fracture and fatigue.

Max Credits: 3
Min Credits: 3

22.321 Mechanical Design I

Course ID: 3814

Course Details: Design and kinematic analysis of linkages. Course topics include linkage synthesis and motion analysis (position, velocity and acceleration) and technical writing. These topics are integrated in a semester-long design-build-test project utilizing commercial CAD and simulation software. This project involves project management, teamwork, design, creation of shop-quality drawings, manufacturing and assembly as well as performance testing of a three-position double-dwell linkage. Schedules (Gantt charts), progress reports and final reports are submitted.

Max Credits: 3

Min Credits: 3

22.322 Mechanical Design II

Course ID: 3815

Course Details: Design of cams and gear trains and control of mechanical devices. Course topics include: cam sizing and manufacture, cam and gear train kinematics, dynamic force analysis, machine balancing, introduction to the control of mechanical systems. The major project involves the design, analysis, manufacture, and dynamic testing of a cam having specified performance requirements; computer aided design (CAD) and computer numerically controlled (CNC) milling machines are applied. Dynamic simulation (MATLAB) is used throughout the course.

Max Credits: 3

Min Credits: 3

22.341 Conduction & Radiation Heat Transfer

Course ID: 3817

Course Details: The theory of steady state and transient heat conduction in solids is developed and applied. The concepts of Biot and Fourier numbers are covered and their applications are studied. The principals of thermal radiation with application to heat exchange between black and non-black body surfaces are studied. The use of radiation networks (electrical network analogy) is examined. Surface radiation properties are extensively covered. Design projects are integrated into the course.

Max Credits: 3

Min Credits: 3

22.342 Convective Processes

Course ID: 3818

Course Details: Internal and external flows with friction, Reynold's number, laminar and turbulent flows. Mathematical development of the hydrodynamic boundary layer. Boundary layer separation and fluid dynamic drag. Flow in pipes. Forced and free convective heat transfer, the thermal boundary layer, Reynolds' analogy, Prandtl and Grashof numbers. Empirical engineering convection relations. Students engage in a design project throughout the term.

Max Credits: 3

Min Credits: 3

22.361 Mathematical Methods for Mechanical Engineers

Course ID: 3823


Max Credits: 3

Min Credits: 3

22.381 Fluid Mechanics
Course ID: 3824

Course Details: A calculus-based engineering course which deals with the development of basic fluid mechanic relations. Emphasis is placed on the control-volume approach for solving problems. Topics include fluid behavior and fluid properties: hydrostatic pressure and forces; buoyancy and stability; continuity, momentum, and Bernoulli equations; similitude and dimensional analysis; scale analysis and modeling; internal and external flows with friction; Reynolds number; laminar and turbulent flows; mathematical development of the hydrodynamic boundary layer; boundary layer separation and fluid dynamic drag; fluid flow in pipes and ducts.; friction and minor losses.

Max Credits: 3
Min Credits: 3

22.400 Mechanical Engineering Project III

Course ID: 32999

Course Details: Students work on engineering design/build/test (DBT) projects under the supervision of a mechanical engineering faculty member. Projects can include student club based DBT projects. Completion of 22.400, 22.300, and 22.200 can count as a mechanical engineering technical elective (academic petition required).

Max Credits: 1
Min Credits: 1

22.403 Mechanical Engineering Lab II: Measurement Engineering

Course ID: 3825

Course Details: Continuation of Mechanical Engineering Lab I. Focuses on digital data acquisition systems used on mechanical engineering equipment. Students design measurement systems composed of various transducers, their associated signal conditioners and digital data acquisition and recording devices. Statistical methods are emphasized. Experiments require the students to provide calibration and to select appropriate sampling rates and test durations. Systems under test range from simple multisensor laboratory apparatus to actual operating mechanical systems.

Max Credits: 3
Min Credits: 3

22.423 Capstone Design

Course ID: 3835

Course Details: Students perform independent design work and participate in team efforts to develop conceptual designs from functional requirements. Perform design analysis and synthesis, modeling, fabrication, testing, cost estimating, and documenting the essential elements of the system design.

Max Credits: 3
Min Credits: 3

22.425 Design of Machine Elements

Course ID: 3837

Course Details: The principles of mechanics and commonly used failure theories are applied to the design and analysis of machine elements subjected to static and dynamic (fatigue) load conditions. Elements studied include power screws, bolts, springs, bearings, gears, lubrication, shafts, brakes, clutches, and belts.

Max Credits: 3
Min Credits: 3

22.426 Green Energy Engineering

Course ID: 36920

Course Details: Introduces a comprehensive range of green energy sources, and the tools and techniques to use that energy. A strong emphasis is given to residential applications, particularly those that are cost effective. Topics include solar energy, photovoltaic, water power, wind power, geothermal heating, and bio-fuel production and use. Course will also
investigate architectural considerations essential to effective implementation of green energy. Course is open to Seniors in engineering and science and those with a solid knowledge of vector notations and college algebra. Familiarity with the MATLAB computing environment would be useful.

Max Credits: 3
Min Credits: 3

22.441 Analysis of Thermo-Fluid Processes

Course ID: 3841

Course Details: Topics covered include: heat exchanger analysis and design; thermodynamic analysis of: gas power cycles, steam and combined cycles, and refrigeration cycles; mixtures of ideal gases; air-vapor mixtures and psychrometric charts with application to air conditioning systems; flow of a compressible fluid through a variable area passage: Mach number, choking conditions, and normal shock.

Max Credits: 3
Min Credits: 3

22.450 Nanoscale Transport Phenomena for Manufacturing Nanodevices

Course ID: 36698

Course Details: An interdisciplinary course taught by faculty from the Chemical, Mechanical and Plastics Engineering Departments, who have special knowledge in nanoscale fluid mechanics and heat transfer. The course on nanoscale transport phenomena constitutes a bridge between existing fluid and heat transfer courses in multiple disciplines and emerging nanoscale science and engineering concepts to reflect the forefront of nanomanufacturing. The course is designed to incorporate recent advances in manufacturing polymer based nanodevices. Key issues of the implementation and maintenance costs for fabrication will be addressed. Hands-on laboratory experiments will be performed to complement the lectures with the ultimate goal of designing and building a complete nanodevice at the end of the course. The course will prepare graduates for employment focused on designing and manufacturing nano/microfluidic systems, lab on ship devices, electronic devices, medical devices and other emerging technologies.

Max Credits: 3
Min Credits: 3

22.451 Dynamic Systems Analysis

Course ID: 3844

Course Details: Dynamic modeling of mechanical, electrical, electro-mechanical, hydraulic and thermal components. Application of ordinary differential equations, Laplace transforms, and numerical simulation for the response of these systems; response due to initial conditions and to transient and sinusoidal inputs using both time and frequency domain approaches considered. Use of block diagrams and numerical simulation using MATLAB and Simulink for linear time invariant systems is emphasized. Project work includes model identification and synthesis from measured data for first and second order systems.

Max Credits: 3
Min Credits: 3

22.453 Mechatronics

Course ID: 3845

Course Details: Devices and methods to monitor and control mechanical systems, with particular emphasis on the use of embedded microprocessors.

Max Credits: 3
Min Credits: 3

22.457 Vibrations

Course ID: 3847

Course Details: Fundamentals of vibration analysis of 1, 2 and multi DOF mechanical systems including the effects of damping; free response, forced response to transient and steady state harmonic and periodic excitations; the significance of
natural modes, resonance frequency, mode shape, and orthogonality; vibration control, vibration isolators and absorbers; introduction to vibration measurement. Computer problems include the design of vibration control devices. A measurement project involves the use of an accelerometer, signal conditioning and analysis instrumentation.

Max Credits: 3
Min Credits: 3

22.473 Design Theory and Constraints

Course ID: 3851

Course Details: Concepts of world class design and manufacturing of modern products, including the issues of Design for Quality (DFQ), cost and the customer will be studied. Tools and techniques to be studied include Total Quality Management (TQM), statistical process control, process capability studies, six sigma quality, design efficiency ratings, design for cost, design of experiments, Analysis of Variance (ANOVA) of the mean and signal-to-noise ratio, and quality function deployment. Industrial case studies are used and student project work is required.

Max Credits: 3
Min Credits: 3

22.483 Aerodynamics and Flight Mechanics

Course ID: 3856


Max Credits: 3
Min Credits: 3

22.486 Ocean Engineering

Course ID: 3859


Max Credits: 3
Min Credits: 3

22.491 Industrial Experience I

Course ID: 3860

Course Details:

Max Credits: 3
Min Credits: 3

22.492 Industrial Experience II

Course ID: 3861

Course Details:

Max Credits: 3
Min Credits: 3

22.493 Industrial Experience III

Course ID: 3862

Course Details:
Max Credits: 9
Min Credits: 3

22.499 Directed Studies in Mechanical Engineering

Course ID: 3865

Course Details: This course provides seniors in Mechanical Engineering with the opportunity to pursue the study of a technical topic or project, individually under the supervision of a faculty member and, if desired, a responsible project engineer from industry. The course is to result in a term paper or technical report.

Max Credits: 3
Min Credits: 3

23.101 Engineering Graphics

Course ID: 3974

Course Details: This course presents material in both class and laboratory format. Topics covered include: geometric constructions; multi-view sketching and projection; sectional views; isometric and oblique drawing; and dimensioning.

Max Credits: 2
Min Credits: 2

23.102 Engineering Design and Graphics

Course ID: 3975

Course Details: This course presents material in both class and laboratory format. Topics covered include: dimensioning, print reading, auxiliary views, graphs, screw threads, gears, and the design process. Working in teams, a major design project with written and oral reports is required.

Max Credits: 3
Min Credits: 3

23.200 Computer Aided Drafting (CADr)

Course ID: 3979

Course Details: This course introduces the student to the use of CAD for construction of basic shapes and multi view drawings. It is a project oriented course introducing the student to graphic design using AutoCAD. AutoCAD, as it is applied in 23.200, is a two dimensional CAD program used to produce computer design models. Course stresses hands-on work with AutoCAD. Course is a fundamentals approach and requires no experience with other CAD programs. Pre-Requisite: 23.101

Max Credits: 3
Min Credits: 3

23.211 LABVIEW(TM) Programming with Engineering Applications

Course ID: 30827

Course Details: LabVIEW(TM) software is a graphical programming language "G" that is widely used in industrial setting by engineers and scientists alike. Materials covered in the course will be basic to programming structures. As an example the course will cover For Loops, While Loops, Case Structures, and Boolean Logic. Control, data acquisition, data reduction, and analysis tools associated with the software program will be covered, and used. A comprehensive semester project will be assigned to teams of students to solidify the basic programming topics covered, teach the Virtual Instrument (VI) hierarchy, and to emphasize the importance of teamwork. Special Notes: Can be used as an MET elective or as a substitute for 90.211 (Introduction to Programming with C-Part I) in the MET Program.

Max Credits: 3
Min Credits: 3

23.221 Statics
Course ID: 3981
Course Details: Statics is the study of objects in equilibrium and the forces acting on that object. Students will develop mathematical models to predict and analyze forces and their distributions with the use of the free body diagram. The concepts presented in this course directly relate to other mechanical and civil engineering fields. Students must have a basic understanding of trigonometry, geometry, physics and calculus. This course is in a combined section with CET.
Max Credits: 3
Min Credits: 3

23.222 Dynamics
Course ID: 3982
Course Details: This course introduces the student to the kinematics and kinetics of particles, systems of particles, and rigid bodies. This course covers the basic methods of analysis including Newton's 2nd Law (force, mass, acceleration), Work and Energy, and Impulse and Momentum. This course is in a combined section with CET.
Max Credits: 3
Min Credits: 3

23.223 Mechanics of Materials
Course ID: 3983
Course Details: This course discusses the principles of strength of materials and the relationships between externally applied forces and internally induced stresses in various types of structural and machine members and components. Included are axial, torsional, and flexural loadings, stress-strain relationships, deformation of materials, elastic deformation, principal stresses, temperature effects, Mohr's circle, shear and bending moment diagrams, the design of beams, and the deflection of beams.
Max Credits: 3
Min Credits: 3

23.241 Elements of Thermodynamics I
Course ID: 3984
Course Details: This course presents a thorough treatment of the concepts and laws of thermodynamics. The first law (energy) and the second law (entropy), properties of liquids and gases, and common power cycles (Rankine and Otto) are covered. Included is an overview of the global energy problem and power generation technologies, both established and novel
Max Credits: 3
Min Credits: 3

23.242 Applied Fluid Mechanics
Course ID: 3985
Course Details: This course addresses the Properties of Fluids and basic concepts of Continuity, Momentum, Hydrostatics, and Fluid Flow Kinematics. Analysis of flow of real fluids in pipes, ducts and open channels is conducted. The study of compressible flows, fluid couplings as well as flow measurement techniques will also be discussed
Max Credits: 3
Min Credits: 3

23.243 Elements of Thermodynamics II
Course ID: 3986
Course Details: This course is a continuation of Thermodynamics I analyzing in more detail various real world, practical power generation cycles, such as Rankine, reheat, regenerative, Otto, and Diesel. Also covered are refrigeration cycles, the basics of psychrometry, and the thermodynamics of combustion.
23.262 Engineering Data Analysis

Course ID: 3987

Course Details: This course introduces students to basic statistical techniques, probability, risk analysis, and predictive modeling, and how they impact engineering and manufacturing activities in both analytical and forward looking activities. Topics covered include basic statistics, probability, combinations, permutations, regression, correlation, and predictive model development with the objective of building working statistical models for a technical environment. Pre-Requisites: 92.126, Proficiency in MS Excel or equivalent.

Max Credits: 3
Min Credits: 3

23.295 Materials Science

Course ID: 3988

Course Details: Properties of materials, selection of materials and processing of materials for appropriate applications are the focus of this course. Case studies are utilized to demonstrate failures which need not have occurred. Materials which are considered include metals and alloys, ceramics, polymers, and composites.

Max Credits: 3
Min Credits: 3

23.314 Manufacturing Productivity

Course ID: 3994

Course Details: The course will focus upon three primary categories of manufacturing improvement: theory of constraints/workflow, work definition and design, and quality improvement. Each students should understand and be conversant in the principles of productivity and able to lead a productivity improvement project upon successful completion of the course. Case studies will be used to illustrate the proper implementation of productivity improvement principles.

Max Credits: 3
Min Credits: 3

23.353 Forensic Engineering

Course ID: 32150

Course Details: This course is a survey of forensic engineering with particular emphasis on using engineering science and technology to investigate and reconstruct failures of engineered systems. Topics include qualifications of the forensic engineer, the scientific method, failure hypotheses, levels of confidence, physical evidence, field investigation techniques, examination and testing, codes and standards, and personnel safety. Other topics include ethics, the hired gun, junk science, the legal process, introduction to expert witness testimony, trial exhibits, Frye and Daubert decisions, bias, forensic engineering practice, and engineering reports.

Max Credits: 3
Min Credits: 3

23.414 Engineering Economics

Course ID: 4004

Course Details: This course introduces students to accounting and finance operations and principles, and how they impact engineering and manufacturing activities in both analytical and forward looking planning activities. Topics covered include financial statements, costing, depreciation, time value of money, cash flows, capital budgeting, and capital recovery with the objective of building working financial models for a technical environment. Pre-Requisites: 49.201 Economics I or instructor permission. Proficiency in MS Excel or equivalent.

Max Credits: 3
Min Credits: 3
23.475 Heat Transfer

Course ID: 4021

Course Details: This course focuses on the study of the fundamentals of heat transfer. Case studies are utilized to enhance the students' knowledge of the basic principles of heat transfer and to develop their problem-solving ability in conduction, convection and radiation heat transfer.

Max Credits: 3
Min Credits: 3

23.485 Introduction to SolidWorks

Course ID: 4027

Course Details: This course introduces the student to the use of CAD for construction of basic shapes and multiview drawings. It is a project oriented course introducing the student to graphic design using SolidWorks. SolidWorks is a three dimensional solid modeling program used to produce computer design models. Pre-Requisite: 23.200 or some experience with another CAD program is required.

Max Credits: 3
Min Credits: 3

23.492 Directed Study: Special Topics

Course ID: 4028

Course Details: Covers basic mechanical comprehension as it relates to solving problems associated with mechanical systems. Materials covered will be in the form of theoretical equations simplified and applied directly to physical components used for demonstration & verification.

Max Credits: 3
Min Credits: 3

24.331 Introduction to Nuclear Engineering I

Course ID: 1263

Course Details: Review of relevant nuclear physics topics including nuclear stability, various forms of radiation, radioactive decay, and the interaction of radiation with matter (including health effects). Emphasis placed on neutron reactions in various core and structure materials, neutron cross sections, and the development and analysis of the neutron balance equation for various reactor types. Key aspects of nuclear reactor core physics and shielding design (criticality, power generation, reactor kinetics, reactivity control, fuel depletion, fission product poisoning, etc.) are treated. (10.331 and 24.331 are the same)

Max Credits: 3
Min Credits: 3

24.419 Nuclear Reactor Operator Training I

Course ID: 4047

Course Details: This course provides an introductory overview of nuclear physics and related theory and the various systems associated with the operation of the UMASS Lowell Nuclear Research Reactor (UMLRR). The course is intended for students who want to learn about the operations of the UMLRR and who are interested in a career in nuclear engineering and science. The course provides a multidisciplinary systems approach to education and training, which emphasizes "learning by doing". In a practical setting, students study and learn basic nuclear theory and design aspects of real-world systems associated with nuclear reactor operations. Knowledge is gained by working closely with experienced reactor operators and staff, and through independent study.

Max Credits: 3
Min Credits: 3

24.420 Nuclear Reactor Operator Training II
Course ID: 4048

Course Details: Continuation of 24.419. Upon completion of this course, the student will be given a simulated Reactor Operator examination, including a written test, an oral test about reactor systems, and a controls manipulation test.

Max Credits: 3
Min Credits: 3

**24.434 Introduction to Nuclear Engineering II**

Course ID: 36717

Course Details: A continuation of 10.331/24.331 with further discussion of basic nuclear reactor theory and reactor operations. The 2nd half of the semester focuses on heat removal and energy conversion in pressurized and boiling water reactors, including heat transfer in fuel elements and shields and the heat transfer characteristics of boiling and non-boiling liquids. Engineered safety and overall reactor core and plant design considerations are also discussed. (10.434 and 24.434 are the same)

Max Credits: 3
Min Credits: 3

**24.495 Directed Studies**

Course ID: 4053

Course Details: Special problems in nuclear science and engineering assigned to the individual student, with emphasis on modern research methods and preparation of results for publication.

Max Credits: 3
Min Credits: 3

**25.3CE Cooperative Education**

Course ID: 37567

Course Details: This zero credit course is specifically designated for Plastics, Chemical, And Mechanical Undergraduate Engineering students who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program and have secured their first, full-time co-op employment. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0
Min Credits: 0

**25.4CE Cooperative Education**

Course ID: 37566

Course Details: This zero credit course is specifically designated for Plastics, Chemical, and Mechanical Undergraduate Engineering students who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program and have secured their first, full-time co-op employment. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0
Min Credits: 0

**25.103 Environmental Biotechnology**

Course ID: 34562

Course Details: This UML TEAMS Academy course will investigate the chemical and biological impact of human activity on
aquatic environments. A specific focus of this course will be to observe the behavior of microorganisms impacted by pollutants introduced into the environment by humans. Students will explore possible engineering solutions to alleviate the problems caused by pollutants. This course can be described as "inquiry based discovery" and will rely heavily on laboratory investigations and laboratory based projects analyzing environmental samples collected in the field. This course is open only to high school students accepted to the UML-TEAMS Academy. Instructor permission required.

Max Credits: 3
Min Credits: 3

**25.107 Introduction To Engineering I**

Course ID: 4112

Course Details: This course provides a hands-on introduction to engineering and the engineering design process. Through assignments and projects, students learn how to: identify a problem, develop alternative solutions, select the best alternative, make critical decisions, and work as a team. The course is intended for freshmen in all engineering majors and provides an overview of the different engineering disciplines. Lecture and lab component.

Max Credits: 2
Min Credits: 2

**25.108 Introduction To Engineering II**

Course ID: 4113

Course Details: This course is intended for first-year engineering students and provides an introduction to technical communications, teamwork and other skills. Topics vary depending on the department and include data analysis, computer-aided drafting/design/modeling program usage, report-writing and/or oral presentation. Depending on the department, software introduced may include Excel, PowerPoint, AutoCad, Matlab and/or MathCad. Team-based labs and projects may be employed. Students should enroll in the sections corresponding to their major or intended department to develop relevant skills.

Max Credits: 2
Min Credits: 2

**25.130 Introduction to Nano-Engineering**

Course ID: 30335

Course Details: The multi-billion dollar investment in nanoscience and nanotechnology is beginning to yield new products, including better sunscreens and wear-resistance materials. "Introduction to Nano-Engineering" is as overview of engineering at the nanoscale, including measurement techniques, nanoelectronics, nanomaterials, design of nanodevices, nanomanufacturing, and the societal impact of nanotechnology. "Lecture" material is accompanied by open-ended questions for chat-room discussion and five virtual laboratories. Targeted for the general public. This is an interdisciplinary course.

Max Credits: 3
Min Credits: 3

**25.151 Assistive Technology & Electronics**

Course ID: 34563

Course Details: UML-TEAMS Academy students will explore basic electronics physics in a hands-on laboratory environment. Students will apply their knowledge as they learn how to breadboard, test, and troubleshoot a series of lab projects. Students will use CAD tools as they learn how to fabricate printed circuit boards. The course culminates with groups projects that apply the engineering design process and electronics to design and build a product for disabled clients in our community. This course is open only to high school students accepted to the UML-TEAMS Academy. Instructor permission required.

Max Credits: 3
Min Credits: 3

**25.200 Community-based Engineering Project I**

Course ID: 32562
Course Details: Students work on multi-disciplinary teams and apply their engineering problem-solving skills on community-based design projects.

Max Credits: 1
Min Credits: 1

25.210 Professional Development Seminar

Course ID: 36962

Course Details: The Professional Development Seminar is designed to provide students with the necessary structure, resources, and support to successfully secure and engage in their first cooperative education experience. Through a variety of teaching methodologies and assignments, students will participate in a sequence of learning activities including self-assessment, industry research, and the development of co-op learning objectives. Students will prepare to engage in the job search process through resume writing, strategic interviewing, professional networking and through learning professional behavior and presentation skills. The goal of the course is to assist each student in developing a sound plan of action to successfully participate in the cooperative education experience.

Max Credits: 1
Min Credits: 1

25.300 Community-based Engineering Project II

Course ID: 32563

Course Details: Students work on multi-disciplinary teams and apply their engineering problem-solving skills on community-based design projects.

Max Credits: 1
Min Credits: 1

25.310 Co-op assessment 1

Course ID: 36964

Course Details: The primary goal of this seminar is to assist students in the overall assessment of their overall cooperative education experience. Through facilitated small group discussion, individual consultation and hands on practice, students will have an opportunity to identify and articulate their technical and professional skills, and explore how these skills and their co-op employment might be translated and leveraged into future work environments and their academic program at UML.

Max Credits: 1
Min Credits: 1

25.400 Community-based Engineering Project III

Course ID: 32564

Course Details: Students work on multi-disciplinary teams and apply their engineering problem-solving skills on community-based design projects. Completion of 25.400, 25.300, and 25.200 can count as a mechanical engineering technical elective (academic petition required).

Max Credits: 1
Min Credits: 1

25.401 Engineering Capstone Design Project

Course ID: 32565

Course Details: Integrative design experience in engineering. Students work on multi-disciplinary teams and apply their engineering problem-solving skills on open-ended, real-world projects. Projects may be service-oriented in concept and teams may include members from other Departments and Colleges. Emphasis on communication, team-work, report-writing, oral presentations. This course may be used as a Technical elective for all Engineering Departments. Alternatively, this course may be used as a substitute for the culminating Capstone course in Electrical and Computer Engineering (16.499), Mechanical Engineering (22.423) and Plastics Engineering (26.416). Prerequisite: senior status & permission of instructor.

Max Credits: 3
25.410 Co-op Assessment 2

Course ID: 36967

Course Details: This seminar is designed to support and assist students in the continued assessment of their cooperative education experience. Through a deepening of their work in Co-op Assessment 1, students will review their overall performance in the cooperative education program, while continuing to demonstrate their technical and professional skills through written work and public presentations to multiple audiences. It is expected that students will clearly define their future academic and career goals, enhance their professional networks, and develop a future plan to support their engineering aspirations.

Max Credits: 1
Min Credits: 1

25.490 Industrial Experience

Course ID: 35536

Course Details:
Max Credits: 0
Min Credits: 0

25.491 Industrial Experience I

Course ID: 4128

Course Details:
Max Credits: 12
Min Credits: 0

26.4CE Co-op Experience

Course ID: 37824

Course Details: This zero credit course is specifically designated for Plastics, Chemical, and Mechanical Undergraduate Engineering students who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program and have completed their first, full-time co-op employment. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an Industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0
Min Credits: 0

26.201 Polymer Materials I

Course ID: 1258

Course Details: This introductory course in plastics materials first evaluates how commercial plastics were developed, characterized and compared throughout the relevant industry. Various ASTM testing protocols are reviewed followed by an initial study of commodity plastic materials, including polyethylene, poly (vinyl chloride), polystyrene, diene rubbers and other selected and relatively high-volume resins. Applicable commercial polymerization methods are introduced along with comparative structure/property relationships. Initial comparisons are drawn as between commodity thermoplastic resins and thermoset compositions. Comparative end-use applications are continuously discussed along with a consideration of selected environmental issues (recyclability).

Max Credits: 3
Min Credits: 3

26.202 Polymer Materials II
Course ID: 4149

Course Details: A critical review of the commercial family of materials known as engineering thermoplastics including an examination of relatively important thermoset polymer systems. Major commercial polymerization reactions are reviewed (e.g. applicable chain growth or step-growth polymerizations) including comparative market performance based upon mechanical, thermal, chemical properties and environmental considerations. Also considered are selective high performance plastic materials suitable for use at elevated temperatures and in other relatively extreme working environments. Recommended Pre-Req: 26.201 Polymer Materials I.

Max Credits: 3
Min Credits: 3

26.210 Professional Development Seminar

Course ID: 33446

Course Details: The Professional Development Seminar is designed to provide students with the necessary structure, resources, and support to successfully secure and engage in their first Plastics Cooperative Education experience. Through a variety of interactive teaching methodologies and assignments, students will participate in a sequence of learning activities including self-assessment, industry research, and the development of co-op learning objectives. Students will prepare to engage in the job search process through resume-writing, strategic interviewing, professional networking and learn professional behavior and presentation skills. The goal of the course is to assist each student in developing a sound plan of action to successfully participate in the cooperative education experience.

Max Credits: 1
Min Credits: 1

26.211 Engineering Mechanics

Course ID: 4153

Course Details: Equilibrium of structures subjected to forces and moments. Area and mass moments of inertia. Internal forces, shear and bending moments acting on loaded structures, including cantilevers, beams, trusses, bridges and machine frames. Friction.

Max Credits: 3
Min Credits: 3

26.215 Plastics Processing Engineering Laboratory I

Course ID: 4155

Course Details: A plastics laboratory courses to study plastics properties and processability. This course focuses on physical property testing of plastics. The property tests covered in this lab course include tensile properties, flexural properties, pendulum impact resistance, drop impact resistance, bulk properties, surface properties, and melt flow rate. The effect of temperature on many of these properties is also evaluated.

Max Credits: 1
Min Credits: 1

26.216 Plastics Process Engineering Laboratory II

Course ID: 4156

Course Details: This laboratory introduces students to the processes of plastics single screw extrusion, plastics injection molding, blow molding and sheet thermoforming. Experiments are designed so that the student will understand the theory of polymer conversion techniques by the interaction between process variables and materials characteristics.

Max Credits: 1
Min Credits: 1

26.218 Introduction to Design

Course ID: 4157
Course Details: This course is designed to teach basic principles of technical drawing, fundamentals of design, dimensioning and tolerances. Basic concepts of manufacturing and rapid prototyping are covered. The lecture component covers theoretical information, and the lab component covers hands-on learning, where students learn to use a commercial CAD software.

Max Credits: 2
Min Credits: 2

26.247 Thermodynamics

Course ID: 4159

Course Details: The principles of thermodynamics, a study of the first and second laws of thermodynamics with applications to classic power generation and refrigeration systems. The concepts of entropy, reversibility, irreversibility and availability.

Max Credits: 3
Min Credits: 3

26.306 Methods of Experimental Analysis

Course ID: 4163

Course Details: Basic concepts dealing with the interpretation of experimental engineering results. Deterministic vs. stochastic processes. Elementary probability theory and common distributions. Graphical analysis and mathematical modeling. Statistical parameters and their applications to quality control, and tests of significance. Design of experiments (DOE) for process development and optimization.

Max Credits: 3
Min Credits: 3

26.310 Co-op Assessment I

Course ID: 35650

Course Details: The primary goal of this seminar is to assist students in the overall assessment of their overall cooperative education experience. Through facilitated small group discussion, individual consultation and hands on practice, students will have an opportunity to identify and articulate their technical and professional skills, and explore how these skills and their co-op employment might be translated and leveraged into future work environments and their academic program at UML.

Max Credits: 1
Min Credits: 1

26.314 Fluid Flow

Course ID: 4164


Max Credits: 3
Min Credits: 3

26.315 Plastics Process Laboratory III

Course ID: 4165

Course Details: This laboratory introduces students to the processes of twin screw extrusion compounding, advanced injection molding and process monitoring, the plastics recycling process, and extrusion rheological measurements for plastics. Experiments are designed so that the student will understand the theory of polymer conversion techniques by the interaction between process variables and material characteristics.

Max Credits: 1
Min Credits: 1
26.316 Plastics Process Engineering Laboratory IV

Course Details: This laboratory introduces students to the processes of blown film extrusion, sheet extrusion, tubing extrusion with statistical quality control, twin screw compounding of nano-composites and over-molding. Experiments are designed so that the student will understand the theory of polymer conversion techniques by the interaction between process variables and material characteristics.

Max Credits: 1
Min Credits: 1

26.348 Heat Transfer

Course Details: This course covers the theory and application of steady and transient heat conduction, convection, and radiation. Particular emphasis is placed on heat transfer problems in plastics processing and modern engineered systems. Computational methods and analysis of heat exchangers are covered.

Max Credits: 3
Min Credits: 3

26.373 Plastics Mold Engineering I

Course Details: Course work entails the introduction to the fundamentals of plastics mold and die engineering with the objective to develop an overall appreciation of the mold engineer's job. Emphasis is placed on an integrated approach to mold engineering which includes the interrelationships of polymeric materials, engineering principles, processing, and plastics product design, mold and die design/construction, and design communications. Laboratory consists of the actual design of an old or mold components with emphasis on CAD and computerized Material Database. A semester project is required. Junior status or permission of instructor.

Max Credits: 3
Min Credits: 3

26.377 Plastics Process Engineering I

Course Details: The first course in a two semester sequence to study the fundamental principles of polymer processing, i.e., the conversion of the polymeric materials into useful articles. The course will first study the properties of polymers (bulk and rheological and thermal properties) and why they are important to understanding polymer processing. This course will emphasize the fundamental principles of the extrusion process and examine the correlation between elements of the extruder, polymer properties, and processing variables and why they all must be considered when studying and understanding a plastics processing technique.

Max Credits: 3
Min Credits: 3

26.378 Plastics Process Engineering II

Course Details: This course will study the basic extrusion processes of blown film, flat film, tube, pipe, extrusion coating, coextrusion, injection molding, thermoforming, rotational molding and blow molding with emphasis on how polymeric materials, machine components and process variables affect properties of the products produced with each process. Recommended Pre-Req: 26.377 Plastics Process Engineering I.

Max Credits: 3
Min Credits: 3

26.381 Polymer Science for Engineers I
Course ID: 33717

Course Details: An introduction to polymer science with a focus on making polymers. Topics covered include the chemistry, kinetics, and statistics of step and chain polymerizations and copolymerizations, polymerization processes. Industrially relevant polymers and commercial polymerization processes will be highlighted, with coverage of the health and safety aspects of various approaches to the preparation of various polymers given.

Max Credits: 3
Min Credits: 3

26.382 Polymer Science for Engineers II

Course ID: 33718

Course Details: An introduction to polymer science with a focus on polymer properties and behavior. Topics covered include analytical techniques (chemical, thermal, and microstructural analysis of polymers, measurement of molecular weight distribution, etc.), as well as the underlying physical, rheological and solution properties that make these techniques possible. Recommended Pre-Req: 26.381 Polymer Science for Engineers I

Max Credits: 3
Min Credits: 3

26.383 Polymer Science I Lab

Course ID: 34579

Course Details: Synthesis of polymers by step growth, condensation, suspension and free radical emulsion polymerization techniques. Fundamental concepts in polymerization kinetics and mechanism will be covered as well as structure-property considerations and polymerization with functional groups.

Max Credits: 1
Min Credits: 1

26.384 Polymer Science II Lab

Course ID: 34580

Course Details: Polymer characterization techniques including molecular weight distribution by gel permeation chromatography, crystallinity and order by differential scanning calorimetry; polymer morphology and surface properties, and spectroscopic (nuclear magnetic resonance, Raman, infrared) and mechanical (tensile, dynamic mechanical, rheological) techniques will also be covered. Recommended Pre-Reqs: 26.381 Polymer Science for Engineers I and 26.383 Polymer Science I Lab; Co-Req: 26.382 Polymer Science for Engineers II.

Max Credits: 1
Min Credits: 1

26.403 Mechanical Behavior of Polymers

Course ID: 1260

Course Details: Topics covered in this course include linear viscoelasticity, creep, stress relaxation, dynamic behavior, hysteresis, stress-strain response phenomena, principles of time-temperature superposition, rubber elasticity, failure and fracture mechanisms for polymers, and the effect of additives on mechanical behavior. Real life design examples are used to demonstrate the topics and concepts as much as possible.

Max Credits: 3
Min Credits: 3

26.404 Process Control

Course ID: 4172

Course Details: Basic principles of control systems used with plastics processing equipment. Included are instrumentation, signal conditioning, data acquisition, feedback control, process monitoring, data reduction, and SPC/SQC.

Max Credits: 3
Min Credits: 3

26.406 Polymer Structure, Properties and Applications

Course ID: 4173

Course Details: The fundamental relationships between molecular structure, properties and end-use applications of plastics materials will be explored in detail. Molecular structural features include chemical composition, molecular size and flexibility, intermolecular order and bonding, and supermolecular structure. Properties include processability, mechanical, acoustic, thermal, electrical, optical and chemical properties, price, and balance of properties. Applications include rigid solids, flexible solids, foams, film and non-plastic applications.

Max Credits: 3
Min Credits: 3

26.409 Senior Research Plastics I

Course ID: 4175

Course Details: Individual research projects in plastics chemistry, properties, processing, products, and industry organization. Students will review the existing literature, obtain materials and equipment, plan and carry out research programs and submit final reports for publication.

Max Credits: 3
Min Credits: 3

26.410 Coop Assessment II

Course ID: 4176

Course Details: This seminar is designed to support and assist students in the continued assessment of their cooperative education experience. Through a deepening of their work in Co-op assessment 1, students well review their overall performance in the cooperative education program, while continuing to demonstrate their technical and professional skills through written work and public presentations to multiple audiences. It is expected that students will clearly define their future academic and career goals, enhance their professional networks, and develop a future plan to support their engineering aspirations.

Max Credits: 2
Min Credits: 2

26.418 Product and Process Design

Course ID: 4183

Course Details: Theoretical principles and sound engineering practice involved in the design of new end products made from polymers, applying the total systems approach to the balance between product design, choice of materials, tool design, and process techniques, as they affect competitive choices for commercial success. A semester project is required. Recommended Pre-Reqs: 26.373 Plastics Mold Engineering I and 26.378 Plastics Process Engineering II.

Max Credits: 3
Min Credits: 3

26.450 Nanoscale Transport Phenomena for Manufacturing Nanodevices

Course ID: 36698

Course Details: An interdisciplinary course taught by faculty from the Chemical, Mechanical and Plastics Engineering Departments, who have special knowledge in nanoscale fluid mechanics and heat transfer. The course on nanoscale transport phenomena constitutes a bridge between existing fluid and heat transfer courses in multiple disciplines and emerging nanoscale science and engineering concepts to reflect the forefront of nanomanufacturing. The course is designed to incorporate recent advances in manufacturing polymer based nanodevices. Key issues of the implementation and maintenance costs for fabrication will be addressed. Hands-on laboratory experiments will be performed to complement the lectures with the ultimate goal of designing and building a complete nanodevice at the end of the course. The course will prepare graduates for employment focused on designing and manufacturing nano/microfluidic systems, lab on ship devices, electronic devices, medical devices and other emerging technologies.
30.102 Introduction to Public Health

Course ID: 37903

Course Details: Public health topics, both historical and contemporary are of importance to all citizens and to societal decisions. This survey course provides a foundation for understanding public health through exposure to current health care and policy issues viewed through the perspective of multiple disciplines. Methodology for understanding population health and developing critical thinking and decision-making skills in the analysis of public health issues using a population-based perspective will be developed. The course will provide an ecological understanding of the causation and prevention of disease with an emphasis on health issues that affect society as a whole.

Max Credits: 3
Min Credits: 3

30.104 Topics in Health

Course ID: 38079

Course Details: This introductory course is designed to provide students with the opportunity to explore a variety of topics and issues in health through reading and discussing recently published articles. Using classroom discussions as the major format for this course, students will be encouraged to think critically about current topics and issues in health to strengthen their analytical skills. This course will also assist students in developing oral presentation and communication skills that are necessary in the health field.

Max Credits: 3
Min Credits: 3

30.120 Life Skills

Course ID: 4440

Course Details: This course is designed to assist new students adjust to, and succeed in college and beyond. Course subject matter has been created in conjunction with the National Collegiate Athletic Association (NCAA). This course has been specifically designed to meet the needs of the student-athletes who are current members of our campus community. Successful completion of this course will give the participants the skills necessary to be successful students, athletes and citizens academically, socially, personally and professionally.

Max Credits: 3
Min Credits: 3

30.204 Introduction to Exercise Physiology

Course ID: 4446

Course Details: This course serves as an introductory course to the field of Exercise Physiology. It is designed as a program foundation to the profession and to professional behavior. Students will be exposed to what happens in both the fitness centers and in the cardiac or pulmonary rehabilitative facilities. The course will serve as a precursor to the remaining upper division major courses.

Max Credits: 3
Min Credits: 3

30.210 Clinical Calculations

Course ID: 35852

Course Details: This elective course is designed for students beginning the nursing program. It reviews the mathematics necessary to compute drug calculations using dimensional analysis. This course covers the metric system of weights and measures. The focus of the course is on the computation of drug dosages for oral and parenteral medications with emphasis on the application of skills necessary to calculate intravenous infusions and medications.

Max Credits: 1
**30.214 Careers in Health**

Course ID: 38080

Course Details: This introductory survey course is designed to give those students interested in health careers the opportunity to explore a variety of career path options in the health field. The goal of this course is to help students recognize their interests, knowledge, skills, and aspirations so that they can begin to make educated career decisions. The knowledge students will gain throughout this course will help them discern their own career path in the health care industry.

Max Credits: 1
Min Credits: 1

**30.305 Exercise Physiology Lecture**

Course ID: 4455

Course Details: This course is designed to enable students to understand the acute and chronic physiologic effects of exercise on the human body. Topics will include bioenergetics, cardiopulmonary and cardiovascular physiology, neuromuscular physiology, special populations, and exercise prescription for apparently healthy athletic and clinical populations. Special topics in exercise physiology and environmental physiology will also be covered.

Max Credits: 4
Min Credits: 4

**30.306 Introduction to Gerontology**

Course ID: 4456

Course Details: This course examines human aging from a multidisciplinary and developmental perspective. The course will focus on the adult years of the life span. The social-psychological factors involved in adjustments to the aging process, to retirement, to family, to leisure, to aloneness, to death and bereavement will be discussed together with such special concerns of the elderly as widowhood, finances, religion, sexuality and health problems. Rehabilitative strategies such as remotivation and reality orientation are included.

Max Credits: 3
Min Credits: 3

**30.308 Global Health**

Course ID: 36693

Course Details: The focus of this course is on examining health issues from a global perspective including issues related to maternal and child health, aging, infectious diseases, sanitation, and health inequality. Nutritional and environmental health issues in diverse societies are analyzed. Social determinants of health and access to health care in developing and developed countries are emphasized.

Max Credits: 3
Min Credits: 3

**30.309 Universal Design in the Promotion of Health**

Course ID: 36694

Course Details: This is a three-credit interdisciplinary undergraduate blended course (face-to-face and online). The course is designed to examine the principles of universal design and investigate challenges of equity, access and inclusion in healthy communities. Undergraduate students from a variety of disciplines will examine universal design and Assistive Technology (AT) that enhances the participation of individuals with a physical, emotional, sensory or intellectual and cognitive disability in education, community development, health care, recreation and public policy. The course reviews design concepts and the use of Assistive Technology as it relates to education, communication, vocation, recreation, and mobility for individuals with disabilities. Laws focusing on assistive technology in the home, school, community, and the workplace will be examined. The course explores both 'low tech' and 'high tech' types of assistive technologies that are available to support people with disability, based on the ICF model of disability. Interaction with users of assistive technology is accomplished through an experiential learning project. Students will engage in a team project that completes a thorough examination of a particular access or functional challenge and the use of universal design and AT to increase participation and minimize the effects of the person's impairments.
30.315 Kinesiology

Course ID: 1250

Course Details: This course combines the study of mechanics, kinematics, kinetics, anatomy and neuromuscular physiology to teach the examination and evaluation of human movement. The major focus of the course is in qualitative evaluation of movement. Topics also include quantitative evaluation, body mechanics, posture and gait evaluation with a focus on identification of abnormal movement patterns. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.

Max Credits: 3
Min Credits: 3

30.319 Pathophysiology

Course ID: 34614

Course Details: This course provides an overview of the dynamic aspects of disease processes as they present in major body systems.

Max Credits: 3
Min Credits: 3

30.320 Legal Issues in Nursing

Course ID: 34664

Course Details: This course provides an overview of legal issues nurses encounter in clinical practice. Case studies will be used to identify common risks to safety and quality of care. to examine the legal process when lawsuits are filed and to identify preventive strategies which improve quality of care and therefore, decrease legal risks for nurses.

Max Credits: 3
Min Credits: 3

30.322 Independent Study Health Promotion

Course ID: 4462

Course Details: This course focuses on a health promotion project. Must have faculty approval for the course. Can be for 1, 2, or 3 credits.

Max Credits: 1
Min Credits: 1

30.402 Global Health Experience

Course ID: 36715

Course Details: The Global Health Experience provides an experiential learning experience in health within a country outside of the United States. Students will study the health issues of a given country while examining the socio-cultural, economic and environmental determinants of health within that society. The strengths and weaknesses of the existing health care system will be analyzed. Students will explore the culture, environment, and health care system under the direction of School of Health and Environment faculty.

Max Credits: 3
Min Credits: 3

31.100 Environmental Health Seminar

Course ID: 35835
Course Details: This required, non-credited seminar for Freshman and Sophomore Environmental health Students explores current affairs and controversies in environmental health theory and practice. Readings and outside speakers will supplement short lectures, faculty and student-led discussions.

Max Credits: 0
Min Credits: 0

31.201 Community Health and Environment

Course ID: 4476

Course Details: This course emphasizes the concepts, philosophy, and principles of public health and their relationship to physical, mental, and social well-being of the community. The focus is on the prevention of disease, the promotion and maintenance of health, and the provision of environmental and personal health services through organized community effort.

Max Credits: 3
Min Credits: 3

31.203 Technology in Public Health

Course ID: 31960

Course Details: A lecture and hands-on course designed to help students better understand the role of computers and information technology in public health. Students will be guided through the use of various software applications that enhance public health efforts, including: word processing, database design and management, spreadsheets, presentations, geographical information systems (mapping health data), and internet based applications for social networking to address health related issues, as well as other uses. Discussions of what the future may hold for health information technology will also be included. Hands-on assignments will help students become more proficient with PC based software.

Max Credits: 3
Min Credits: 3

31.204 Intro to Health Promotion

Course ID: 4478

Course Details: This course focuses on the role health education plays in the development of healthful patterns of living. A philosophy of health education emphasizing holistic health will be generated. The organization and administration of school, community, health care facility, and workplace health education programs are introduced.

Max Credits: 3
Min Credits: 3

31.206 Research Methods in Public Health

Course ID: 32566

Course Details: Introduction to research methodologies used in the study of community and environmental health problems. Students will discuss actual research studies conducted by UMASS Lowell faculty in the College of Health Sciences.

Max Credits: 3
Min Credits: 3

31.301 Program Planning in Health Promotion

Course ID: 4479

Course Details: This course is primarily designed to introduce undergraduate students studying Health Education to the concepts and principles underlying the educational strategies geared toward promoting health and preventing disease in a variety of settings. The course emphasizes practical utility of the concepts as they relate to the students' future health education/promotion efforts. The importance of a needs assessment and program evaluation will be especially focused upon in the course, as well as strategies integrating these valuable tools into curriculum design.

Max Credits: 3
Min Credits: 3
31.303 Social Determinants of Health

Course ID: 4481

Course Details: This course introduces students to the concept of social determinants of health, and strongly emphasizes the influence of social power relations on public health. An examination of a set of major health issues, at both the international and national levels provides the framework for students to learn and understand these concepts. A set of learning modules begins with identifying major contemporary health problems, definitions of health and health promotion as established through the World Health organization, and an exploration of social power relations and how they can shape public health. The course then moves to examine a set of specific health issues to see how they have been shaped by their social determinants. Juniors only.

Max Credits: 3
Min Credits: 3

31.304 Politics of Health

Course ID: 4482

Course Details: The course addresses a range of contemporary health problems (primarily in the U.S.) that are described and analyzed in their social context. Areas for consideration will include: political, economic, scientific/technological, environmental, and cultural factors. Students will be introduced to health education theories and methods that support the development of strategies for social change. Juniors only.

Max Credits: 3
Min Credits: 3

31.305 Introduction to Epidemiology

Course ID: 4483

Course Details: This course is designed to introduce basic epidemiological methods used in the study of current major health problems. Content includes explanation of the scope and focus of epidemiology, simple measures of disease frequency and association used in the study of the distribution and determinants of disease, types of epidemiological study designs, and practical applications. Emphasis on interpretation of epidemiological information and application of findings. Prerequisite: Community Health and an elementary statistics course. Required for seniors in Community Health Education; open by permission to other upper division students in Health Professions.

Max Credits: 3
Min Credits: 3

31.306 Socio-Ecological Health Assessment

Course ID: 4484

Course Details: Systems thinking, ecological and spatial principles and techniques are used to assess multiple contemporary health issues such as health literacy, emergence, reemergence of infectious diseases, climate change impacts and dimensions, aging population, and war and violence among other topics. The practical component of the course includes mapping and spatial analysis projects. Juniors only.

Max Credits: 3
Min Credits: 3

31.313 Principles of Environmental Health

Course ID: 4487

Course Details: This course will survey the rapidly growing field of environmental health through an introduction to the links between environmental stressors and impacts on public health. The course will explore human and industrial activities that impact on environmental health such as population, food production, air and water pollution, waste, the built environment, toxic substances, pests, and global climate change. The course will also examine the types of diseases and illnesses that result from environmental impacts. Students will be encouraged to examine in greater detail a specific topic in environmental health of personal interest.

Max Credits: 3
31.316 Environmental Health in Practice

Course ID: 32049

Course Details: Through a combination of class lectures, field trips, and a service learning project, this course is designed to introduce students to the daily responsibilities of an environmental health professional. The class will provide indepth knowledge and hands-on understanding of topics such as food safety, indoor air quality, water quality, waste water disinfection, and chemicals management. Through lectures and guest speakers students will understand the challenges facing environmental health professionals and the resources available to them. Students will undertake a final group project for a health board or other organization.

Max Credits: 3
Min Credits: 3

31.321 Health Care Systems

Course ID: 4488

Course Details: This course describes and analyzes the nature and functions of health care services and health professionals. The course examines the impact of social, political, economic, ethical, professional, legal, and technological forces on them and the system they comprise. Juniors and Seniors only.

Max Credits: 3
Min Credits: 3

31.370 Food Safety and Agriculture

Course ID: 36701

Course Details: This course focuses on food safety and agriculture using a production-consumption life cycle model. Multiple ecological, socio-economic and regulatory aspects of food production, preparation, and consumption systems are explored. The course has an integrated theoretical and experiential learning component.

Max Credits: 3
Min Credits: 3

31.371 Chemicals and Health

Course ID: 36702

Course Details: Provides a broad overview of how the design, manufacture, use and disposal of chemicals and chemical products affect health and ecosystems. Provides an in-depth overview of how chemicals are monitored in the environment (including biomonitoring), how their risks are characterized, and the prevention of chemical risks through safer chemical design.

Max Credits: 3
Min Credits: 3

31.403 Mind, Body and Health

Course ID: 4492

Course Details: The interconnectedness of the mind, body, and spirit is integral to achieving "wellness". It is also important to acknowledge the impact each of these three aspects of wellness has upon each of the others. The growing body of research indicating the significant effects of things such as stress, anger, optimism, and healthy relationships on health status will be analyzed and evaluated. Practical strategies related to health advisement will be shared and experimented with during the semester. In this senior level course, we will explore these and many other areas of mind, body, and spirit awareness that are critical to consider when conducting health education programs.

Max Credits: 3
Min Credits: 3

31.405 Communication Techniques in Health Promotion
Course ID: 4494

Course Details: This course focuses upon the communication techniques and mass media approaches necessary to promote and implement effective health promotion programs and activities. Awareness and sensitivity toward cultural, ethnic, and religious diversity will be particularly emphasized when discussing various communication techniques in relation to particular health issues.

Max Credits: 3
Min Credits: 3

31.409 Service Learning in Community Health

Course ID: 4496

Course Details: This course is designed to serve as a service learning experience in the fall semester of students’ senior year in Health Education. Students will be expected to participate in a pre-determined community health project happening in the City of Lowell for a minimum of 40 hours. During the course of this experience, students will provide the community health organization with their time, knowledge, and effort, and will, in return, gain tremendous experience in the organization, development, implementation, and/or evaluation of Community Health Education and Promotion Projects. Collaboration with various professionals involved in the programs and projects will certainly add to students' understanding of what a Health Educator does! An integral piece of this service learning experience will be the bi-monthly seminar geared toward assuring the connection between the community experience and the theoretical and academic framework from which it is derived. Through the use of readings, discussions, student presentations, and guest speakers, students will gain wonderful experience in terms of what it means to “build the capacity of a community”.

Max Credits: 3
Min Credits: 3

31.410 Community Health Practicum

Course ID: 4497

Course Details: Full-time health education field experience (28 hours per week). Students continue at the prepracticum site, participating in the development, implementation and evaluation of health education programs and take an active part in the total community health education process. Seniors only.

Max Credits: 10
Min Credits: 10

31.414 Program Management in Health

Course ID: 1253

Course Details: The concepts of program planning, development, budgeting and evaluation, which are essential functions for individuals working in health care agencies, are presented. Starting with the mission of the organization, the steps of conceptualizing, designing, implementing, budgeting and evaluating health programs are covered. Students will be expected to develop a grant proposal for an agency. This course is a capstone experience and resources from all other relevant coursework will be called upon. Seniors only.

Max Credits: 3
Min Credits: 3

31.416 Environmental Health Practicum

Course ID: 32048

Course Details: This course is designed to provide students real world practical experience in the field of environmental health, as final preparation for their BS Degree. This 32 hour/week internship opportunity situates students in an environmental health setting most conducive to his or her needs and interests. Placements can vary from health boards and health departments to non-profit agencies, government agencies, university research institutes, and industry. Students work directly with an academically and professionally qualified preceptor to assure their progress in the field. The faculty supervisor is responsible for periodic meetings and correspondence to also assure appropriate development.

Max Credits: 10
Min Credits: 10
31.417 Climate Change: Science, Communication, and Solutions

Course ID: 36711

Course Details: Climate change offers one of the greatest challenges yet faced by society and scientists. The scientific consensus is clear that climate change is occurring, its pace is accelerating, its impacts on human society will be largely negative, and it is largely caused by anthropogenic greenhouse gas emissions. Yet, despite strong scientific evidence for the enormous challenges that society may face, scientists' attempts to disseminate that evidence beyond their peers have not yet been successful. Indeed in today's media world of blogs, YouTube video clips, and sound-bites, confusion over the scientific reality of climate change frequently dominates the discourse in classrooms and communities. This course will provide students with the tools and knowledge that they need to develop their own well-informed view of climate change. Because climate change is both impacted by humans and will increasingly impact society, this course takes a cross-disciplinary approach, integrating science, policy solutions, and media literacy as they relate to climate change.

Max Credits: 4
Min Credits: 4

31.493 Directed Study

Course ID: 4499

Course Details:

Max Credits: 3
Min Credits: 1

33.210 Nursing Fundamentals

Course ID: 34582

Course Details: This course enables students to begin their basic knowledge of nursing. The course provides an organizing framework, based on Gordon's functional health patterns, that is strictly nursing. Therapeutic nursing interventions are incorporated into the more detailed discussion of each of the functional health patterns. A separate laboratory component is included for demonstration and practice of nursing interventions. At the conclusion of this course students will demonstrate competency in performing basic nursing intervention for individuals in a clinical setting.

Max Credits: 2
Min Credits: 2

33.210L Nursing Fundamentals Lab

Course ID: 34583

Course Details:

Max Credits: 1
Min Credits: 1

33.301 Research in Nursing and Health Care

Course ID: 4545

Course Details: This course provides an overview of the research process. Health care research interests and the methodology of various disciplines are examined. Through a review of research studies, students examine the basic steps in the process of research. Ethical problems in the world of research are explored and students learn how research influences health care practice and policy.

Max Credits: 3
Min Credits: 3

33.306 Health Assessment

Course ID: 4550

Course Details: This combined didactic and laboratory course builds on the students' professional nursing education and
experiences through the inclusion of health assessment information as applied to the professional nursing role in the community setting. Emphasis is on systematic data collection including thorough history taking, physical examination, screening and risk-factor recognition.

Max Credits: 3
Min Credits: 3

33.307 Concepts for Baccalaureate Nursing

Course ID: 4551

Course Details: This course is designated as a transition course for registered nurse students pursuing a baccalaureate degree with a major in nursing. This course aims to refine critical thinking skills and analyze nursing's unique contribution to health care. Consideration is given to the interrelationships of theory, research, and practice. Special emphasis is placed on the concepts of health promotion and risk reduction as they relate to individuals and families who are at risk for or experiencing health problems. This course includes a practicum component that focuses on the development of interventions to promote the health of individuals and families at risk.

Max Credits: 3
Min Credits: 3

33.308 Health Promotion in Nursing

Course ID: 4552

Course Details: This course is designed as a transition course for registered nurse students pursuing a baccalaureate degree with a major in nursing. It introduces the theory and research related to the concepts of health promotion and risk reduction. These concepts are presented as essential components of professional nursing practice. This course includes a clinical practicum which focuses on the development of interventions to promote the health of individuals and families. This course aims to refine critical thinking skills and analyze nursing's unique contribution to health care. Consideration is given to the interrelationships of theory, research and practice.

Max Credits: 2
Min Credits: 2

33.309 Health Promotion in Nursing Practice Practicum

Course ID: 33015

Course Details: This course is a clinical practicum which focuses on the development of interventions to promote the health of individuals and families. This course aims to refine critical thinking skills and analyze nursing's unique contribution to health care. Consideration is given to the interrelationships of theory, research and practice.

Max Credits: 3
Min Credits: 3

33.311 Hlth Promotion and Risk Reduction of Families Practicum I

Course ID: 4554

Course Details: This community-based clinical course is focused on health promotion of young families including childbearing women, infants, children, and adolescents. A portion of the clinical experience consists of establishing a relationship by the student with a family. First four semesters of nursing curriculum.

Max Credits: 4
Min Credits: 4

33.312 Concepts of Professional Nursing

Course ID: 4555

Course Details: Nursing as a health profession is introduced in this foundation course. The concepts of health promotion, communication, critical thinking, culture, nursing theory and research, and therapeutic nursing interventions are presented. Within the context of the American Nurses' Association Standards of Clinical Nursing Practice, standards of professional performance are introduced and standards of care are emphasized. First four semesters of nursing curriculum.
Max Credits: 2
Min Credits: 2

**33.313 Nursing Assessment and Skills**

Course ID: 4556

Course Details: This course introduces students to the foundations of communication, nursing assessment, and psychomotor skills guided by standards of nursing practice. Emphasis is placed on the integration and application of these skills through the use of critical thinking.

Max Credits: 2
Min Credits: 2

**33.313L Nursing Assessment and Skills Lab**

Course ID: 33014

Course Details: This laboratory course introduces students to the foundations of communication, nursing assessment, and psychomotor skills guided by standards of nursing practice. Emphasis is placed on the integration and application of these skills through the use of critical thinking.

Max Credits: 1
Min Credits: 1

**33.315 Health Promotion Family Practicum II**

Course ID: 4558

Course Details: In this clinical course, students provide nursing care to adult clients and their families. The focus is the development of specifically tailored therapeutic interventions to promote the health of these clients and assist with potential or actual health problems.

Max Credits: 4
Min Credits: 4

**33.318 Pharmacology**

Course ID: 30340

Course Details: This course focuses on the study of pharmacology. Pharmacology is the study of drugs prescribed to prevent, cure or care for disease processes. The nursing focus highlights major health problems across the lifespan to include pharmacological management.

Max Credits: 3
Min Credits: 3

**33.319 Pathophysiology**

Course ID: 30878

Course Details:

Max Credits: 3
Min Credits: 3

**33.320 Community-Focused Health and Policy**

Course ID: 37806

Course Details: This course provides a foundation to community health nursing with the community, family and individual as Client. This course presents an overview of the US health care delivery system with an emphasis on the role of government in healthcare, Medicaid, and current efforts at healthcare reform.

Max Credits: 3
Min Credits: 3

33.321 Independent Study
Course ID: 30341
Course Details: Independent Study on a topic chosen by the student and agreed on by the faculty member.
Max Credits: 1
Min Credits: 1

33.322 Independent Study
Course ID: 30342
Course Details:
Max Credits: 2
Min Credits: 2

33.323 Independent Studies
Course ID: 30865
Course Details: Independent Studies
Max Credits: 3
Min Credits: 3

33.324 Community-Focused Project Implementation
Course ID: 37882
Course Details: This course focuses on improving the health of one aspect of the community. Students analyze health problems in identified communities. Interventions for community as client are developed and implemented and the effectiveness of applied interventions in evaluated.
Max Credits: 2
Min Credits: 2

33.325 Community-Focused Project Dissemination
Course ID: 37883
Course Details: This one credit course focuses on the dissemination of the results of a community based program. Students develop presentations which describe methods used to identify, intervene and evaluate the health problems of a community. Students are required to present their findings at a formal dissemination venue identified by faculty.
Max Credits: 1
Min Credits: 1

33.412 Community Health and Health Policy
Course ID: 4569
Course Details: This course analyzes the development of policy and its impact on the health of populations. Students apply epidemiology and community health science to population-based nursing practice. Students identify a community health problem that can be addressed through health promotion activities.
Max Credits: 4
Min Credits: 4

33.413 Role Transition
Course ID: 4570

Course Details: This capstone course focuses on the transition to the professional nursing role. Content includes professional issues, trends, and leadership and management principles which impact on nursing practice. Students analyze nursing practice in relation to the standards of professional performance.

Max Credits: 4
Min Credits: 4

33.420 Leadership in Nursing

Course ID: 37884

Course Details: This course focuses on leadership roles, responsibilities, and opportunities for the professional nurse. Course content includes professional issues, trends, and leadership and managerial principles pertinent to healthcare and nursing practice. Students explore professional perspectives, norms, and ethical standards essential in values-driven management and leadership.

Max Credits: 3
Min Credits: 3

33.421 Selected Topics in Nursing

Course ID: 37885

Course Details: Selected Topics in Nursing is a course for advanced undergraduates in the RN-BS option. The content will vary from semester to semester depending on the research interest of the faculty member(s) teaching the course.

Max Credits: 3
Min Credits: 3

35.101 Human Anatomy and Physiology I

Course ID: 4746

Course Details: This course provides a basic knowledge of the structure and function of the human body. An overview of the general organization of the body introduces the course. Following a discussion of basic human chemistry, the anatomy and physiology of cells, tissues, organs, and organ systems are studied with special emphasis placed on homeostasis and interaction among the various systems. The topics treated are body plan, chemistry, cytology, histology, the integumentary system, the skeletal system, the muscular system, and the nervous system. Clinical applications will be presented.

Max Credits: 3
Min Credits: 3

35.102 Human Anatomy and Physiology II

Course ID: 4747

Course Details: A continuation of the basic knowledge of human structure and function. The topics treated are cardiovascular system, lymphatic system, respiratory system, endocrine system, digestive system, metabolism, urinary system, and reproductive system.

Max Credits: 3
Min Credits: 3

35.103 Human Anatomy and Physiology Laboratory I

Course ID: 4748

Course Details: Laboratory exercises are designed to reinforce didactic material by providing hands-on experience with the subject matter. Students actively participate in simple chemical analysis, microscopic observations, and studies of anatomical models and preserved specimens. Students perform simple physiological tests on themselves and work in small groups to discuss conclusions.

Max Credits: 1
**35.104 Human Anatomy and Physiology Laboratory II**

Course ID: 4749

Course Details: Laboratory exercises are designed to reinforce didactic material by providing hands-on experience with the subject matter. Students actively participate in simple chemical analysis, microscopic observations, and studies of anatomical models and preserved specimens. Students perform simple physiological tests on themselves and work in small groups to analyze results and discuss conclusions.

Max Credits: 1

Min Credits: 1

**35.107 Bodies and Bones**

Course ID: 35013

Course Details: This course is open only to high school students accepted to the UML TEAMs Academy. This course uses an investigative approach to examine concepts related to the fields of Anatomy and Biochemistry. Select topics will be studied and applied to clinical situations and forensic cases. Assessment techniques will be used in hands-on laboratory activities and forensic simulations. The course will emphasize investigations using the scientific method, observation, and critical analysis. This course is open only to high school students accepted to the UML TEAMs Academy.

Max Credits: 3

Min Credits: 3

**35.205 Introduction to Nutritional Science**

Course ID: 36735

Course Details: This course introduces students to the major in Nutritional Science. Objectives of the major are covered along with beginning nutritional and food science principles, history of the profession, career options, and legal aspects of practice as a nutrition educator. An integrated survey of nutrition science as it relates to human physiological chemistry, food chemistry and biochemistry will also be discussed. This course will include guest speakers from within the department and outside the university. This course will be restricted to nutritional science majors.

Max Credits: 3

Min Credits: 3

**35.206 Human Nutrition**

Course ID: 4756

Course Details: This course provides an overview of nutrition and the components of a nutritious diet during the various stages of the life cycle. It emphasizes the impact of nutrition on the major contemporary health problems in the United States. Nutrition issues, trends and research, and their effect on society and the legislative process will be explored.

Max Credits: 3

Min Credits: 3

**35.210 Nutrition and Health**

Course ID: 38081

Course Details: This course is an introductory course to the science of nutrition as it applies to everyday life and health. Focus will include the six major nutrients: carbohydrates, lipids (fats), protein, vitamins, minerals, and water and their importance in the human body. Digestion, absorption, and metabolism in the human body will be introduced. The course will also examine energy balance and weight management as they relate to nutrition and fitness. The impact of culture, demographics and ethnicity on nutritional intake will be discussed. Students will explore the relationship between nutrition and health through laboratory experiences.

Max Credits: 3

Min Credits: 3
35.211 Basic Clinical Microbiology & Pathology

Course ID: 4759

Course Details: Studies the fundamentals of microbiology with major emphasis on structure, function, growth, metabolism, and classification of clinically important microorganisms. The human body's response to invading microbes and an introduction to the ecological aspects of microorganisms in the environment with particular stress on their significance, activities (beneficial and detrimental) and control measures will also be studied.

Max Credits: 3  
Min Credits: 3

35.213 Basic Clinical Microbiology & Pathology Laboratory

Course ID: 4760

Course Details: Laboratory investigations of basic properties and characteristics of microorganisms are conducted. Students will perform commonly used techniques for collecting, handling, and studying clinically important microorganisms.

Max Credits: 1  
Min Credits: 1

35.251 Physiological Chemistry I

Course ID: 4762

Course Details: This course provides a foundation in basic chemistry for students majoring in the Health Sciences. Basic concepts covered include: properties of matter, energy, atomic and molecular structure, isotopes and radioactivity, chemical bonding, chemical formulae and reactions. Quantitative aspects of chemical processes, chemical equilibrium and the behavior of gases, including blood gases and their transport are discussed. Properties of water and solutions are studied and include units of concentration, osmosis, osmolality, and physiological fluid and electrolyte balance. The chemistry of acids, bases and buffers is reviewed with emphasis on physiological buffer systems. Quantitative aspects, acid/base balance, compensatory mechanisms and elementary diagnosis are discussed. The chemistry of inorganic trace elements and their physiological roles are investigated. Concepts of organic chemistry are introduced, including the structure and function of carbon, isomerism and the properties and selected reactions of the major functional groups important in human biochemistry.

Max Credits: 3  
Min Credits: 3

35.252 Physiological Chemistry II

Course ID: 4763

Course Details: This course is designed to provide a foundation in basic biochemistry for students majoring in the Health Professions. Selected concepts in organic chemistry are integrated into this framework. Aspects of amino acid and protein structure are studied. The structure and function of enzymes, their effects on reaction energetics and dynamics and the diagnostic uses of enzyme assays in clinical medicine are covered. The plasma proteins, hemoglobin, and the structure and function of miscellaneous cellular proteins are reviewed. The chemistry of the nucleic acids, protein anabolism and catabolism are studied along with selected metabolic disturbances and genetic disease. The structure and chemical properties of the simple and complex carbohydrates and lipids their metabolic pathways and cycles, and selected pathologies are studied in detail. Diagnostic tests relating to carbohydrate and lipid abnormalities are included. The course concludes with a study of chemical communication mechanisms, which includes neurotransmitters, hormonal secretions, and immunoglobulins.

Max Credits: 3  
Min Credits: 3

35.253 Physiological Chemistry Laboratory I

Course ID: 4764

Course Details: Laboratory experiments are conducted to complement the material covered in 35.251. Exercises dealing with properties of matter, chemical equations, qualitative analysis, energy, osmosis, chemical equilibrium and acids/bases/buffers will be performed. The qualitative properties of alcohols, aldehydes, ketones, acids and esters will be explored.
35.254 Physiological Chemistry Laboratory II

Course Details: Laboratory experiments are conducted to complement the material covered in 35.252. The chemistry of the basic biochemical molecules will be explored, including proteins, enzymes, carbohydrates, lipids, and nucleic acids. Selected aspects of metabolism and the assay of clinically significant materials will be studied.

Max Credits: 1
Min Credits: 1

35.435 Medical & Clinical Genetics

Course Details: This course covers the clinical and pathological aspects of human genetics with emphasis on prevention, diagnosis, and treatment of genetic diseases. Mendelian, cellular, and molecular genetics are reviewed, as is the metabolic basis of inherited diseases. Students learn principles of genetic counseling and how they integrate with other health care disciplines. These genetic counseling precepts are applied when students research and analyze a condition occurring in their own family, and write a report that embodies the results of this research. Following a review of DNA chemistry and dynamics, molecular alterations that cause human diseases is extensively discussed, including SNP activity, gene therapy techniques, and epigenetic mechanisms. Transcription and translation, the "switching on and off" of genes, and other DNA activity is discussed. The genetics of cancer, somatic cell genetics, and immunogenetics are integrated into genetic counseling. Laboratory techniques such as autoradiography, DNA extraction and analysis by electrophoresis, DNA profiling, automated DNA sequencing, RFLP analysis, PCR amplification, microarray analysis, and cloning methodology are presented. Pre-implantation diagnosis, germ-line alteration, and embryo cloning will also be discussed, along with their legal, ethical, and moral implications. Current progress on the Human Proteome, Transcriptome, and Kinome Projects will also be reported. Applications of genomics will be pervasive throughout the course.

Max Credits: 3
Min Credits: 3

36.241 Clinical Laboratory Theory

Course Details: This course is designed to introduce the theoretical principles and applications of diagnostic techniques and the procedures of the clinical laboratory including phlebotomy. It will define and describe both qualitative and quantitative, manual and automated laboratory techniques, particularly in hematology.

Max Credits: 3
Min Credits: 3

36.243 Clinical Laboratory Theory Lab

Course Details: A laboratory course designed to expose prospective clinical scientists to many of the essential skills, methods, and procedures basic to professional performance in the clinical laboratory; to explain and demonstrate to students and have them perform these methods; to develop an understanding of these techniques and to provide a technical background, an approach to testing that the student can build upon and use in future courses.

Max Credits: 1
Min Credits: 1

36.273 Introduction to Clinical Laboratory Science

Course Details: This course is intended to provide the student with an overview of the medical laboratory. Topics include the history of the field, hospital and laboratory professional organizations, state and federal regulations, and careers in the clinical setting, in research and in industry. The role of the medical laboratory scientist in the clinical setting will be explored further through examination of each laboratory department.
Max Credits: 2  
Min Credits: 2  

36.311 Medical Bacteriology I  
Course ID: 4783  
Course Details: A study of the cultural, biochemical, genetic, serological and pathogenic characteristics of disease producing microorganisms. Emphasis will be placed on the pathophysiology of the infectious diseases and their relationship to isolation and identification of the pathogenic microorganisms.  
Max Credits: 3  
Min Credits: 3  

36.313 Medical Bacteriology Laboratory I  
Course ID: 4784  
Course Details: This course is designed to introduce the student to pathogenic microorganisms, media and techniques used in the identification of these organisms. Emphasis will be based upon the isolation, identification and differentiation of pathogenic microorganisms common to man. In addition, quality control and antimicrobial susceptibility testing will be covered.  
Max Credits: 2  
Min Credits: 2  

36.321 Clinical Hematology  
Course ID: 4786  
Course Details: A study of the human hematopoietic system and its relationship to other organ systems. Discussions will include morphological and biochemical relationships of erythropoiesis and leukopoiesis in health and disease states. A study of the mechanics of blood coagulation as it relates to health and disease states will also be included.  
Max Credits: 3  
Min Credits: 3  

36.323 Clinical Hematology Laboratory  
Course ID: 4787  
Course Details: This course is designed to emphasize current hematological and coagulation procedures used in today's clinical laboratory. The implications of these tests to diagnose, monitor and evaluate the various hematological disorders are also discussed.  
Max Credits: 2  
Min Credits: 2  

36.331 Clinical Immunology  
Course ID: 4788  
Course Details: An introduction to the principles of immunology including: the study of antigens and antibodies and their interactions and controls; description of cellular events and the immune response, and in vivo and in vitro antigen-antibody interactions with clinical relevance. Immunological aspects of transplantation, autoimmune disease, immunodeficiencies and cancer pathogenesis are also discussed.  
Max Credits: 3  
Min Credits: 3  

36.336 Life Cycle Nutrition  
Course ID: 37040
Course Details: Biology of the life cycle including development, growth, maturation, and aging and its impact on nutritional requirements of humans from the zygote to the elderly is considered. How to meet these nutritional requirements is discussed relative to the feeding issues and context of each major life stage. Course emphasizes the critical analyses of beneficial and adverse outcomes of various nutrient intakes and dietary patterns of the nutritional status and well-being through integration of nutrition and other health sciences in understanding nutritional needs during the life cycle. Analysis of cultural, environmental, psychosocial, physical, and economic factors affecting nutritional status through the life span will also be discussed. Methods of nutritional assessment for each stage of the life cycle will be examined.

Max Credits: 3
Min Credits: 3

36.341 Organic Reactions & Structure

Course ID: 4789

Course Details: This course surveys the principles of organic chemistry important for the study of clinical chemistry and human biochemistry. The chemistry of carbon compounds, bonding and the concepts of isomerism will be studied. Detailed information is presented on each of the major functional classes of organic compounds, including: hydrocarbons, halides, alcohol, phenols, ethers, aldehydes, ketones, carboxylic acids and their derivatives, amines, organosulfur compounds. Emphasis is placed on chemical structure, physical and chemical properties, common and IUPAC nomenclature, and chemical reactions and their mechanisms. Selected aspects of the properties and synthesis of polymeric materials are presented. Qualitative analysis of organic compounds is discussed with emphasis on the use of spectral techniques, including infra-red and nuclear magnetic resonance spectroscopy for the elucidation of chemical structure.

Max Credits: 3
Min Credits: 3

36.343 Organic Reactions & Structure Laboratory

Course ID: 4790

Course Details: Laboratory exercises are performed to supplement the material covered in 36.341.

Max Credits: 1
Min Credits: 1

36.345 Community Nutrition

Course ID: 36921

Course Details: This course explores the role of the nutrition professional in community needs assessment, intervention development and evaluation, and in forming domestic nutrition policy. Nutrition problems in contemporary communities and of selected target groups in the United States and in developing countries are examined. Programs and strategies to meet nutrition needs outside the acute care setting, such as nutrition education and food assistance are explored. Local, state, and national nutrition policy and initiatives in nutrition will also be examined.

Max Credits: 3
Min Credits: 3

36.350 Human Biochemistry

Course ID: 4791

Course Details: This course is an in-depth study of biochemical substances and their reactions in the body, with major emphasis placed on metabolism at the cellular level and examined in the tissues of the various organs where these reactions occur. Correlation of biochemical processes underlying pathologic conditions will be made whenever practical.

Max Credits: 3
Min Credits: 3

36.351 Clinical Chemistry I

Course ID: 4792

Course Details: This course is designed to provide students with knowledge and theory of techniques used in the Clinical Chemistry laboratory for measurement of aminoacids, proteins, carbohydrates, and lipids in body fluids. Students will learn
to use, interpret and evaluate the performance of these laboratory methods and develop the ability to recognize levels of
these biochemical components in both normal and pathophysiological states. Examination and comparison of laboratory
results will be used to diagnose or rule out disease. Techniques reviewed range from general to specific assays and from
the classical to state-of-the-art methodologies. In addition, students will be able to assess the quality of laboratory generated
values determine when values are invalid and suggest ideas to troubleshoot clinical laboratory methods.

Max Credits: 3
Min Credits: 3

36.353 Clinical Chemistry Laboratory I

Course ID: 4793

Course Details: This course is designed to introduce the clinical techniques of biochemical measurement in body fluids.
These techniques range from general to specific assays and from the classical to the up-to date state of the art
methodologies. Biochemical measurements of the following in the normal state and alterations due to pathophysiology are
discussed: amino acids, proteins, carbohydrates and lipids. Quality control of assay procedures is emphasized.

Max Credits: 2
Min Credits: 2

36.361 Clinical Laboratory Instrumentation

Course ID: 4794

Course Details: This course is designed to provide an in-depth knowledge of clinical chemistry laboratory instrumentation.
Emphasis is placed on theoretical concepts, instrument components and design, calibration and troubleshooting of modern
instrumentation, and analytical methodologies in the clinical laboratory. Additionally, qualitative and quantitative applications
of instrumental techniques are covered. Computer applications are included where appropriate. The following spectroscopic
instruments are studied: ultraviolet, visible and infra red absorption, fluorescence, turbidimetry and nephelometry,
reflectance, flame emission and atomic absorption spectroscopy. Electrochemical methods of analysis are reviewed,
including potentiometric techniques, voltammetry and coulometry. Chromatographic instrumentation and methods are
discussed, such as column and thin layer chromatography, high pressure liquid chromatography, gas chromatography, and
ion exchange chromatography.

Max Credits: 3
Min Credits: 3

36.363 Clinical Laboratory Instrumentation Laboratory

Course ID: 4795

Course Details: Laboratory exercises will be performed to supplement the material covered in 36.361.

Max Credits: 2
Min Credits: 2

36.371 Nutrition and Metabolism

Course ID: 4796

Course Details: This class is advancement into the biochemical and physiologic process through which the nourishment of
the human organism is accomplished and how the interactions among nutrients, other aspects of the environment, and the
body result in perturbations affecting human health. The process of human nourishment proceeds within the context of an
organism with an intricate structure, unique composition, and specific capacities for adaptive change. Basic information
from many disciplines relating to body function and structure will be summarized. This will serve as setting the stage for
detailed discussions, which describe the nutritional biochemistry and metabolism of the body for the normal state, and for
states where nutrient availability is altered of disease is imposed. Prerequisites: 35.206

Max Credits: 3
Min Credits: 3

36.372 Obesity & Weight Control

Course ID: 4797
Course Details: Etiology, pathophysiology, and treatments of obesity, anorexia nervosa, and bulimia are reviewed. Role of hereditary, neurological, metabolic, and environmental mechanisms are discussed. Particular emphasis on obesity.

Max Credits: 3
Min Credits: 3

36.373 Clinical Laboratory Sciences Seminar

Course Details: This course is designed to familiarize the student with different interview skills and approaches to resume writing, the process of implementing a laboratory information system, good education practices and team building skills. Students will evaluate current research designs and work in a team to create a presentation to express their opinions as educated consumers.

Max Credits: 1
Min Credits: 1

36.406 Biochemistry of Lipids

Course Details: This advanced course in the nutritional biochemistry and physiology of lipids will detail the role of lipids in the normal and pathological processes at both the cellular and whole organism level. Topics will range from general discussions of the digestion, absorption and transport of lipids to the role of eicosanoids and lipid soluble antioxidants during normal and diseased states, such as atherosclerosis, diabetes and hypertension. Subject matter will also include a discussion of the various interventions for the prevention and treatment of certain of these disease states. There will also be discussion of the current issues in lipid nutrition.

Max Credits: 3
Min Credits: 3

36.410 Clinical Microbiology Practicum

Course Details: Supervised clinical training in an affiliated clinical laboratory, designed to reinforce knowledge and skills gained in lecture and laboratory and at the same time introduce the student to the daily activities of the clinical microbiology laboratory. Emphasis will be placed on quality control, methodology and clinical interpretation.

Max Credits: 2
Min Credits: 2

36.411 Medical Mycology & Parasitology

Course Details: Intensive study of classification, morphology, physiology, genetics and ecology of medically important fungi and parasites. Emphasis on epidemiology, pathogenicity and diagnosis.

Max Credits: 3
Min Credits: 3

36.413 Medical Mycology & Parasitology Laboratory

Course Details: The laboratory is designed to emphasize principles and procedures used in the isolation, cultivation, and identification of medically important fungi and parasites.

Max Credits: 2
Min Credits: 2

36.414 Infectious Disease
Course ID: 4805

Course Details: The course is designed for students in the health and biological sciences and is offered for both undergraduate and graduate students. A general microbiology course is advised as a prerequisite. The focus of the course is the pathophysiology of infectious disease. Major infectious organisms will be discussed as biological models and presented in the way they affect major systems of the body. Emphasis will be placed on significant episodes of emerging infections and current technology in diagnosis and treatment of infectious disease in the new millennium.

Max Credits: 3
Min Credits: 3

36.416 Molecular Diagnostics Lab

Course ID: 4807

Course Details: This course is designed to instruct students in the principles and techniques used in Molecular Diagnostics in the clinical laboratory setting. Students will be given both lecture and laboratory instruction in basic molecular testing methodologies. At the completion of this course, the student will have a basic understanding of molecular diagnostic principles and will be proficient in molecular diagnostic laboratory techniques including DNA extraction, PCR using SINEs and STRs, restriction enzyme digestion, ELISA, bacterial transformation, DNA sequencing and microarrays.

Max Credits: 1
Min Credits: 1

36.420 Clinical Hematology Practicum

Course ID: 4808

Course Details: Supervised clinical training in an affiliated clinical laboratory. Designed to reinforce knowledge and skills gained in lecture and laboratory and at the same time introduce the student to the daily activities of a clinical hematology laboratory. Emphasis will be placed on quality control, methodology, and clinical interpretation and correlation.

Max Credits: 2
Min Credits: 2

36.430 Clinical Immunohematology Practicum

Course ID: 4809

Course Details: Supervised clinical training in an affiliated clinical laboratory is designed to reinforce knowledge and skills gained in lecture and laboratory and, at the same time, introduce the student to the daily activities of the clinical immunohematology laboratory. Emphasis will be placed on quality control, methodology and clinical interpretation and correlation.

Max Credits: 2
Min Credits: 2

36.431 Clinical Immunohematology

Course ID: 4810

Course Details: Lecture and case study discussions look at the major red cell antigen/antibody systems that are of importance in understanding transfusion therapies, blood antigen and antibody testing, compatibility testing, and pathological diseases. Emphasis is on differentiation and clinical significance of each system. Donor selection regulations, component preparation, adverse transfusion reactions, and hemotherapy will also be discussed.

Max Credits: 3
Min Credits: 3

36.433 Clinical Immunohematology Laboratory

Course ID: 4811

Course Details: Practical laboratory experience in blood banking, illustrating the concepts stressed in the lecture including ABO and Rh typing, identification of other red cell antigens, antibody screening and identification, direct antiglobulin testing, crossmatching, and other techniques performed in the Clinical Immunohematology laboratory.
Max Credits: 2
Min Credits: 2

36.434 Advanced Topics in Hemostasis
Course ID: 4812
Course Details: This course will constitute an in depth study of the hemostatic mechanism. Current research and case studies on the roles of vessel endothelium, platelet function, clotting procoagulants and fibrinolysis will be presented. Students will diagnose pathologic hemostatic states, such as hemorrhage or thrombophilia, due to deficiencies and impairments of these roles, including the impact of natural and acquired anticoagulants/inhibitors and anticoagulant therapy.
Max Credits: 1
Min Credits: 1

36.450 Clinical Chemistry Practicum
Course ID: 4814
Course Details: Supervised clinical training in an affiliated hospital clinical laboratory. Designed to reinforce knowledge and skills gained in lecture and laboratory and at the same time introduce the student to the daily activities of the clinical laboratory. Emphasis will be placed on quality control, methodology and clinical interpretation and correlation.
Max Credits: 2
Min Credits: 2

36.451 Urinalysis Practicum
Course ID: 4815
Course Details: A one-week clinical rotation in an affiliated laboratory designed to give the student experience in microscopic examination and evaluation of urine sediments. Emphasis is on correlating physical and chemical characteristics with sediment evaluation and diagnoses as well as on quality control, methodology, and clinical interpretation and correlation. Additional routine tests of a physical and chemical nature will be performed and demonstrated.
Max Credits: 0
Min Credits: 0

36.452 Clinical Chemistry II
Course ID: 4816
Course Details: This course will provide students with knowledge and theory of techniques associated with determinants of acid-base balance, blood gases, electrolytes, osmolality, hemoglobin, toxicology, therapeutic drug monitoring and endocrinology. Students learn to interpret and evaluate the performance of these laboratory methods and develop the ability to recognize levels of these biochemical components in both normal and pathophysiological states. Laboratory techniques range from general to specific assays and from the classical to state-of-the-art methodologies. In addition, students will be able to assess the quality and validity of laboratory generated values, determine when values are invalid and suggest ideas to troubleshoot methodologies. Students will also be able to produce and analyze statistical data for use in correlation, comparison and evaluation of laboratory techniques. Prerequisite: 35.351
Max Credits: 3
Min Credits: 3

36.453 Laboratory Management and Ethics
Course ID: 4817
Course Details: This course will acquaint the student with the many managerial, educational, technical, and administrative theories and practices, as well as moral and ethical issues that may confront the health care professional functioning within a clinical or research laboratory setting. In addition, it will present the varied career opportunities that are available for graduates.
Max Credits: 2
36.454 Clinical Chemistry Laboratory II

Course ID: 4818

Course Details: This course, a continuation of 36.353, is designed to instruct the student in the analytical procedures and methods currently used in the clinical laboratory. Manual and automated methods utilized in the assessment of such topics as acid-base balance, porphyrins, toxicology and vitamins will be introduced. In addition, methods associated with the routine examinations of urine and other body fluids will be introduced. Quality control, laboratory safety and professional performance are emphasized.

Max Credits: 2
Min Credits: 2

36.463 Vitamins and Minerals

Course ID: 4819

Course Details: Detailed analysis of the digestion, absorption, transport, and intermediary metabolism of vitamins and minerals as essential nutrients. The chemical and biochemical characteristics of vitamins and minerals are examined to account for the physiological functions.

Max Credits: 3
Min Credits: 3

36.465 Lab Methods in Nutrition Assessment

Course ID: 31884

Course Details: This course provides the student the opportunity to assess nutritional status using several modern analytical methods. The course uses spectrophotometry, HPLC and automated procedures to assess the status of vitamins, lipids, iron, glucose, and insulin. The student will learn the mathematical calculations needed for the methods. This course enables the student to appreciate how nutrient analysis is designed and implemented in the analytical laboratory.

Max Credits: 3
Min Credits: 3

36.472 Nutrition and Gene Expression

Course ID: 4821

Course Details: Regulation of eukaryotic gene expression by specific nutrients, hormones, and metabolites will be discussed. Transcriptional, post-transcriptional, and translational mechanisms of specific nutrients with emphasis in disease development or prevention.

Max Credits: 3
Min Credits: 3

36.474 Senior Seminar

Course ID: 4823

Course Details: This course is designed to familiarize the student with different types of questions used in the national certification exams and to give the student the opportunity to practice taking mock certification examinations.

Max Credits: 1
Min Credits: 1

36.481 Medical Nutrition Therapy I

Course ID: 4824

Course Details: This course is intended to provide students with current knowledge and application in dietary prevention, treatment, and long-term management of obesity, diabetes, cardiovascular diseases, and upper gastrointestinal diseases.
Topics include nutrition counseling and communication skills, professional ethics, medical terminology, clinical laboratory values, dietary menu planning and analysis in specific situations, evaluating nutritional status, case studies for these diseases. This course will stress the steps in the nutrition care process, determine appropriate methods for screening patients for nutritional risk, and help the student assess the nutritional status of patients.

Max Credits: 3
Min Credits: 3

36.482 Medical Nutrition Therapy II

Course ID: 37039

Course Details: This course is a continuation of Medical Nutrition Therapy I that will provide students with current knowledge and application in dietary prevention, treatment, and long-term management of patients with trauma, burns, HIV, cancer, liver, lower gastrointestinal diseases, celiac disease, and renal diseases. Topics include nutrition counseling and communication skills, professional ethics, medical terminology, clinical laboratory values, dietary menu planning and analysis in specific situations, evaluating nutritional status, case studies for these diseases, and will examine enteral and parental nutrition support for critically ill patients. Students will also develop a basic knowledge related to the principles of fluid and electrolytes balance as well as acid-base balance as they relate to the nutritional care of patients/clients.

Max Credits: 3
Min Credits: 3

36.483 Senior Research

Course ID: 4825

Course Details: Students along with their faculty advisor will structure a research project commensurate with the students’ areas of interest. A paper embodying the results of the research project will be prepared.

Max Credits: 2
Min Credits: 2

36.484 Senior Research

Course ID: 4826

Course Details: Continuation of 36.483

Max Credits: 2
Min Credits: 2

36.493 Clinical Laboratory Sciences Directed Studies

Course ID: 4827

Course Details: Students along with their faculty advisor will structure an acceptable project in one of four areas: research, program development, teaching, or clinical practicum. Students are eligible to earn three credits in accordance with departmental policy.

Max Credits: 3
Min Credits: 3

36.494 Directed Research in Nutrition

Course ID: 4828

Course Details: Students with their faculty advisor structure a research project in the area of nutrition. A paper embodying the results of the project will be prepared.

Max Credits: 3
Min Credits: 3

36.496 Senior Research in Nutrition
Course ID: 4829
Course Details: Continuation of 36.494.
Max Credits: 3
Min Credits: 3

38.101 Freshman Seminar
Course ID: 35271
Course Details: The Freshman Seminar will introduce new students to UMASS Lowell, the College of Health Sciences. Class participants will participate in weekly activities to improve study skills, communication skills, and problem solving. They will also learn important information about careers in Exercise Physiology and health-related fields.
Max Credits: 1
Min Credits: 1

38.202 Introduction to Exercise Physiology
Course ID: 4875
Course Details: This course introduces students to the major in Exercise Physiology. Objectives of the major are covered along with beginning fitness principles, history of the profession, career options, and legal aspects of practice. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 3
Min Credits: 3

38.301 Junior Seminar
Course ID: 35272
Course Details: The Junior Seminar, offered spring semester to Exercise Physiology majors, will orient students to information required for their Practicum experience during their Senior Year.
Max Credits: 1
Min Credits: 1

38.305 Exercise Physiology I
Course ID: 4881
Course Details: This first course of a two-course sequence will examine the short and long term effects of exercise on the oxygen transport systems. The lecture portion of this course will introduce the students to understanding the concepts of physiological and metabolic functioning of the human body during all forms of physical activity. Students taking this course are advised that the capability to exercise moderately and maximally will be necessary. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 4
Min Credits: 4

38.307 Exercise Physiology I Laboratory
Course ID: 4882
Course Details: This course must be taken concurrently with 38.305. It offers students the opportunity to test and evaluate physiological concepts and skills discussed in the lecture. Student physical examinations completed prior to each academic year should include cardiopulmonary status indicating exercise capability. Documentation must be provided to the Department prior to entering this laboratory course. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 1
Min Credits: 1
38.315 Kinesiology
Course ID: 1250
Course Details: This course combines the study of mechanics, kinematics, kinetics, anatomy and neuromuscular physiology to teach the examination and evaluation of human movement. The major focus of the course is in qualitative evaluation of movement. Topics also include quantitative evaluation, body mechanics, posture and gait evaluation with a focus on identification of abnormal movement patterns. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 3
Min Credits: 3

38.317 Kinesiology Laboratory
Course ID: 4884
Course Details: All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 1
Min Credits: 1

38.356 Pharmacology
Course ID: 31962
Course Details: All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 3
Min Credits: 3

38.406 Exercise Physiology II
Course ID: 1249
Course Details: This course provides a continuation of Exercise Physiology I and deals with the short and long effects of exercise on the skeletal and neuromuscular systems. This portion of the sequence also provides an integration of the physiological systems when considering the effect of exercise. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 4
Min Credits: 4

38.408 Exercise Physiology II Laboratory
Course ID: 4887
Course Details: This course is designed to provide the student with hands on experience in a variety of laboratory techniques and field techniques for the assessment of human performance. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 1
Min Credits: 1

38.412 Clinical Practicum I and II
Course ID: 4888
Course Details: This course is an off-campus experience in either a cardiac/pulmonary rehab clinical facility or fitness setting. Students experience practical applications of the concepts and theories learned in the classroom settings. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.
Max Credits: 4
Min Credits: 4
38.417 Research Methods in Exercise Physiology

Course ID: 4889

Course Details: This course involves an in-depth study of current research methods and topics with specific applications to the field of Exercise Physiology. The content includes the sources of data acquisition, research design, testing procedures, and treatment of data. Each student must participate in a senior research project utilizing information gained from the lecture portion of the class. All 1st 2nd and 3rd year course work in the exercise physiology major. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.

Max Credits: 3
Min Credits: 3

38.418 Senior Seminar

Course ID: 4890

Course Details: The Senior Seminar, offered concurrently with 38.412 Clinical Practicum, will be an on-campus discussion of the practicum experience.

Max Credits: 3
Min Credits: 3

38.420 Advanced Study in Exercise Physiology

Course ID: 4891

Course Details: This course is a capstone course in Exercise Physiology. Students summate and synthesize classroom and clinical experiences in Exercise Physiology in the preparation of a final project. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.

Max Credits: 3
Min Credits: 3

38.421 Directed Study Health Promotion

Course ID: 30347

Course Details: All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.

Max Credits: 3
Min Credits: 3

38.422 Exercise Prescription & Programming

Course ID: 4892

Course Details: This course provides an essential foundation for exercise prescription and programming, and sound educational practice. Factors that impede or enhance exercise compliance and progress are explored. Clinical teaching skills, safety, and professional behavior are also addressed. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.

Max Credits: 3
Min Credits: 3

40.248 Values in American Culture

Course ID: 1248

Course Details: Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists. Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists.

Max Credits: 3
**40.257 The Family in American Literature**

Course ID: 4950

Course Details: A study of literary selections dealing with traditions of family life, the individual, and social change.

Max Credits: 3
Min Credits: 3

**40.274 Literature of Beat Movement**

Course ID: 31963

Course Details: A survey of fiction and poetry by Beat Movement authors, including Lowell native Jack Kerouac, Allen Ginsberg, William Burroughs, Herbert Huncke, Gregory Corso, and Lawrence Ferlinghetti.

Max Credits: 3
Min Credits: 3

**40.311 South in American Literature**

Course ID: 4951

Course Details:

Max Credits: 3
Min Credits: 3

**40.376 African American Literature**

Course ID: 4957

Course Details: An upper-level survey covering African American literature from slave narratives through contemporary literature. Authors covered typically include Frederick Douglass, Booker T. Washington, W.E.B. Du Bois, Zora Neale Hurston, Langston Hughes, Richard Wright, Ann Petry, Ralph Ellison, Toni Morrison, and Lucille Clifton.

Max Credits: 3
Min Credits: 3

**40.401 American Studies Seminar**

Course ID: 4958

Course Details: A required seminar for American studies majors normally taken during the second semester of the junior year or during the senior year. Students undertake a research project leading to the writing of a major paper with a theme that combines more than one discipline.

Max Credits: 3
Min Credits: 3

**40.491 Directed Studies in American Studies**

Course ID: 4959

Course Details: An investigation of a topic using an interdisciplinary approach and leading to the writing of a major paper. The course provides an opportunity for a student to work closely with an instructor on a topic of special interest.

Max Credits: 3
Min Credits: 1

**40.496 Practicum Experience in American Studies**
Course ID: 4960

Course Details: Allows students an opportunity to combine their formal education with an off campus project. After developing a proposal for the practicum under the guidance of an instructor, the student spends a portion of his or her time working with persons engaged in business, the arts, museums, the professions, community service, or government. The coordinator for American studies maintains a file of organizations that accept students.

Max Credits: 3
Min Credits: 3

40.497 Practicum in American Studies

Course ID: 4961

Course Details:

Max Credits: 1
Min Credits: 1

41.103 Introduction to Paralegal Studies

Course ID: 4963

Course Details: Familiarizes students with the role of a paralegal in both the public and private sector. Other topics will include principles of jurisprudence and basic legal concepts and terminology.

Max Credits: 3
Min Credits: 3

41.210 Restorative Justice

Course ID: 37755

Course Details: This course will introduce students to the fundamental principles and practices of restorative justice as a method of building positive peace. Students will develop a working knowledge of the general theories of restorative justice, as well as practical hands-on experience with peacemaking circles. Traditional assumptions about justice and the adversarial legal process will be explored and challenged. The relationship between restorative justice, restorative practices, and other conflict resolution methods such as mediation will be discussed. Practical challenges in implementing restorative justice on the ground will also be examined.

Max Credits: 3
Min Credits: 3

41.234 Criminal Law

Course ID: 4964

Course Details: Studies substantive criminal law, with emphasis on general principles of criminal culpability, such as the act requirement, the mens rea requirement, and causation. The course will also cover the law of attempted crimes, accomplice liability, and defenses. The elements of specific crimes, such as homicide, burglary, robbery, and larceny will be studied in depth.

Max Credits: 3
Min Credits: 3

41.250 Disability and the Law: Legal Rights of People with Disabilities

Course ID: 35292

Course Details: An examination of the history and progress of the disability rights movement in America, the current state of the law and trends ad prospects for the future, with particular focus on those laws designed specifically to address the needs of people with disability.

Max Credits: 3
Min Credits: 3
41.261 Introduction to Legal Concepts

Course ID: 4966

Course Details: Serves as an introductory legal course. It is a survey of many specific topics, such as product liability, consumer law, intellectual property, and ethics. More importantly, the course emphasizes critical legal thinking and human values.

Max Credits: 3
Min Credits: 3

41.262 Introduction to Business Law

Course ID: 4967

Course Details: Introduces the student to the fundamentals of criminal and tort law. The main emphasis is on all aspects of contract law including the agreement consideration, writing third-party rights, illegality, performance, and remedies. Also covered is agency law concerning all situations where one party is working for another in the business world. This course is highly recommended for pre-law students, CPA's, and paralegals.

Max Credits: 3
Min Credits: 3

41.360 Legal Issues in Racism

Course ID: 4972

Course Details: A study of racial discrimination in the United States. Emphasis will be placed on relevant constitutional provisions, statutory provisions, and on United States Supreme Court cases.

Max Credits: 3
Min Credits: 3

41.363 Corporate and Property Law

Course ID: 4973

Course Details: Studies the law and its impact on the business world. Partnerships, limited partnerships, and joint ventures are studied at the outset of the course. The main emphasis is on elements of the corporate structure. The last part of the course deals with personal and real property with coverage of wills and trusts. This course is highly recommended for pre-law students, CPA's, and paralegals.

Max Credits: 3
Min Credits: 3

41.365 The Legal Environment of Business

Course ID: 4975

Course Details: This class explores the intersection of business and the law in American society in the 21st century. This class builds on the concepts covered in Business Law and Explores current legal topics that affect doing business in the United States and abroad. Topics covered include: The U.S. Constitution and the court system, white collar crime, cyberlaw, the laws of intellectual property, international trade, consumer protection, bankruptcy, product liability, administrative law and labor and employment law.

Max Credits: 3
Min Credits: 3

41.366 International Law

Course ID: 4976

Course Details: Introduces the body of international rules, customs, and regulations which are in force between nations. Specific legal issues involving a study of multinational, cultural, political, economic, and ethnic perspectives are addressed. Topics covered include human rights, war prevention, foreign policy, tort and criminal liability, business trade practices, and
dispute settlement. Recommended at the senior level.

Max Credits: 3
Min Credits: 3

41.367 Environmental Law

Course ID: 4977

Course Details: Examines the legal and administrative problems of protecting the quality of the human environment. Federal and state legislation on environmental policy is studied. Public interest litigation as a supplement to the enforcement of environmental law is discussed. Places emphasis on the law as a means of protecting the environment.

Max Credits: 3
Min Credits: 3

41.370 Real Estate Law

Course ID: 4980

Course Details: Examines contracts for the sale of real estate, deeds, title examinations, security for real estate transactions, methods and problems of co-ownership, zoning ordinances, brokerage contracts, leases and landlord and tenant rights and liabilities.

Max Credits: 3
Min Credits: 3

41.372 Sports, Entertainment and Art Law

Course ID: 4981

Course Details: The purpose of this course is to challenge students to engage in analytic reading, critical thinking and problem solving as it relates to the legal issues facing the sports, entertainment and art worlds.

Max Credits: 3
Min Credits: 3

41.376 Family Law

Course ID: 4983

Course Details: Studies the critical family law issues facing society today. Subject matter examined includes the law of marriage, custody, adoption, divorce, child support, juveniles, right to die, fetal tissue transfer to prolong the life of another, reproduction control, and surrogate parenting. This course is taught from a legal and human values perspective.

Max Credits: 3
Min Credits: 3

41.377 Elder Law

Course ID: 36724

Course Details: This course introduces the student to the major architectural components of the legal environment of the elderly, including Medicare, Medicaid, SSI, pensions, nursing homes, assisted living and related issues.

Max Credits: 3
Min Credits: 3

41.379 The Relationship of Law, Logic, and Ethics

Course ID: 4984

Course Details: Examines the impact of ethical viewpoints on the structure of legal doctrines. It stresses the fact that the study of law is a study of ethics as well as logic.
**41.381 Women and the Law**

Course ID: 4985

Course Details: Presents issues that particularly affect women. Topics include: sex discrimination, sexual harassment, marriage, divorce, reproductive control, surrogate motherhood, and custody.

Max Credits: 3
Min Credits: 3

**41.386 Intellectual Property**

Course ID: 4988

Course Details: Surveys the law of the protection of ideas, trade secrets, inventions, artistic creations, and reputation. The course will briefly review the bases for patent, trademark, copyright and trade secret protection, the distinction between the various forms of intellectual property, and the statutory and common law methods of enforcing rights.

Max Credits: 3
Min Credits: 3

**41.387 Legal Research Methods**

Course ID: 4989

Course Details: Designed to introduce the student to the fundamentals of legal research and writing. The student will gain hands-on experience in legal research and in the reporting of such research in written assignments, case briefs and memoranda.

Max Credits: 3
Min Credits: 3

**41.388 Directed Study: Law**

Course ID: 4990

Course Details:

Max Credits: 3
Min Credits: 3

**41.390 Litigation**

Course ID: 4992

Course Details: Examines the practices and procedures involved in the litigation process. Topics include: legal research, courts and jurisdictions, evidence and discovery, pleadings, motions, depositions, trials and appeals, and federal rules of procedure.

Max Credits: 3
Min Credits: 3

**41.392 Wills, Trusts and Estates**

Course ID: 4994

Course Details: Introduction to the law of wills, trusts, and estates. This course covers the fundamental legal concepts and vocabulary necessary to understand, draft, and work with the core estate planning tools. Practical examples and sample legal cases and materials will be provided and discussed. No prior legal knowledge is required, though some familiarity with the United States legal system or case law will be helpful.

Max Credits: 3
Min Credits: 3

41.488 Directed Study in Law

Course ID: 5000
Course Details: Permits superior students to engage in specialized study.
Max Credits: 3
Min Credits: 1

41.489 Seminar in Law

Course ID: 5001
Course Details: Provides opportunity for small groups of advanced students to study selected topics.
Max Credits: 3
Min Credits: 3

41.490 Legal Aspects of Cyberspace

Course ID: 5002
Course Details: The growth of the Internet has created two parallel universes each with its own set of rules and reality: real space and cyber space. Traditional notions about privacy, defamation, contracts, freedom of expression, pornography, stalking, jurisdiction and intellectual property are challenged by the latest cyberspace technology. Much of the debate about control, which leads to questions about rights and responsibilities, centers around who, if anyone, should design the architecture of cyberspace, i.e., the "code". These and other topical subjects serve as the focus on the study of legal issues in cyberspace.
Max Credits: 3
Min Credits: 3

41.497 The Paralegal Practicum

Course ID: 5004
Course Details: Assigned fieldwork under the supervision and with the permission of the coordinator. This course is designed to broaden the educational experience of paralegal students by providing exposure to selected legal environments such as corporate legal departments, financial institutions, law firms, real estate departments, banks, and government agencies. This course is intended to provide a correlation of theoretical knowledge with practical experience in an area of particular interest to students.
Max Credits: 3
Min Credits: 3

42.101 College Writing I

Course ID: 5014
Course Details: A workshop course that thoroughly explores the writing process from pre-writing to revision, with an emphasis on critical thinking, sound essay structure, mechanics, and academic integrity. Students will read, conduct rhetorical analyses, and practice the skills required for participation in academic discourse. Students will write expository essays throughout the semester, producing a minimum of four formal essays.
Max Credits: 3
Min Credits: 3

42.101SI Intensive Writing Lab - Supplemental Instruction

Course ID: 36232
Course Details: Taken simultaneously with College Writing I, the two-credit Intensive Writing Lab offers students supplemental instruction to complement their work in that course. Students who place into the Writing Lab will receive
extensive training in grammar, mechanics, and the use of Standard English. The once-per-week lab encourages students' success in College Writing I and in their other classes. The course credit cannot be used to satisfy the credits required for graduation, but may be used to satisfy credits required for full-time student status.

Max Credits: 2
Min Credits: 2

42.102 College Writing II

Course ID: 5015

Course Details: A workshop course that thoroughly explores the academic research writing process with an emphasis on entering into academic conversation. Building on the skills acquired in College Writing I, students will learn to write extensively with source material. Key skills addressed include finding, assessing, and integrating primary and secondary sources, and using proper documentation to ensure academic integrity. Students will produce analytical writing throughout the semester, including a minimum of four formal, researched essays.

Max Credits: 3
Min Credits: 3

42.110 College Writing A ESL

Course ID: 33851

Course Details: A workshop course that provides a thorough review of the basics of essay writing in preparation for success in College Writing I ESL, with a focus on the particular needs of multilingual students. Students placed into this course will use the writing process to strengthen the fundamental skills necessary for clear academic writing in English, including the basic rules of grammar and principles of rhetoric. Credit for both 42.100 and 42.110 will not be granted.

Max Credits: 3
Min Credits: 3

42.111 College Writing I ESL (formerly 42.103)

Course ID: 33852

Course Details: Satisfies the first half of the first-year writing requirement, equivalent to 42.101 College Writing I, with a focus on the particular needs of multilingual students. Credit for both 42.101 and 42.111 will not be granted, nor credit for both 42.101 and 42.103.

Max Credits: 3
Min Credits: 3

42.112 College Writing II ESL (formerly 42.104)

Course ID: 5018

Course Details: Satisfies the second half of the first-year writing requirement, equivalent to 42.102 College Writing II, with a focus on the particular needs of multilingual students. Credit for both 42.102 and 42.112 will not be granted, nor credit for both 42.102 and 42.104.

Max Credits: 3
Min Credits: 3

42.200 Critical Methods of Literary Inquiry

Course ID: 31885

Course Details: Examination of diverse critical and theoretical approaches to literature in the development of literary analysis.

Max Credits: 3
Min Credits: 3

42.201 Great Books of Antiquity
Course ID: 5019
Course Details: Studies representative literary selections from the Hebrews, the Greeks, the Romans, and other societies of the ancient world.
Max Credits: 3
Min Credits: 3

42.202 Great Books of the Modern Period
Course ID: 5020
Course Details: Much of what we consider "contemporary" was born out of the modernist period, roughly 1900-1950, and was considered radical, even salacious, in its time. This course provides a sampling of modernist literature. Students will explore this period by examining exemplary texts, numerous historical and social events, and a few films.
Max Credits: 3
Min Credits: 3

42.210 Drama
Course ID: 5027
Course Details: Presents a study of plays from the classical period to the present.
Max Credits: 3
Min Credits: 3

42.211 Poetry
Course ID: 5028
Course Details: Studies selections from the Renaissance through contemporary periods.
Max Credits: 3
Min Credits: 3

42.212 The Short Story
Course ID: 5029
Course Details: Studies the development of the short story from Poe and Chekhov to the present.
Max Credits: 3
Min Credits: 3

42.216 Monsters, Apes & Nightmares
Course ID: 5033
Course Details: This course examines literary responses to science in England and the United States from the early Nineteenth Century to the present. Readings include novels--Frankenstein, The Island of Doctor Moreau, Dr. Jekyll and Mr. Hyde, Jurassic Park--essays, and poems.
Max Credits: 3
Min Credits: 3

42.217 The Horror Story
Course ID: 5034
Course Details: Explores the genre from Poe to the present.
Max Credits: 3
Min Credits: 3

42.218 Comedy
Course ID: 5035
Course Details: Presents the theory and practice of comedy from the Greeks to the present.
Max Credits: 3
Min Credits: 3

42.220 Oral & Written Communication for Computer Science
Course ID: 5036
Course Details: The main goal of this course is to enhance the student's understanding of the elements of effective communication, and to put that knowledge into practice in a supportive, co-operative, workshop environment. Limited to Computer Science majors.
Max Credits: 3
Min Credits: 3

42.222 Oral Communication
Course ID: 5038
Course Details: Develops and applies the basic speaking skills that can be adapted to a variety of personal and professional contexts. Emphasis is placed on selection, analysis, organization and presentation of speech materials. Practice skills include listening, interviewing and the delivery and critique of extemporaneous speeches.
Max Credits: 3
Min Credits: 3

42.224 Business Writing
Course ID: 5040
Course Details: Studies the theory and practice of writing letters, memoranda and reports on specific business and technical problems. Registration preference for students enrolled in Business programs.
Max Credits: 3
Min Credits: 3

42.226 Technical and Scientific Communication
Course ID: 5042
Course Details: Studies the theory and practice of letters, memoranda, reports and oral presentations on specific scientific and technical problems.
Max Credits: 3
Min Credits: 3

42.227 Essay Writing for English Majors
Course ID: 5043
Course Details: Analyzes and discusses the techniques and styles of selected professional essayists as well as the preparation of student essays. Emphasis will be placed on the writing process from prewriting through drafting and revising. English majors and minors only.
Max Credits: 3
Min Credits: 3
42.229 Essay Writing for Non-English Majors

Course ID: 5045

Course Details: Analyzes and discusses the techniques and styles of selected professional essayists as well as the preparation of student essays. Emphasis will be placed on the writing process from prewriting through drafting and revising. Non-English majors only.

Max Credits: 3
Min Credits: 3

42.232 Turning Fiction into Film

Course ID: 5048

Course Details: Often when we encounter narratives (in the movies or in books) we tend to practice a "suspension of disbelief" letting the story unfold, following the conventions of film and fiction without question. This course will direct our critical focus on the mechanisms through which writers and filmmakers convey meaning to their audiences.

Max Credits: 3
Min Credits: 3

42.233 Play Analysis

Course ID: 36436

Course Details: An introduction to the principles of play construction and the vocabulary and methods of interpreting play texts for theatrical production. Required of all theatre arts concentrators.

Max Credits: 3
Min Credits: 3

42.236 Science Fiction and Fantasy

Course ID: 5051

Course Details: Designed to introduce students to understand science fiction and fantasy within the broader context of literature and literary theory. It attempts to develop and hone student's skills of critical analysis as it supplies them with the tools to contextualize their reading experience - i.e., to understand the origins and politics of the books that they read.

Max Credits: 3
Min Credits: 3

42.238 Introduction to Creative Writing

Course ID: 36923

Course Details: A course for aspiring creative writers among freshman and sophomores which offers an introduction to the craft of creative writing in its primary genres: poetry, fiction, drama, creative non-fiction (emphases will vary depending upon instructor). The focus of this course will be on learning the fundamentals of craft techniques and peer review.

Max Credits: 3
Min Credits: 3

42.240 Literature and Women

Course ID: 5053

Course Details: A survey of literary attitudes toward women from the Judaic and Hellenic periods through the present.

Max Credits: 3
Min Credits: 3

42.242 The Heroine in Modern Fiction
Course ID: 5055
Course Details: Provides a study of selected short stories and novels which deal sympathetically with the changing roles of women.
Max Credits: 3
Min Credits: 3

42.243 Contemporary Women Writers

Course ID: 5056
Course Details: Contemporary Women Writers introduces students to American women writers of the last fifty years. We examine the historical, socio-cultural, political, and personal influences on these writers' work by studying trends and events in recent American history and themes reflected in the works. By studying contemporary women's writing in this contextualized fashion, students can appreciate larger trends in our society, the role writing plays in examining such trends, and the value of literature as an exploration of human growth and struggle. Through discussion, group collaboration, critical analysis, and by designing their own graphic organizers, students gain a breadth of knowledge in the following areas: the themes and stylistic concerns of contemporary American women's writing; the key historical events that influence contemporary American women's writing; the critical reading of literary texts.
Max Credits: 3
Min Credits: 3

42.246 Gay & Lesbian Literature

Course ID: 5059
Course Details: Explores the treatment of homoeroticism and homosexual love in literature from Antiquity to the present. Emphasis is given to texts reflecting the construction of a homosexual identity and recurring motifs among gay, lesbian, and bisexual writers.
Max Credits: 3
Min Credits: 3

42.248 Values in American Culture

Course ID: 1248
Course Details: Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists. Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists.
Max Credits: 3
Min Credits: 3

42.249 Literature on Technology and Human Values

Course ID: 5060
Course Details: A study of the relationship between works of fiction, cultural attitudes toward technology, and social values.
Max Credits: 3
Min Credits: 3

42.250 The Bible as Literature

Course ID: 5061
Course Details: Presents a literary and historical analysis of selected Old and New Testament books.
Max Credits: 3
Min Credits: 3
42.251 War in Literature

Course Details: In "War in Literature" we will study conflict and human values in times of war, focusing on the literature of World War I, World War II, Vietnam, and the Gulf War. Content covered includes a selection of representative (and divergent) literary texts written throughout the 20th century in a variety of genres (poetry, essays, memoir, short story, novel, and hybrid forms like the "graphic novel").

Max Credits: 3
Min Credits: 3

42.253 The Culture of American Sport

Course Details: An examination of the history, literature, sociology, and aesthetics of sport. Attention to corollary issues and values including racism, sexism, and violence.

Max Credits: 3
Min Credits: 3

42.257 The Family in American Literature

Course Details: A study of literary selections dealing with traditions of family life, the individual, and social change.

Max Credits: 3
Min Credits: 3

42.258 Disability in Literature

Course Details: The course will focus on historical and contemporary portrayals of disability and disabled people in literature.

Max Credits: 3
Min Credits: 3

42.267 Introduction to Shakespeare

Course Details: A study of selected histories, comedies, and tragedies. Not for English majors.

Max Credits: 3
Min Credits: 3

42.274 The Literature of the Beat Movement

Course Details: Explores both the writings and the personal lives of a loose confederation of poets, novelists, and essayist who emerged onto the American literary and cultural scene following World War II and who came to be known as the -Beat Generation+. The primary focus will be on the life and writings of Lowell native Jack Kerouac (1922-1969) with others of the -beat circle+ included as well, i.e., Allen Ginsberg, William Burroughs, Diana DiPrima, etc.

Max Credits: 3
Min Credits: 3

42.281 British Literary Traditions
Course ID: 36426
Course Details: A survey of British Literary history from the medieval through the modernist periods.
Max Credits: 3
Min Credits: 3

42.282 American Literary Traditions

Course ID: 5081
Course Details: A survey of American Literary history from early contact between Native American populations and European colonists through contemporary American writing.
Max Credits: 3
Min Credits: 3

42.285 Crime in Literature

Course ID: 5082
Course Details: A study of how various authors use crime as a plotting device to study character, reveal social order, and critique social institutions.
Max Credits: 3
Min Credits: 3

42.286 The Graphic Narrative: Comics in Context

Course ID: 33659
Course Details: While picture-images date as far back as the Egyptian tombs, or the caves of Lascaux, this course will consider the development of the modern comic in twentieth-and twenty-first century America. Readings will include not just comics, but also the history of comics, art and literary theory, a novel about comics, and articles that consider the legal, political, and social issues surrounding comics. We will also look at traditional and contemporary comic strips and graphic novels to explore what we can learn from them about American Popular Culture. Comics are on the cutting edge of contemporary literature, and there are many avenues to pursue in the study of this narrative form. This course will include intensive reading and writing, and will ask students to engage with demanding theoretical works, in addition to incorporating a considerable amount of research. While the subject matter can be lighthearted the course takes these texts seriously, and asks for intellectual engagement with the issues and concerns of culture depicted in these words and pictures. (Full proposal and supplemental material available).
Max Credits: 3
Min Credits: 3

42.291 History of English Literature I

Course ID: 5083
Course Details: A survey of representative writers and works from the Anglo-Saxon period to the mid-seventeenth century.
Max Credits: 3
Min Credits: 3

42.292 History of English Literature II

Course ID: 5084
Course Details: A survey of representative writers and works from Milton into the twentieth century.
Max Credits: 3
Min Credits: 3

42.294 History of American Literature I
Course ID: 5086
Course Details: Studies the historical development of American literature from the Colonial period to the Civil War. Selected works by representative authors from each period are studied.
Max Credits: 3
Min Credits: 3

**42.295 History of American Literature II**

Course ID: 5087
Course Details: Studies the historical development of American literature from the Civil War to World War I.
Max Credits: 3
Min Credits: 3

**42.298 Children's Literature**

Course ID: 32364
Course Details: A survey course covering traditional and contemporary children's literature. Texts are selected to represent different historical periods and a diversity of authorial perspectives. Attention is given to changing views of children and childhood as reflected in selected texts.
Max Credits: 3
Min Credits: 3

**42.300 Intro to Journalism**

Course ID: 5090
Course Details: An introduction to techniques of writing for the news media.
Max Credits: 3
Min Credits: 3

**42.302 Creative Writing: Fiction**

Course ID: 5092
Course Details: Studies the theory and practice of fiction. Conducted as a workshop with close analysis of student work.
Max Credits: 3
Min Credits: 3

**42.303 Creative Writing: Poetry**

Course ID: 5093
Course Details: Discusses the theory and practice of poetry. Conducted as a workshop with close analysis of student work.
Max Credits: 3
Min Credits: 3

**42.304 Creative Writing: Playwriting**

Course ID: 5094
Course Details: Studies the theory and practice of playwriting. Conducted as a workshop with close analysis of student work.
Max Credits: 3
Min Credits: 3
42.305 Reviewing the Arts
Course ID: 5095
Course Details: Theory and practice of writing short, critical essays in a journalistic mode on the visual and performing arts. Special attention to theater, movie, and television criticism. Conducted as a workshop with close analysis of student work.
Max Credits: 3
Min Credits: 3

42.307 History of the English Language
Course ID: 5097
Course Details: Examines the phonetic, lexical, syntactical, and semantic shifts in the English language from its beginnings to the present.
Max Credits: 3
Min Credits: 3

42.308 Analysis of Modern English
Course ID: 5098
Course Details: A study of English syntax examining traditional, structural, and transformational grammars. Attention to issues of dialect, usage, phonology, and morphology.
Max Credits: 3
Min Credits: 3

42.310 Writing Popular Fiction
Course ID: 5100
Course Details: This course is designed for students who are interested in writing in one or more of the popular forms of genre fiction: the mystery, the horror story, science fiction, fantasy, romance, and the thriller. Class time will be spent discussing and work-shopping student writing. Some time will also be devoted each week to brief lectures on practical matters like choosing between the short story and the novel, finding ideas, constructing plots, building characters, pacing, generating suspense, and marketing one’s work. In addition, there will be assigned readings to illustrate the above.
Max Credits: 3
Min Credits: 3

42.311 The South in American Literature
Course ID: 5101
Course Details: A study of the writers, movements, and social culture of the South, from both the nineteenth- and twentieth-centuries.
Max Credits: 3
Min Credits: 3

42.313 Realism and Naturalism American Fiction
Course ID: 5103
Course Details: A study of realism and naturalism in fiction from the end of the Civil War to World War I.
Max Credits: 3
Min Credits: 3

42.315 Old English Language and Literature
Course ID: 30353

Course Details: Students will acquire reading knowledge of the Old English language, spending half the semester mastering grammar and vocabulary, and the second half translating texts such as The Wanderer, Dream of the Rood, and Beowulf. Attention will also be given to Anglo-Saxon culture.

Max Credits: 3

Min Credits: 3

42.317 British Literature of the Twentieth Century

Course ID: 5105

Course Details: A study of twentieth-century British short stories, poetry, and drama.

Max Credits: 3

Min Credits: 3

42.320 Personal and Reflective Writing

Course ID: 5107

Course Details: A workshop format encourages peer criticism of individual writings and discussion of models from various texts.

Max Credits: 3

Min Credits: 3

42.321 Community Writing I

Course ID: 5108

Course Details: Students work on various writing projects the professor brings into the classroom on behalf of local non-profit organizations. This service learning course provides opportunities for students to learn through thoughtful engagement with the community, applying knowledge of writing gained in the classroom to real world problems. The course will be held in a workshop format with strong emphasis on revision.

Max Credits: 3

Min Credits: 3

42.323 Writing About People

Course ID: 5110

Course Details: A creative non-fiction course run in a workshop format. Writing assignments are equally divided between reflective, personal pieces about people you know and more journalistic, biographical writing about people you don't know. Readings cover both categories.

Max Credits: 3

Min Credits: 3

42.324 Writing About Place

Course ID: 5111

Course Details: Writers throughout time have been thoroughly grounded in place. Students in this course will read and write on a variety of topics: travel, cities, suburbs, dwelling places, nature, environmental issues, etc., in a variety of genres: creative non-fiction, essays, journalism, short stories, poetry, journals. This course will be held in a workshop format with strong emphasis on revision.

Max Credits: 3

Min Credits: 3

42.325 The Rise of the Novel
Course ID: 5112
Course Details: A study of the British novel in the eighteenth and early nineteenth centuries from DeFoe through Austen.
Max Credits: 3
Min Credits: 3

42.327 Victorian Fiction
Course ID: 5114
Course Details: A study of fiction from 1837 through 1901. May include reading and writing about texts by Dickens, Collins, Gaskell, Bronte, eliot, thackeray, Trollope, Hardy, wilde, and others.
Max Credits: 3
Min Credits: 3

42.330 Twentieth Century British Novel
Course ID: 5115
Course Details: A study of the novel from Conrad through Greene and others.
Max Credits: 3
Min Credits: 3

42.331 American Novels to 1900
Course ID: 5116
Course Details: A study of the American novel from colonial beginnings to 1900.
Max Credits: 3
Min Credits: 3

42.333 American Autobiography
Course ID: 5118
Course Details: A Study of autobiographical writing from Colonial America to the present. Works from the 17th to the 21st century will allow students to explore the genre of autobiography and related sub-genres, including the captivity narrative, the slave narrative, and the immigration narrative. Readings will also explore literary and political autobiographies.
Max Credits: 3
Min Credits: 3

42.337 The Gothic Tradition in Literature
Course ID: 33662
Course Details: This course will consider works that fall under the very broad genre known as "The Gothic." As this genre is one of highly contested boundaries, we will consider how to define the Gothic, and what exactly constitutes this form. We will look at texts from both England and America, and spanning from the late 18th century to our own times. Our study will focus on the form of the novel, and the development and emergence of the gothic novel from its beginnings in England to its contemporary manifestations in the United States.
Max Credits: 3
Min Credits: 3

42.341 Studies in Film
Course ID: 31938
Course Details: A rigorous examination of a topic of current interests in film studies organized by particular themes, genres or filmmakers.
Max Credits: 3  
Min Credits: 3

42.342 Women Writers and the Past
Course ID: 30861  
Course Details: Women Writers and the Past
Max Credits: 3  
Min Credits: 3

42.345 British Women Novelists
Course ID: 5121  
Course Details: Selected novels by writers such as Austen, the Brontes, Eliot, Woolf, Bowen, and Drabble.
Max Credits: 3  
Min Credits: 3

42.348 Modern American Drama
Course ID: 5123  
Course Details: A study of such playwrights as O'Neill, Odets, Wilder, Williams, and Miller.
Max Credits: 3  
Min Credits: 3

42.349 Arthurian Literature
Course ID: 5124  
Course Details: Will examine works in modern English translation from a variety of genres (romance, history, tragedy, epic) that tell stories of the mythical King Arthur and the knights and ladies of his courtly world. The course will focus primarily on texts of the medieval and renaissance periods, but will include attention to nineteenth- and twentieth-century versions in poetry, prose, art, music and film.
Max Credits: 3  
Min Credits: 3

42.351 Literature of the Middle Ages
Course ID: 5126  
Course Details: A study of the prose, poetry, and drama of England from 1200-1500 set against cultural and historical backgrounds.
Max Credits: 3  
Min Credits: 3

42.353 Literature of the Seventeenth Century
Course ID: 5128  
Course Details: A study of English prose and poetry of the period excluding Milton.
Max Credits: 3  
Min Credits: 3

42.354 Literature of the Eighteenth Century
Course ID: 5129
Course Details: A study of the prose and poetry of the period.
Max Credits: 3
Min Credits: 3

42.356 Literature of the Victorian Period

Course ID: 5131
Course Details: A study of British fiction, poetry, and prose from 1837 to 1901.
Max Credits: 3
Min Credits: 3

42.361 Restoration Comedy

Course ID: 5134
Course Details: A study of comic plays from 1660 to the mid-eighteenth century. Focus on the works of Ethridge, Wycherley, Congreve, and Sheridan.
Max Credits: 3
Min Credits: 3

42.362 Modern Drama

Course ID: 5135
Course Details: A study of selected Continental, British and American plays of the late nineteenth century to the present.
Max Credits: 3
Min Credits: 3

42.363 English Renaissance Drama

Course ID: 5136
Course Details: A study of major dramatists of the Age of Shakespeare including Marlowe, Dekker, Webster, Jonson, Beaumont and Fletcher, Massinger, Ford and others
Max Credits: 3
Min Credits: 3

42.364 African American Drama

Course ID: 38101
Course Details: A study of the history and development of African American drama, with emphasis on major aesthetic, political, and social movements in African American culture.
Max Credits: 3
Min Credits: 3

42.366 Creative Writing: Poetry II

Course ID: 5138
Course Details: Combines discussion and critique of student poems with readings in contemporary poetry and poetics. The focus is on enabling students to develop their individual voices, forms, and subjects.
Max Credits: 3
Min Credits: 3
42.368 Feature Writing
Course ID: 36427
Course Details: This writing-oriented course will focus on learning how to write feature stories for newspapers, magazines, and the Internet.
Max Credits: 3
Min Credits: 3

42.369 Reading and Writing New Media
Course ID: 36428
Course Details: This course will focus on learning how to write for electronic media and understanding the changing world of journalism.
Max Credits: 3
Min Credits: 3

42.370 Contemporary American Fiction
Course ID: 5140
Course Details: Discusses novels and short fiction from World War II to the present.
Max Credits: 3
Min Credits: 3

42.373 Modern Poetry
Course ID: 5143
Course Details: A study of the development of British and American poetry from 1900 through World War II.
Max Credits: 3
Min Credits: 3

42.374 Contemporary Poetry
Course ID: 5144
Course Details: A study of selected British and American Poets since World War II.
Max Credits: 3
Min Credits: 3

42.375 Modern Irish Literature
Course ID: 5145
Course Details: Poetry, drama, and prose fiction from the Irish literary renaissance to the present. Writers will include Yeats, Joyce, O'Casey, Friel and Heaney.
Max Credits: 3
Min Credits: 3

42.376 African-American Literature
Course ID: 5146
Course Details: A study of selected works by black American writers, such as Toomer, Wright, Ellison, Walker, and Morrison.
42.378 Asian American Literature

Course ID: 36696

Course Details: Asian Americans hold an intriguing place in the cultural imagination: as perpetual foreigners, as so-called 'model minorities' that serve to maintain hegemonic power relations, and as living embodiments of America's memory of its involvement in recent wars. As artists, however, Asian Americans have contributed an impressive body of literary work, and we'll examine some of the most enduring and provocative of these texts. We'll explore themes such as trauma and the immigrant experience, issues of exile and dislocation, Asian Americans' embattled place in our country's history, and the intersections of race and ethnicity with gender and sexuality.

Max Credits: 3
Min Credits: 3

42.379 Post Colonial Literature

Course ID: 36924

Course Details: When the peoples of Africa, India, the Caribbean, Ireland, and Canada finally gained, to a greater and lesser extent, independence from the British during the 20th century, they found that their national, cultural, and individual identities had been radically altered by the experience of colonization. In this course, we will examine how authors have related this postcolonial condition. We will examine a diverse body of texts--poetry which eloquently describe the heroic journey out of colonialism, drama which lays bare the conflicts of assimilation, and novels which fantastically present political struggle--as we determine how postcolonial theory and literature affects and possibly redefines all literature.

Max Credits: 3
Min Credits: 3

42.382 Theatre History I: Ancient Greece through the 18th Century

Course ID: 33541

Course Details: A survey of ancient to early modern theatre in its historical and social contexts, tracing changes and developments in acting styles, theatre architecture, scenic practices, dramatic literature, and the audience. The course examines how theatre both reflects and shapes the changing beliefs and priorities of a culture.

Max Credits: 3
Min Credits: 3

42.383 Theatre History II: Nineteenth Century to the Present

Course ID: 33542

Course Details: A survey of theatre in its historical and social contexts from the 19th century to the present, focusing on innovations in design and technology, the advent of the director, the emergence of modern schools of acting, and the creation of new forms of theatre to suit the changing needs of a modern world.

Max Credits: 3
Min Credits: 3

42.387 Introduction to Editing and Publishing

Course ID: 5153

Course Details: Designed for students considering a career in book publishing, this course provides an overview of the publishing industry. You will examine the stages of the book publishing process from acquisition to bound book or e-book, using assignments and examples from school, college, and trade book publishing. You will also consider the specific responsibilities of an editor. The course includes class visits by authors, editors, or publishing executives, as well as a trip to a local printing company.

Max Credits: 3
Min Credits: 3
42.388 Undergraduate Seminar on the Teaching of Writing

Course ID: 5154

Course Details: Training in writing theory for direct application in peer tutoring. Discussion supplemented by experimental exercises, class presentations, reading, and writing. Meets two hours each week. Students tutor four hours each week.

Max Credits: 3
Min Credits: 3

42.391 Writing on the Job

Course ID: 5157

Course Details: A study of special problems of writing in business from memos and press releases through reports and proposals, including strategies for correspondence, presentation of complex information, and writing for diverse audiences. For English majors and minors.

Max Credits: 3
Min Credits: 3

42.395 Special Topics in English

Course ID: 38096

Course Details: This course focuses on the exploration of thematic or issue-oriented or timely topics of interest. The precise topics and methods of each section will vary. Barring duplication of topic, the course may be repeated for credit.

Max Credits: 3
Min Credits: 3

42.401 Selected Authors

Course ID: 31986

Course Details: A study of selected works. Authors to be announced each semester.

Max Credits: 3
Min Credits: 3

42.402 Topics in Writing

Course ID: 5160

Course Details: A study of issues and the practice of skills needed in specific areas of professional writing. Topics to be announced each semester.

Max Credits: 3
Min Credits: 3

42.406 Community Writing II

Course ID: 5164

Course Details: Students work for a local non-profit for the semester completing a variety of writing tasks, depending on the placement. In class students apply the principles of rhetoric and use the tools of research and revision to write effectively for their community partner; to articulate in a public presentation a thoughtful, intelligent position on relevant social policy; and to become more active, engaged citizens.

Max Credits: 3
Min Credits: 3

42.407 Creative Writing Fiction II
Course ID: 30856
Course Details: Creative Writing Fiction II
Max Credits: 3
Min Credits: 3

42.412 Software Writing

Course ID: 32148
Course Details: Focuses on the document preparation process from start to finish, focusing on each stage of the process. Includes documents design, document organization, using examples and illustrations, style, creating an index and the review process.
Max Credits: 3
Min Credits: 3

42.413 Advanced Software Writing

Course ID: 32149
Course Details: Introduces a range of advanced topics in software writing. Topics may include electronic publishing, hypertext, advanced graphics, document set components, and working in project teams. In this course, the student selects some aspect of the computer industry that interests him/her and documents it.
Max Credits: 3
Min Credits: 3

42.415 Young Adult Literature-Critical Methods

Course ID: 5167
Course Details: Using young adult literature as a vehicle, this course considers traditional methods of interpretation and evaluation. Particular attention is given to the analytical, psychological and sociological approaches.
Max Credits: 3
Min Credits: 3

42.423 Shakespeare I

Course ID: 5170
Course Details: A study of selected histories, comedies, and tragedies.
Max Credits: 3
Min Credits: 3

42.424 Shakespeare II

Course ID: 5171
Course Details: A study of selected histories, comedies, and tragedies not covered in 42.243. Shakespeare I is not a prerequisite.
Max Credits: 3
Min Credits: 3

42.429 Introduction to Literary Theory

Course ID: 5173
Course Details: A solid introduction to major trends in contemporary critical theory. Emphasis on producing a sample critical paper treating one or more current critical approaches to reading a literary text.
Max Credits: 3
Min Credits: 3

**42.450 Writing Workshop**

Course ID: 5176

Course Details: A capstone level creative writing class: a substantial writing project is developed through the collaborative environment of an advanced workshop. May be repeated for credit when workshop topic is different.

Max Credits: 3
Min Credits: 3

Max Credits: 3

**42.479 Senior Seminar**

Course ID: 5178

Course Details:

Max Credits: 3
Min Credits: 3

**42.490 Directed Studies in Writing**

Course ID: 32037

Course Details: The student develops a plan for a sustained writing project or portfolio and submits preliminary and final versions for critique and evaluation.

Max Credits: 3
Min Credits: 3

**42.491 Directed Study in Literature**

Course ID: 5179

Course Details: The student develops a plan of directed reading, defines a problem for individual research, and prepares a paper or papers.

Max Credits: 3
Min Credits: 3

**42.492 Directed Study in Language Analysis**

Course ID: 5180

Course Details: The student develops a plan of directed readings in linguistics, semantics, or stylistics and defines a topic for individual research.

Max Credits: 3
Min Credits: 3

**42.493 Directed Study in Creative Writing**

Course ID: 5181

Course Details: The student develops a series of projects in creative writing and composes poetry, fiction, or drama.

Max Credits: 3
Min Credits: 3

**42.495 Practicum in Theater**
Course Details: A part-time full-semester internship at an approved off-campus theater. To be arranged through the Program Coordinator during pre-registration period.

Max Credits: 3
Min Credits: 3

**42.496 Practicum**

Course Details: An off-campus writing experience for English Majors. Practicum experience is intended to provide students with the opportunity of applying their writing skills in actual business, technical, or professional situations.

Max Credits: 3
Min Credits: 3

**42.498 Practicum-English Study**

Course Details: A short-term, intensive project related to English study and/or writing.

Max Credits: 1
Min Credits: 1

**43.101 Classical Civilization**

Course Details: This course provides an introduction to the Ancient Near East, Greece and Rome. The class first examines the formation of urban centers and the evolution of civilization as the late Bronze Age world transforms into the Iron Age with the creation of the vast empires such as Assyria and Achaemenid Persia. The course then focuses on the development of Greek city-states and the ideological differences between Athens and Sparta with a brief exploration of Classical Greed culture. Finally the class looks at the conquests of Alexander and his successors in the East, and the development of Rome as it shaped and was shaped by the cultures it conquered. The course requires short analytical papers, exams, and historical analysis of primary sources.

Max Credits: 3
Min Credits: 3

**43.105 Western Civilization I**

Course Details: This course surveys some important issues and tendencies in the history of Western Civilization from its origins through the early modern period, including ancient Mesopotamia, classical Greece and Rome, the Middle Ages, and the Renaissance. These include "civilization" and the rise of cities, different imaginings of god(s) and humanity, evolving forms of political organization, continuity and change in social organization and everyday life, and the ongoing dialogue of faith and reason.

Max Credits: 3
Min Credits: 3

**43.106 The Modern World**

Course Details: In a period of intensifying globalization a basic understanding of our world is increasingly important. The main purpose of this course is to expose students to the global processes that have shaped our modern world since roughly the year 1500. Taking on a global and comparative perspective, this course will help students to develop a topical, chronological, and geographical understanding of global history and cultures.

Max Credits: 3
43.107 World Civilization I

Course ID: 5193

Course Details: This class examines societies and cultures from ancient until early modern times with the underlying assumption that world history is an important conceptual tool for understanding our interdependent world. Course topics analyze the nature of the earliest human communities, the development of the first civilizations and the subsequent emergence of cultures in selected areas of Eurasia, Africa, and the Americas. This course also offers a consideration of issues related to the connections and relationships that shaped civilizations as a result of migration, war, commerce, and the various cultural expressions of self, society, and the cosmos before 1500.

Max Credits: 3
Min Credits: 3

43.108 World Civilization II

Course ID: 5194

Course Details: This course will introduce you to the study of world history, its relevance for living in the present, and the challenge to think critically about the emergence and subsequent development of the modern world since 1500. Participants in this course will examine experiences that transcend societal and cultural regions, focus on processes of cross-cultural interaction, and investigate patterns that influenced historical development and continue to impact societies on a global scale.

Max Credits: 3
Min Credits: 3

43.111 United States History to 1877

Course ID: 5195

Course Details: This course surveys United States history from the early settlement of North America through the Civil War and Reconstruction. It considers the role of the political and economic leadership in the building of the nation as well as actions of ordinary people whose energies and aspirations constitute the fabric of United States society.

Max Credits: 3
Min Credits: 3

43.112 United States History since 1877

Course ID: 5196

Course Details: This course surveys the history of the United States from the end of Reconstruction to the present. It covers significant developments in the politics, economy, culture, and other aspects of American life during that period.

Max Credits: 3
Min Credits: 3

43.204 China & the Modern World

Course ID: 5201

Course Details: This course introduces China’s interactions with the world since the 1840s. With the Opium War as the starting point, students are ushered into a traditional China whose political system, cultural values, and an economic structure stood in sharp contrast to those of the outside world. The main focus of the course is to explore the process in which China fought for its survival as a sovereign nation and searched for its road to modernization.

Max Credits: 3
Min Credits: 3

43.207 Women in China

Course ID: 5204
Course Details: From Confucian texts to current conditions, the course examines the evolution of Chinese women's status throughout the centuries. The course will ask questions such as whether Confucianism dictated oppression against women, what factors influenced the changes of status for women, how Western feminism is connected with Chinese women, what roles women played in transforming China, and how ordinary women lived and are still living in China.

Max Credits: 3
Min Credits: 3

43.209 Colonial Latin America

Course ID: 5206

Course Details: This class examines the history of Latin America from 1492 until the early nineteenth century. After considering the rise of the Aztec and Inca empires, we will consider how the Spanish and Portuguese were able to acquire and maintain control in the region. Topics include indigenous-European relations, slavery, economic developments, the challenges of maintaining a colonial government, and Latin American independence.

Max Credits: 3
Min Credits: 3

43.211 Historical Dimensions of Globalization

Course ID: 33660

Course Details: This course explores the impact of globalization on the development of world societies in the late 20th-early 21st century. Using historical analysis of contemporary realities, it develops an appropriate frame of reference to address questions about the nature and cause of globalization.

Max Credits: 3
Min Credits: 3

43.212 Modern Latin America

Course ID: 33661

Course Details: Modern Latin America, a 200-level course, surveys Latin America from independence in the early nineteenth century to the present using primary sources, a textbook, and scholarly works. It begins with an understanding of the political, social, and economic context from which ideas of independence emerged and considers the wars for independence. We will spend a significant part of the course studying nation-building: how did the leaders of new nations define their nations and the values that would guide them? Who was included and who was excluded in the process of nation-building? The next part of the course examines the demands of groups originally excluded: the indigenous population, women, and the poor. The portion of the course covering the twentieth century emphasizes Latin America’s international connections, focusing on influence from the United States and the effects of world wars on the region. Mass politics also emerge, and are expressed in the Mexican Revolution and in Peronism. We also will consider the Cuban Revolution and its wider effects in the region. We will conclude our survey of the region by considering how historical trends continue to affect politics today. For example, the Bolivian political scene continues to be affected by the events and outcome of the War of the Pacific (1879-1883) and by a strong indigenist movement.

Max Credits: 3
Min Credits: 3

43.213 History of the Ancient Near East

Course ID: 37455

Course Details: This broad survey investigates the development of the so-called "Cradles of civilization," Ancient Mesopotamia, Egypt, Anatolia, the Levant and Persia. At times the class will dip deeply into these cultures, using primary texts as well as archaeological and artistic evidence to better understand the political, religious, economic, military, social and artistic evolution of these closely associated cultures. We will focus on themes such as the development of kingship as a secular and sacred ruler, the ideology of Empire, the environment, and the fragility of the inter-connected network of resources that developed. The ultimate goal is to understand the inter-cultural milieu of the Ancient Near East and demonstrate how much Western civilization owes to these historical developments.

Max Credits: 3
Min Credits: 3
43.223 England to 1660

Course ID: 35872

Course Details: A survey of English History to 1660 with emphasis on the Institutional, Economic and cultural developments. In addition to providing general knowledge of the topic, the course is designed to enhance the learning experience of both History and English majors.

Max Credits: 3
Min Credits: 3

43.224 England Since 1660

Course ID: 35704

Course Details: A survey of English History since 1660 with emphasis on the Institutional, Economic and cultural developments. In addition to providing general knowledge of the topic, the course is designed to enhance the learning experience of both History and English majors.

Max Credits: 3
Min Credits: 3

43.225 Ancient Greek History

Course ID: 5213

Course Details: A study of Greek history, institutions and culture from Minoan times through the Hellenistic period.

Max Credits: 3
Min Credits: 3

43.226 Roman History and Civilization

Course ID: 5214

Course Details: This course examines one thousand years of Roman history (ca. 500 BC-500AD) with equal emphasis upon social, political, military, and cultural aspects of the Republic and Empire.

Max Credits: 3
Min Credits: 3

43.227 Europe in the Middle Ages

Course ID: 1244

Course Details: A survey of the Latin West during the formative period from the Roman Empire to the creation and development of the first European civilization.

Max Credits: 3
Min Credits: 3

43.228 Women in European History

Course ID: 5215

Course Details: This course examines the history of women in late medieval, early modern, and modern Western Europe (ca. 1300-1900). From medieval saints and Renaissance queens to Enlightenment Salonieres and ordinary wives and mothers, women have played an astonishing variety of roles. We will utilize primary and secondary sources, historical films, and works of art to understand the contributions and challenges of women in the past.

Max Credits: 3
Min Credits: 3

43.231 Renaissance and Reformation
Course ID: 5217

Course Details: The history of Europe in the time of transition between the late Middle Ages and the Early Modern Period. Two principle topics are the intensification of cultural change which began in Italy around 1300 and spread slowly northward and the disruption of the unity of the Western Christian Church.

Max Credits: 3
Min Credits: 3

**43.237 Europe in the Twentieth Century**

Course ID: 5221

Course Details: This course will survey the continent’s history over its ‘age of extremes’ in the twentieth century, moving broadly from the apogee of European global power at the turn of the century to its decline in the trauma of two world wars and decolonization, through the Cold War and post-1945 recovery and the challenges and possibilities that have arisen for Europe in the aftermath of 1989 and the fall of the Berlin Wall.

Max Credits: 3
Min Credits: 3

**43.239 The Nonwestern World Since 1945**

Course ID: 5223

Course Details: The recent history of Africa, the Middle East, Asia and Latin America and the comparative global processes and trends that have influenced the world since 1945.

Max Credits: 3
Min Credits: 3

**43.240 World War I**

Course ID: 5224

Course Details: The course will cover the wide range of causes of this major conflict, the difficulties and changing dynamics of waging this massive war and the effects of all this on both the internal political and social conditions and external consequences for the combatants with the peace settlement.

Max Credits: 3
Min Credits: 3

**43.241 Colonial Survival: Case Studies in Early American Legal and Political History**

Course ID: 37709

Course Details: This class contrasts the dominant monoculture colonies of Massachusetts Bay and Virginia with the lesser known multicultural colonies of Maine, Plymouth, New Amsterdam, Maryland and Rhode Island. While some of the multicultural colonies foundered, others flourished by utilizing a wide range of political and legal methods which allowed for their survival alongside much larger rival colonies. The class finishes by examining similar political and legal methods employed by Native American tribes for their own survival, in particular the Cherokee, whose carefully negotiated accommodations to Anglo-American culture allowed them to live side by side with the growing United States until the 1830’s. Close analysis of both primary and secondary source material will provide students with an intensive look at rarely examined issues in early American history.

Max Credits: 3
Min Credits: 3

**43.242 World War II**

Course ID: 5225

Course Details: The Second World War transformed states and people from East Asia to the United States to Europe. We examine diplomatic and military aspects of the war and how it affected the lives of people in the countries involved. Topics
include the prelude to the war, military campaigns in Europe and the Pacific, collaboration and resistance, the home front, the Holocaust, science and the atom bomb, and the consequences of the war.

Max Credits: 3
Min Credits: 3

43.258 Russia to 1796

Course ID: 5233

Course Details: The growth of the Russian state: Varangian origins, the Kievan state, conversion to Christianity, Mongol domination, the rise of Muscovy, Europeanization and expansion under Peter the Great and Catherine the Great.

Max Credits: 3
Min Credits: 3

43.270 Women in American History

Course ID: 5238

Course Details: This course surveys the history of women in the British North American colonies and United States with a special focus on social and economic change. It examines women as a distinct group but also attends to divisions among them, particularly those based on class, ethnicity/race, and regional diversity. Course themes include concepts of womanhood, the development and transgression of gender roles, unpaid work and wage labor, social reform and women's rights activism, as well as changing ideas and practices with respect to the female body.

Max Credits: 3
Min Credits: 3

43.274 Native American History

Course ID: 5242

Course Details: A comprehensive study of the Native Americans through historical and first-hand accounts of their lives. Designed to enlighten students and to represent fairly the Native Americans, dispelling some of the existing myths about them.

Max Credits: 3
Min Credits: 3

43.275 African-American History

Course ID: 5243

Course Details: This course surveys African American history in the United States from colonization to the present. It begins with a study of life in West Africa and traces the forced migration of Africans to the Americas. It explores West African transmissions, the freedom struggle, the great migrations from the South, the Harlem Renaissance, the modern Civil Rights movement, and the continuing impact of African Americans on life in the 21st century.

Max Credits: 3
Min Credits: 3

43.281 Sub-Saharan Africa

Course ID: 30354

Course Details: This course provides a basic introduction to the history of the African continent. It will expose students to the processes and patterns that have shaped modern African history. The course examines the historical roots of the many challenges that the continent faces today. But, at the same time, it will also provide students with the knowledge to shatter the myths and stereotypes about Africa.

Max Credits: 3
Min Credits: 3

43.295 Japan Since 1600
Course ID: 5252
Course Details: A study of the traditional Japanese institutions and the transformation of Japan into a modern state after 1868: the Tokugawa Shogunate, Meiji Restoration, Russo-Japanese War, world power status, militarism, World War II, and present day Japan.
Max Credits: 3
Min Credits: 3

43.296 United States Diplomatic History
Course ID: 5253
Course Details: Although the course takes the entire United States diplomatic history as its field of historical study, its focus is on the American foreign policy in the twentieth century. The course first explores domestic and international factors that made the United States a world power by 1898. It will then consider the goals, the practices, and the results of the twentieth century American foreign policy. The course challenges students to view American diplomacy in a global context.
Max Credits: 3
Min Credits: 3

43.298 Introduction to Historical Methods
Course ID: 5255
Course Details: An introduction for the undergraduate student to the nature and principles of history. The course takes up methodology, historiography, research methods, electronic resources, bibliography, and the technical and stylistic problems involved in the presentation of research in scholarly form. Required of all history majors in the sophomore year.
Max Credits: 3
Min Credits: 3

43.301 The World of Things: Consumer Cultures in the Modern West
Course ID: 5257
Course Details: This course will examine the emergence and historical impact of consumer cultures in the modern West, from the eighteenth century through the present. Topics to be covered will include the emergence of spaces of consumption (the home, the commercial/spectacular metropolis, the department store, the shopping mall, the tourist site), changing attitudes toward shopping and spending, the construction of modern social identities of class, gender, generation and race through consumption, and political struggles over consumption.
Max Credits: 3
Min Credits: 3

43.302 Byzantine History & Civilization
Course ID: 5258
Course Details: A study of the important political, social, and cultural changes in the East Roman Empire from the founding of Constantinople to the fall of the Empire in 1453 with emphasis on the role of Byzantium as the custodian of the classical past.
Max Credits: 3
Min Credits: 3

43.304 European Economic & Social History
Course ID: 5260
Course Details: Europe has been transformed in the last 250 years from an agricultural society to a post-industrial one. We study the processes by which this happened, from the Industrial Revolution of the 18th and early 19th century to the wars and depressions of the early 20th century and the collapse of the communist system and European unification in the late 20th century. Students learn basic concepts and methods of history and economics.
43.308 History of Crime and Social Control

Course ID: 5264

Course Details: Analyzes the causes and development of attempts to control crime, ethnic conflict, radical protest movements, urban disorders, and attitude and role conflicts.

Max Credits: 3
Min Credits: 3

43.310 History of New England

Course ID: 5266

Course Details: Explores the evolution of New England society from pre-Columbian to the Post-Industrial, emphasizing the ways succeeding generations of New Englanders have confronted social and economic change. Topics include: white-indian relations, ecological change, Puritanism, the New England town, the industrial revolution, the rise of cities, immigration, ethnic and class conflict, and the distinctiveness of the region.

Max Credits: 3
Min Credits: 3

43.314 American Social History II

Course ID: 5270

Course Details: This course explores various aspects of common peoples’ lives in the United States since 1880. Primary areas of investigation include work and leisure, family and community, as well as culture and values.

Max Credits: 3
Min Credits: 3

43.316 American Environmental History

Course ID: 5272

Course Details: This course explores the environmental history of early America and the United States from the end of the last ice age (c. 12,500 years ago) to the present. It examines the role played by nature as an historical agent as well as the relationship between human communities and the physical and organic environment. Course themes include evolving land use, the environmental significance of industrial capitalism, urban public health, resource conservation and wilderness protection, the impact of ecology on public consciousness, as well as environmentalism.

Max Credits: 3
Min Credits: 3

43.320 American East Asian Relations

Course ID: 5276

Course Details: The course examines relations between the United States on one hand and Japan, Korea, China, Vietnam, and the Philippines on the other in the 19th and 20th centuries. Besides political, trade, and cultural relations, there is also emphasis on American laws and practices regarding immigrants from these East Asian countries. The aim of the course is for students to gain a basic knowledge of American relations with East Asia and to develop analytical skills for sophisticated inter-national relations.

Max Credits: 3
Min Credits: 3

43.321 The Holocaust

Course ID: 5277
Course Details: In a world in which genocide is real, the murder of six-to-eight million Jews between 1939 and 1945 remains a critical topic of inquiry. When were factories of death first conceived? What perverse rationale motivated the collaborators who built and operated the gas chambers and crematoria? This course will answer questions of this kind by examining the most respected scholars who have written on and primary sources that speak directly to the Holocaust.

Max Credits: 3
Min Credits: 3

43.322 Chinese Foreign Policy

Course ID: 5278

Course Details: Chinese foreign policy since 1949 with a strong emphasis on tracing the links between historical, ideological, and cultural influences, on the one hand, and pragmatic and nationalistic considerations on the other. While tracing these links, the course explores the intricate process of policymaking in the People's Republic of China.

Max Credits: 3
Min Credits: 3

43.323 World of the Atlantic

Course ID: 34780

Course Details: The concept of the Atlantic world arose to describe the interactions of the peoples of the Americas, Europe, and Africa through trade, conquest, colonialism, independence and beyond. In this class, we will consider the cultural, economic, and political relationships that are formed and change over time between these groups. We will pay special attention to historical approaches to studying and writing about the Atlantic World.

Max Credits: 3
Min Credits: 3

43.329 Childhood in Premodern Europe

Course ID: 30355

Course Details: This course examines the concept of childhood in medieval and Renaissance Europe (ca. 1100-1600), with particular attention to England and Italy. There are no specific prerequisites, although some knowledge of European history (i.e., Medieval Institutions, Western Civilization, Renaissance-Reformation) will be useful. Among the topics we will consider are the following: the different stages of childhood; children's education and apprenticeship; dress, diet, and demeanor of children; orphans; royal children; Protestant and Catholic views of children; adolescent sexuality; depiction of children in art; child labor; literature for children.

Max Credits: 3
Min Credits: 3

43.330 Tudor and Stuart England, 1485-1714

Course ID: 5283

Course Details: Traces the transformation of England from a small island kingdom to the hub of an overseas empire. During this period the English people underwent religious upheaval and civil war, saw the rise and partial decline of the monarchy, built and rebuilt London, and enjoyed the plays of Shakespeare. Although England provides the focus for this course, the rest of the Tudor and Stuart world is included.

Max Credits: 3
Min Credits: 3

43.332 Warfare in the Ancient World

Course ID: 37440

Course Details: Warfare in the Ancient World is a practical introduction to the study of warfare in the ancient world and traces the advances made in empire building, ideology and military technology. The chronological structure of the class starts with the Egyptians and continues through the Dark Age, Classical and Hellenistic Greeks, to the rise and fall of Rome. This course will trace certain themes through the centuries: how different civilizations waged war; who served in various armies and why soldiers decided to fight. While major battles and important individuals are discussed, military tactics and strategies
are only tools to help understand the underlying causes for armed conflict.

Max Credits: 3
Min Credits: 3

43.334 The French Revolution and Napoleon

Course ID: 5286

Course Details: This course will involve students directly in critical consideration of the central events and issues of the Revolutionary and Napoleonic periods, with an eye to their longer-term historical resonances in France, Europe and beyond. The core problems we will be discussing are ones which have remained vital in modern and even contemporary political history: the nature of liberty, the nation and national identity, equality and inequalities, violence and terror in politics, the cult of the leader, war and empire.

Max Credits: 3
Min Credits: 3

43.336 Problems of Modern Ireland

Course ID: 5288

Course Details: This course focuses on a discussion of the problems in Modern Irish History, how they became problems and what people have tried to do to resolve them. You will also learn about the nature of both history and human beings who have made history, and you will learn how to analyze historical issues, and come to some logical and defensible conclusion about the nature of those events and people. In this course, particularly, you will learn how to analyze events in terms of the challenges of economic, political and social claims by different groups with their competing values.

Max Credits: 3
Min Credits: 3

43.337 Germany Since 1871

Course ID: 5289

Course Details:

Max Credits: 3
Min Credits: 3

43.338 War and Memory in Twentieth Century France

Course ID: 37041

Course Details: This course will address the individual and collective trauma of modern warfare, as that was experienced in France both during and after the country's three main wars in the twentieth century. It focuses on how the experience of modern war was negotiated in culture—in personal and official memory, in gender relations, and in a great variety of written and visual texts. Individual units will be dedicated to World War I, the Occupation and Vichy Regime during World War II, and the Algerian War, and to the long and conflicted afterlife of those conflicts.

Max Credits: 3
Min Credits: 3

43.342 Inquisition: Myth and Reality

Course ID: 5292

Course Details: Following a brief introduction and an overview of the medieval Inquisition, the first few weeks of the course will be devoted to a study of the Inquisition in Spain and Italy from 1450-1650. We will also discuss the way in which the history of the Inquisition has been analyzed during the past five hundred years (what historians call "historiography"). The second half of the course will focus on student research and selected topics in Inquisition studies.

Max Credits: 3
Min Credits: 3
43.343 Fascism and the Radical Right in Twentieth Century Europe

Course Details: This course will offer a comparative exploration of the deep and enduring appeal of fascism and far rightist politics in twentieth century Europe. Beginning with the nationalist revival and cultural crisis of the late nineteenth century and the cataclysm of World War I, we will trace the rise of the radical right to political prominence in Europe in the 1920's and 1930's. While retaining a Europe-wide perspective throughout, we will analyze in particular detail the Fascist and National Socialist seizures of power in Italy and Germany, and examine their efforts of political, social, economic and cultural mobilization. Issues covered will include fascist political communication and governance, terror and "normality" in everyday life, labor and youth policy, racism and racial purification, and gender and reproductive politics, among others. In the final section of the course, we will contemplate the historical legacy of fascism after 1945, focusing on the politics of memory and representation in post-war Germany, Italy and Europe more generally, and assessing the recent resurgence of fascist and quasi-fascist political tendencies in the 1980's and 1990's.

Max Credits: 3
Min Credits: 3

43.345 Slavery and Abolition

Course Details: This course takes a comparative approach to the study of plantation slavery in the Americas with special attention to developments in Virginia and Cuba. It surveys the structure of slavery in the nineteenth century United States South; slavery's legacy in the United States; and its twenty-first century reincarnation in human trafficking and forced labor around the world.

Max Credits: 3
Min Credits: 3

43.348 Making an Historical Documentary

Course Details: This course provides students with the basic conceptual and technical skills for developing and completing an historical documentary, including instruction about subject choice, narrative structure, camera work, and editing.

Max Credits: 3
Min Credits: 3

43.349 The Cuban Revolution

Course Details: The Cuban Revolution has been surrounded by controversy since it took power in 1959. Through readings, films, and discussions, we will examine not only the events that have occurred in Cuba over the last four decades but also the ways that they have been presented to audiences in Cuba, the United States, and elsewhere. We will carefully consider the role of perspective in academic writing and the media and how it has shaped understandings of the Castro era.

Max Credits: 3
Min Credits: 3

43.350 Colonial America: History and Culture

Course Details: Emphasis is on the British North American and Caribbean colonies of the 17th and early 18th centuries. Topics include: the impact of European pandemic diseases on the native American populations, new European technologies and the transformation of the environment: contrasts between religious, social, and economic developments in New England and those in the settlements to the south; a comparative analysis of slavery; and the beginnings of modernism.

Max Credits: 3
Min Credits: 3

43.351 Colonial Society and the Captivity Narrative
Course ID: 37722

Course Details: The long sequence of military conflicts in New England at the turn of the eighteenth century led to an equally long sequence of accounts describing the experiences of English colonists taken captive by French of Native American military forces. While these narratives are often portrayed as a uniquely American literary genre, this course will open by exploring the wider European tradition of captivity narratives from the medieval and early modern periods. Readings for the course will consist of narratives written by Britains taken captive by Barbary pirates, the traditional New England captivity narratives as well as the "anti-captivity" narratives written by colonists who chose to remain with their Native American captors, all of which will be examined against the backdrop of cultural changes on both sides of the Atlantic ocean.

Max Credits: 3
Min Credits: 3

43.352 The Coming of the American Revolution

Course ID: 5296

Course Details: A study of 18th-century British America with emphasis on the paradoxes of unity and diversity, Anglophilia and Anglophobia, slavery and freedom, and enlightenment rationalism and evangelical religion. The course also deals with the major causes, events, and interpretations relating to the coming of the American Revolution. Offered on a rotating basis.

Max Credits: 3
Min Credits: 3

43.353 The French and Indian and Revolutionary Wars

Course ID: 5297

Course Details: The years between 1754 and 1784 saw drastic change on the North American continent and around the world for Britain and its colonies. Colonists in North America went from being devout British subjects during the French and Indian War to rebelling and founding their own new country during the American Revolution. In turn, the British Empire went from spending millions of pounds on North America in the 1750's to barely committing the resources necessary for fighting the Revolution. This class examines these cultural and political transitions in context with discussions on the varied populations of North America who experienced them.

Max Credits: 3
Min Credits: 3

43.355 Jacksonian America

Course ID: 5299

Course Details: An investigation of the social, political, and economic developments in the United States from 1815 to 1848. Special emphasis is placed on the spread of capitalism, the growth of reform movements, the development of cities, and the conflict over slavery.

Max Credits: 3
Min Credits: 3

43.356 Civil War and Reconstruction

Course ID: 5300

Course Details: This course surveys the increasing political, social, and economic tensions between the North and the South during the first half of the nineteenth century; the explosion of those tensions into secession and conflict; the four years of war; and the postwar struggle to reconstruct the South and forge a new union.

Max Credits: 3
Min Credits: 3

43.357 American Civil War in Memory

Course ID: 5301

Course Details: Students analyze how Americans have remembered the American Civil War in the years after the war ended in 1865. By looking at novels, memoir films, National Park Service Battlefields, and monuments, students discover how
remembrances are influenced by views of race, gender, patriotism, regionalism, and economic forces.

Max Credits: 3
Min Credits: 3

43.359 Early United States Political Culture

Course ID: 5303

Course Details: The course examines what is often referred to as the Golden Age of American Democracy. How much power did ordinary Americans have in the political system? What motivated people to participate in politics? What roles did women and racial minorities play in American politics despite not being able to vote?

Max Credits: 3
Min Credits: 3

43.362 The Twenties and the Thirties

Course ID: 5306

Course Details: An examination of the emergence of the corporate and governmental institutions of modern America set in two turbulent decades of cultural and political ferment that involved both booming prosperity and the economic collapse of the Great Depression.

Max Credits: 3
Min Credits: 3

43.365 United States History since 1960

Course ID: 5309

Course Details: Discusses Cold War politics and civil rights upheavals during the 1960's and 1970's, the decline of American economic and political power, and the resurgence of conservative politics in the 1980's.

Max Credits: 3
Min Credits: 3

43.369 Russia in the Nineteenth and Twentieth Centuries

Course ID: 5313

Course Details: Addresses selected topics in modern Russian history: political and social reforms of the nineteenth century, international policies in Europe and Asia, the 1917 revolutions, development of the new regime under Lenin, Stalinist policies, World War II, and Russian expansion. A comparative study of these topics will underscore patterns of continuity in both Tsarist and Communist Russia.

Max Credits: 3
Min Credits: 3

43.373 Nazi Germany

Course ID: 5317

Course Details: This course looks at the period 1933-1945 (the period of the "Third Reich") in Germany from the perspectives of economics, politics, society, and the arts. In the course, we will read preeminent historians who have written on each of these themes in order to gain a firm understanding of the historical debates that surround the period. Specific subjects include the Nazi consolidation of power, the increasingly brutal nature of anti-Semitic policies, the power struggles among chief Nazi officials, the ideologies and persona of figures like Hitler, Rosenberg, and Goebbels, the nature of "Nazi art" and cultural policies, and the path to war.

Max Credits: 3
Min Credits: 3

43.374 Stalin's Russia
Course ID: 5318

Course Details: Spanning the period from the "October Revolution" of 1917 to Stalin's death in 1953, this course considers "Stalinist Russia" from the perspectives of economics, society, the arts, politics and war. In the course, we will read the preeminent historians who have written on these topics.

Max Credits: 3
Min Credits: 3

43.379 United States Industry Twentieth Century

Course ID: 5322

Course Details: An exploration of the rapid growth of the American economy in the 20th century, including the evolution of the large corporation and the mass production assembly line. Particular attention is devoted to the ways in which immigrants, women, and the African Americans were affected by the rise of big business. The course also traces the decline of the traditional U.S. manufacturing base following the Second World War and the impact this had on the working class and their unions.

Max Credits: 3
Min Credits: 3

43.380 Work and Society

Course ID: 5323

Course Details: Provides a survey of labor history from the colonial period to the present focusing on the interrelationship between culture and work in American society and on the dynamics of technical and economic changes on the organization of work processes.

Max Credits: 3
Min Credits: 3

43.381 United States in the 1960s

Course ID: 5324

Course Details: This course examines the United States during the 1960s. General themes include the stifling and freeing of dissent, the "rights revolution," liberal social and economic policy, foreign policy in a bipolar world, redefinition of values and morals, changing relations between women and men, increasing concern with environmental pollution, the growing credibility gap between citizens and their government, and rise of the "New Right".

Max Credits: 3
Min Credits: 3

43.382 The American West

Course ID: 5325

Course Details: Involves readings and discussions of the history of the American frontier and the place of the frontier in American society and thought.

Max Credits: 3
Min Credits: 3

43.384 Radicalism in American History

Course ID: 5327

Course Details: A biographical approach to the influence of radicalism on American history with emphasis on significant and representative personalities and heir contributions.

Max Credits: 3
Min Credits: 3
43.386 History of College, 1100-1900

Course Details: The foundation of universities in late medieval Europe also ushered in the earliest colleges, intended primarily to house students but also to provide tutoring, social support, and financial assistance. The earliest colleges arose in Paris but soon spread to Bologna, Oxford, and other university towns. This course traces the history of colleges from late medieval Europe to nineteenth-century America. It considers the various models of colleges that developed in northern and southern Europe, and how those models were transferred across the Atlantic. Some colleges remained primarily residences, while others expanded to offer a full graduate and undergraduate curriculum. We will also consider topics like student life, financial arrangements, admissions, alumni, and academic requirements.

Max Credits: 3
Min Credits: 3

43.389 Ancient History in Film

Course Details: Ancient History in Film seeks understand the interconnection between ancient texts, social history and pop culture in American cinema. This course is more than an excuse to watch fun films and gain academic credit. It will engage the primary texts that are the foundation for these cinematic creations while investigating the social and cultural influences that shaped the making of these movies. Ultimately, this course will provide a clearer view of our own world through the lens of moviemakers mimicking the Greco-Roman world. We will read primary texts in translation, modern analyses of these movies and you are responsible to watch an entire film between class sessions. All films are on reserve in the Media Center of the O'Leary Library.

Max Credits: 3
Min Credits: 3

43.390 Topics in History

Course Details: An advanced course of study and examination of a variety of issues and topics in history. Students without a sufficient background in history courses should not attempt this course. Subject matter to be announced in advance.

Max Credits: 3
Min Credits: 3

43.391 America and the World

Course Details: In an age of increasing globalization, historians realize the need for putting the American national narrative in a wider historical context. This course will help students locate the study of the United States in a global, comparative and transnational perspective. This course will be used as one of the courses needed by History majors in the global, comparative and under-represented areas of the major.

Max Credits: 3
Min Credits: 3

43.393 History of the Middle East and Islamic World

Course Details: This course examines the history of the Middle East and the Islamic World from the time of Muhammad to the present. It provides an introduction to the history of this often turbulent region. It exposes students to the processes and patterns that have shaped the history of the Islamic World. The course examines the historical roots of the many challenges that the region faces today.

Max Credits: 3
Min Credits: 3

43.410 Olympic Games and World's Fairs
Course ID: 37042

Course Details: The course studies Olympic Games and World's Fairs from the mid-nineteenth century to the present. We examine how these international festivals participate in and contribute to six themes in the history of that period: nationalism and internationalism, mechanization of industry, modern architecture and urban planning, consumer culture, racial politics, and the Cold War. Students write brief papers connecting these themes and one or more game or fair and a research paper on a relevant topic. Special attention is given to certain icons, like the Crystal Palace, the Eiffel Tower, the Nazi Olympics, and the Mexico City games.

Max Credits: 3
Min Credits: 3

43.432 Research Seminar

Course ID: 5337

Course Details: Systematic research in primary and secondary sources culminating in the writing of an original research paper using proper methodological and stylistic techniques. Weekly meetings and written and oral progress reports. Students must be acquainted with word-processing techniques. Required of all History majors.

Max Credits: 3
Min Credits: 3

43.496 Practicum

Course ID: 5343

Course Details: A program of on-campus and off-campus experiences for history majors only. Specific requirements vary depending upon the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a community, social, cultural, or artistic area and for applying techniques of problem solving and/or skills that are appropriate to the student's major discipline. May be repeated for a maximum of nine credits. Students are graded 'satisfactory' or 'unsatisfactory.' The practicum experience may not be substituted for a required course in the major.

Max Credits: 3
Min Credits: 3

43.497 Tsongas Center Field Practice

Course ID: 35077

Course Details: This 3-credit hour course will be an addition to the History Department's other 400-level courses. Currently, students enrolled in the "Research Seminar" conduct primary original research and present that research in one or another format. Those in the "Directed Study" work with assigned faculty on the historiographic breadth of a particular topic, reading selected books, writing response papers, and meeting for weekly discussions. Additionally, the existing "Practicum" allows students to earn course credit for hands-on classroom and history museum projects. The "Tsongas Center Practicum" will combine elements of all three, and make it possible to identify the specific Tsongas Center focus as such on student transcripts.

Max Credits: 3
Min Credits: 3

44.101 The Criminal Justice System

Course ID: 5347

Course Details: This course presents a brief history of the Criminal Justice System and an analysis of its structure and function. This course required of all CJ majors and is a prerequisite for all other courses in criminal justice.

Max Credits: 3
Min Credits: 3

44.111 Introduction to Industrial Security

Course ID: 5349
Course Details: An introduction to the planning, organization, and management of industrial, business, and government security resources. The focuses are on the protection of assets via the integration of physical, personal, and information security. Relations between security organizations and government agencies are also explored.

Max Credits: 3
Min Credits: 3

44.115 Introduction to Homeland Security

Course Details: This course will encompass the study and relationship between those entities and institutions necessary for the protection of the United States. Course instructional material will examine the components of Federal, State and Local Police Agencies, as well as the role of Private Security and Emergency Responders needed to facilitate the implementation of the Homeland Security Act. Particular attention will be focused on Policy, Plans and Procedures at governmental and community levels. Credits: 3

Max Credits: 3
Min Credits: 3

44.151 Introduction to Corrections

Course Details: This course provides an overview of the American correction system including the history of corrections, probation, incarceration, community corrections, the prison experience and release.

Max Credits: 3
Min Credits: 3

44.203 Technology and the Criminal Justice System

Course Details: This course is designed to introduce students to the latest innovations in the applications of new technological advances in the criminal justice system. Topic areas include an examination of the new technology of crime commission, and the corresponding new technology of crime control strategies. Our focus will be on the application of both "hard" technology (e.g. equipment, hardware, devices, etc.) and "soft" technology (e.g. computer software programs, information systems, classification devices, and other problem-solving applications) in each of the following areas: crime prevention, police, courts, institutional corrections, community corrections and the private sector.

Max Credits: 3
Min Credits: 3

44.212 Weapons of Mass Destruction

Course Details: This course will center on Weapons of Mass Destruction (WMD) and their potential use by terrorists to obtain their goals. We will explore the origins, development and weaponization of Chemical, Biological, Nuclear and Radiological Systems and Devices. The course content is designed particularly for the First Responder to such incidents of WMD. The class will focus on the preparation and execution of plans and policies to counter this threat. Credits: 3

Max Credits: 3
Min Credits: 3

44.213 Emergency Management

Course Details: The purpose of this course is to introduce the student to the various ways in which a corporation and local municipality can plan for a disaster before it occurs. Topics covered include risk identification and assessment of multi-hazards whether natural and man-made, violence in the workplace, development of crisis and disaster incident management programs, and business/agency continuation planning.

Max Credits: 3
**44.221 Criminology I**

Course ID: 5356

Course Details: The definition and nature of crime, criminal statistics, and theories of crime causation are included. Required of all CJ majors.

Max Credits: 3
Min Credits: 3

**44.223 Crime and the Media**

Course ID: 5357

Course Details: This course provides an overview about how the media portrays crime and its impact on the general public, crime, and victims and offenders.

Max Credits: 3
Min Credits: 3

**44.233 Criminal Procedure**

Course ID: 5358

Course Details: Examines the rules that govern the everyday operation of the criminal justice system from investigation to sentencing and appeal. Topics include: investigation, arrest, search and seizure, interrogation, pretrial detention and hearings, plea bargaining, trial procedures, sentencing, and appeals.

Max Credits: 3
Min Credits: 3

**44.234 Criminal Law**

Course ID: 5359

Course Details: The historical origins and development of criminal law from the early common law to contemporary decisions and statutes. Constitutional and statutory factors as they pertain to criminal responsibility, capacity, crimes against persons and property, defenses to criminal charges and sentences. Sections of the Massachusetts Criminal Code and other statutes will be covered where applicable.

Max Credits: 3
Min Credits: 3

**44.235 Introduction to the Law and Politics of Constitutional Development**

Course ID: 5360

Course Details: A course examining American constitutional doctrine as it has developed historically through the process of constitutional adjudication.

Max Credits: 3
Min Credits: 3

**44.237 Introduction to the Law and Politics of Civil Liberties**

Course ID: 5361

Course Details:

Max Credits: 3
Min Credits: 3
44.241 Physical Security

Course Details: The basic principles of physical security with emphasis on tailoring these principles to the protection of specific operations and facilities. Proper planning, appropriate design, and use of modern techniques and devices to enhance security while reducing costs are discussed.

Max Credits: 3
Min Credits: 3

44.243 Criminalistics I

Course Details: This laboratory course will cover basic procedures in arrest, search and seizure, and the gathering and evaluation of evidence as to admissibility, weight, and competence.

Max Credits: 3
Min Credits: 3

44.244 Criminalistics II

Course Details: This course is a continuation of Criminalistics I. It is intended to familiarize the student with various types of physical evidence that can be found at the more violent crime scenes. Methods of identification, preservation, collection and analysis of physical evidence relating to specific criminal activities shall be stressed. Topics shall include Bloodstain Pattern Analysis, DNA Typing, Crime Scene Reconstruction, Point of Origin Determination and evidence associated with Death Investigations, Sexual Assaults, Bombings, Arsons, Motor Vehicle Homicides, Robberies and Burglaries.

Max Credits: 3
Min Credits: 3

44.248 Terrorism (international and domestic)

Course Details: This course acquaints the Criminal Justice student with the concept of terrorism at both the international and domestic levels. Topics include the history of terrorism, terrorism today and terrorism in the future. Counter measures taken to respond to terrorist threats are also examined.

Max Credits: 3
Min Credits: 3

44.251 Institutional Corrections

Course Details: Detailed examination of the U.S. prison and jail systems, highlighting such topics as classification of offenders, crowding, treatment programs, prison violence, and privatization.

Max Credits: 3
Min Credits: 3

44.261 Juvenile Delinquency

Course Details: An examination of causative factors in the development of youthful offenders and the development and philosophy behind treatment and rehabilitative practices.

Max Credits: 3
Min Credits: 3
44.280 Criminal Justice Ethics
Course ID: 5371
Course Details:
Max Credits: 3
Min Credits: 3

44.312 Security Management
Course ID: 5375
Course Details: Addresses the basic interdisciplinary principles of security management including planning, budgeting, organizing, staffing, directing, and controlling. This course will also cover marketing security services to management, risk management, civil and criminal liability, and labor relations. Each aspect of the course is designed to prepare security managers to face the new challenges as broader and more cost-effective protection is required with fewer resources. The course will also bring about greater awareness and understanding of the various options available in security and loss control. It will identify a number of risk areas and outline various deterrent and preventative methods.
Max Credits: 3
Min Credits: 3

44.318 American Courts and Judicial Process
Course ID: 33792
Course Details: This course will study the organization of and the processes employed by American Courts in an intensive participation format. Traditional text lessons on the U.S. Court system will be supplemented by simulations and mock trial problems. Using this two track approach, students will learn about the courts and simultaneously develop the analytical, critical reasoning and public speaking skills used in the Judicial system.
Max Credits: 3
Min Credits: 3

44.323 White Collar and Elite Deviance
Course ID: 5378
Course Details: This course will provide an overview of white collar crime including white collar, corporate, occupational, workplace, and organized crime.
Max Credits: 3
Min Credits: 3

44.326 Hate Crime
Course ID: 5379
Course Details: This course examines prejudice as a motivation for criminal behavior. The criminological theory for hate crime is reviewed, as well as historical perspectives of this crime category.
Max Credits: 3
Min Credits: 3

44.327 Violence in America
Course ID: 30803
Course Details: This course provides students with an in-depth analysis of the courses, context, and control of a wide range of violent crimes.
Max Credits: 3
Min Credits: 3
44.342 Criminal Profiling

Course ID: 5383

Course Details: This course provides an overview of the development and character of the many types of offenders who become criminal psychopaths. The course explores the various methods used in classifying and predicting criminal behavior derived from the field of Criminology, Psychology and Forensic Science.

Max Credits: 3
Min Credits: 3

44.343 Forensic Psychology

Course ID: 30368

Course Details: This course examines the application of psychological theories, principles, and research to issues of concern to the criminal justice system.

Max Credits: 3
Min Credits: 3

44.347 Police Innovations

Course ID: 5385

Course Details: This course is concerned with contemporary efforts to change police agencies, particularly in the United States. Contemporary reform revolves mainly around what we now know as “community policing” and this course will dwell at some length on these initiatives. Other innovations, some of which may complement community policing, and all of which are narrower in scope, are also considered.

Max Credits: 3
Min Credits: 3

44.348 Advanced Seminar on Weapons of Mass Destruction and Terrorism

Course ID: 37471

Course Details: This course will examine the scientific and technological details of chemical, biological, radiological and nuclear (CBRN) weapons; the proliferation of these weapons and international CBRN prevention efforts (like the Nuclear Nonproliferation Treaty, the Chemical Weapons Convention, and the Biological Weapons Convention); and the threat of terrorist groups seeking to acquire and use CBRN weapons, and explore ways to improve our response to this complex threat.

Max Credits: 3
Min Credits: 3

44.350 Institutional Correction

Course ID: 5386

Course Details: This course provides an in-depth examination of the history, function, structure, and operation of American adult and juvenile correctional institutions.

Max Credits: 3
Min Credits: 3

44.351 Community-Based Corrections

Course ID: 5387

Course Details: A comprehensive review of community-based sanctions and community-based, early-release mechanisms. In addition to traditional probation and parole reviews, “new” intermediate sanctions such as electronic monitoring, intensive supervision, boot camps, day fines, day reporting centers, and community service sentences.

Max Credits: 3
**44.360 Gender, Race, and Crime**

Course ID: 5390

Course Details: This course examines gender and racial implications of criminal laws, criminal justice practices and programs will be examined. The position of women and racial/ethnic minorities will be assessed from the different perspectives of victims, offenders, and criminal justice practitioners.

Max Credits: 3
Min Credits: 3

**44.361 Philosophy of Law**

Course ID: 5391

Course Details:

Max Credits: 3
Min Credits: 3

**44.365 Hate Crimes**

Course ID: 5392

Course Details: Hate crimes illustrate bigotry plus criminal acts. This course examines prejudice as a motivation for criminal behavior. The criminological theory for hate crime is reviewed, as well as historical perspectives of this crime category. This is a rich and comprehensive exploration that begins with understanding the psychology of prejudice and ends with reviewing genocide as a mass hate crime.

Max Credits: 3
Min Credits: 3

**44.370 Criminal Justice Management**

Course ID: 5393

Course Details: This course provides an introduction to the principles of administration, including planning, budgeting, grantsmanship, and evaluation as they relate to the criminal justice manager.

Max Credits: 3
Min Credits: 3

**44.373 Issues in Police Administration**

Course ID: 5396

Course Details: Specific analysis of the management of contemporary police forces, including staffing, scheduling, training, collective bargaining, community relations, and other related issues.

Max Credits: 3
Min Credits: 3

**44.380 Selected Topics in Criminal Justice**

Course ID: 5397

Course Details: An advanced course of study and examination of a variety of current issues and topics in criminal justice. Students without a sufficient background in criminal justice courses should not attempt this course. Subject matter to be announced in advance. Visit the current semester schedule on the Continuing Studies website for more details.

Max Credits: 3
Min Credits: 3
44.385 Crime and Mental Illness

Course ID: 5401

Course Details: This course examines the realities and myths surrounding the involvement of individuals with mental illness in the criminal justice system. Material from criminal justice and psychology will be examined, with emphasis on service models that foster collaboration between mental health professionals, law enforcement, the courts, and corrections.

Max Credits: 3
Min Credits: 3

44.387 Criminal Mind and Behavior

Course ID: 5402

Course Details: This course will explore the psychological dimensions of criminal thinking and behavior. The course will cover the psychological origins and types of crime, the multidimensional influences on criminal behavior, developmental criminal pathways, diagnoses, assessment and treatment approaches and a description of the continuum of psychopathic behavior.

Max Credits: 3
Min Credits: 3

44.388 Forensic Psychopathology

Course ID: 5403

Course Details: This course addresses psychopathology in forensic settings, providing students with an integrative approach to understanding the multiple causes of psychological problems and disorders of adult and juvenile offenders as well as crime victims including biological, social, emotional, cognitive, and behavioral influences.

Max Credits: 3
Min Credits: 3

44.390 Criminal Justice Research Methods

Course ID: 5404

Course Details: An introduction to research methods for the criminal justice professional including terminology, standard methodologies, and elementary statistics.

Max Credits: 3
Min Credits: 3

44.395 Statistics in Criminal Justice

Course ID: 5406

Course Details: This course is an extension of concepts learned in 44.390 (Introduction to Criminal Justice Research Methods). Statistics will be utilized as a mathematical language for interpreting the interrelation of social forces impacting criminality and deviance. The course will focus on how various statistics are calculated, but more importantly, the meaning of these figures for criminal justice scholars and practitioners will be discussed.

Max Credits: 3
Min Credits: 3

44.397 Crime Mapping

Course ID: 5407

Course Details: This course examines the use of new technologies to analyze crime patterns and develop crime prevention strategies. Students study theories that explain the geographic distribution of crime and learn how to use Geographic Information Systems to study crime in ways that draw upon theory as well as how to apply GIS techniques in the law enforcement and corrections fields.

Max Credits: 3
**44.398 Criminal Justice Data Analysis**

Course ID: 5408

Course Details: The student is introduced to computer software packages (i.e. SPSS) used to analyze large quantitative data sets common in criminal justice/criminology. This course is seen as the capstone to the research methods/technology component of the major, and is intended for upper level students, especially those preparing for graduate study.

Max Credits: 3
Min Credits: 3

**44.401 Substance Abuse and Crime**

Course ID: 5409

Course Details: Covers the problems posed by substance use/abuse and examines the role and impact of the legal, criminal justice, and public health systems, as well as current treatment/intervention approaches.

Max Credits: 3
Min Credits: 3

**44.422 Victimology**

Course ID: 5413

Course Details: This course examines the patterns of victimization, the characteristics and lifestyles of crime victims, and the impact of their victimizations. The treatment of victims by the criminal justice system will be examined along with possible reforms in these approaches.

Max Credits: 3
Min Credits: 3

**44.477 Intimate Partner Violence**

Course ID: 5417

Course Details: This course examines the causes and consequences of domestic violence and the latest research regarding the responses of the criminal justice system.

Max Credits: 3
Min Credits: 3

**44.478 Child Maltreatment**

Course ID: 5418

Course Details: This course introduces students to empirical findings and theoretical perspectives concerned with the maltreatment of Children and youth. One of the major course goals is to balance the view of children and youth in the criminal justice system by focusing of their victimization instead of exclusively on their offending behavior.

Max Credits: 3
Min Credits: 3

**44.491 Directed Study - Criminal Justice**

Course ID: 5420

Course Details:

Max Credits: 3
Min Credits: 3
44.492 Short Directed Study
Course ID: 32152
Course Details: This course is designed as an independent study of a subject with Chair's permission.
Max Credits: 1
Min Credits: 1

44.493 Issues in Technology and Security
Course ID: 5421
Course Details: An examination of the causes and consequences of computer crime as well as the criminal justice system's response to the problem.
Max Credits: 3
Min Credits: 3

44.495 Criminal Justice Field Studies
Course ID: 5423
Course Details: This is an intense internship program for Criminal Justice majors which requires approval by the Department Chair.
Max Credits: 6
Min Credits: 6

44.496 Criminal Justice Internship
Course ID: 5424
Course Details: Assigned fieldwork under the supervision and with the permission of the instructor assigned to the course. The purpose is to broaden the educational experience of pre-service students in law enforcement, probation, and correctional agencies within this area. This course is designed to provide a correlation of theoretical knowledge with practical experience in an area of particular interest to the student.
Max Credits: 3
Min Credits: 3

45.201 Introduction to Philosophy
Course ID: 5497
Course Details: Examines some of the typical approaches to philosophical questioning and the issues raised in such inquiry: what is true knowledge, what is reality, what is the good, what is the right political order, what is the nature of religious faith?
Max Credits: 3
Min Credits: 3

45.202 Introduction to Logic and Critical Reasoning
Course ID: 5498
Course Details: Studies the methods used to distinguish correct from incorrect reasoning. This course will aim at developing (1) an ability to express one's ideas clearly and concisely; (2) an increased skill in defining one's terms; and (3) a capacity to formulate arguments vigorously and to scrutinize them critically.
Max Credits: 3
Min Credits: 3

45.203 Introduction to Ethics
Course ID: 5499
Course Details: Examines the basic issues and problems of ethics and values and a survey of some important alternative answers to the questions raised, on both an individual and a social level, by our necessity to act and to live in a rational and human way.
Max Credits: 3
Min Credits: 3

45.206 Introduction to Political Philosophy

Course ID: 5500
Course Details: Political philosophy is concerned with basic questions about community, public life, and social organization. This course will address issues such as the rights of the individual in relation to the power of the state and society; the nature and legitimacy of political authority and democracy; the significance of power, economics, justice and equality in social life; and the duties and responsibilities of citizens. We will also consider the philosophical meaning of communitarianism, liberalism, and republicanism, individualism, capitalism, and socialism, as well as the role of class, race, and gender in politics.
Max Credits: 3
Min Credits: 3

45.216 Plato and Beginning of Philosophy

Course ID: 5503
Course Details: It is Plato who first uses the words "philosopher" and "philosophy", and who, in his dialogs or dramatic discussions, establishes for all subsequent Western thought just was the enterprise of philosophy will be. In our study of these dialogs we will trace the origins in Plato of philosophy's primary questions concerning what is real and true as opposed to mere appearance (ontology, metaphysics), what is knowledge as opposed to mere opinion (epistemology), what is valid argument (logic), what is beautiful (aesthetics), and what is good, just and fair (ethics, politics). Plato foregrounds speech and language in all these considerations. Hence language, as the medium of thought and communication, will be a fundamental concern throughout our study.
Max Credits: 3
Min Credits: 3

45.285 Ancient Philosophy

Course ID: 5506
Course Details: A survey of the beginnings of philosophy, mainly western, from the Presocratics to Augustine. Studies the emergence of philosophy out of mythical forms of thinking and the development of rational thought in the work of Plato, Aristotle, the Stoics, the Epicureans, and the Neoplatonists.
Max Credits: 3
Min Credits: 3

45.296 Introduction to World Religions

Course ID: 33190
Course Details: A study of religious knowledge and the phenomena of religion from a philosophical standpoint. The course considers explanations for religious behavior, some central issues in religious belief, and the values and goals of religious systems. Various world religions provide specific data for these topics.
Max Credits: 3
Min Credits: 3

45.301 Ways of Knowing

Course ID: 5510
Course Details: Studies and analyzes various forms and expressions of human knowledge (perception, concept-formation and symbolic functioning, myth, aesthetic creation and interpretation, scientific discovery and understanding) and the
individual, social, and historical conditions to which they are subject. The goal of the course is a comprehensive view of the structure of the human mind and its operations.

Max Credits: 3
Min Credits: 3

**45.304 God and Philosophy**

Course ID: 5513

Course Details: Studies, historically and systematically, the following topics: a) the origin and content of the idea of God, b) the possibility of affirming God, philosophically and religiously, c) the complex nature of religious language and imagery, and d) God's relation to the world, history, and the individual.

Max Credits: 3
Min Credits: 3

**45.305 Language Signs and Symbols**

Course ID: 5514

Course Details: An examination of the various grammars of human expressions from the point of view of a general theory of signs. Among the topics to be treated are: a) the nature of signs, symbols, and meaning; b) the structures and functions of language; c) the relations between language, thought, and reality, especially as manifested in metaphor; d) the social dimensions of signification and symbolization; and e) the relations between the different linguistic, sign, and symbol systems.

Max Credits: 3
Min Credits: 3

**45.306 Feminist Theory Politics**

Course ID: 5515

Course Details: What is sexist oppression? Is our culture still sexist, or is the need for feminism over? How should we respond to sexism in other cultures? Do men and women have different natures? Are our culture's sexual representations of women necessarily degrading, and if so, why? We'll consider these questions, and others, by examining the arguments and methodology of analytic feminism. We'll start by tracing the historical development of feminism in the 18th, 19th, and 20th centuries, and then turn to several contemporary feminist analyses of sexist oppression. We'll then use these feminist frameworks to examine more specific issues. Possible topics include: feminist analyses of sexual objectification in pornography, feminist arguments in ethics and social theory, feminist analyses of science, and feminist criticisms of gendered labour.

Max Credits: 3
Min Credits: 3

**45.310 Philosophy of Creative Imagination**

Course ID: 5518

Course Details: Focuses first on imagination as a function of mind, placing it in relation to other functions such as perception, emotion, and conceptualization. Attention is then given to the difference between the reproductive and the creative imagination, with special emphasis on the psychological and social/political dimensions of creativity. Topics to be considered include poetical metaphor, theatrical performance, painting, architecture, or photography.

Max Credits: 3
Min Credits: 3

**45.313 American Philosophy**

Course ID: 5521

Course Details:

Max Credits: 3
Min Credits: 3
45.314 Philosophy of the Gothic Imagination

Course Details: A philosophical inquiry into science fiction, fantasy, and horror, with special emphasis on film. This course will attempt to provide interpretations of some classic examples from these genres, as well as to inquire into the philosophical significance of these literary categories and their relation to mythology and religion. Questions to be addressed will include the problem of knowledge and rationality and its limits, the nature of the human being, and the moral problem of the role of violence in the social order. The class will attempt to identify a continuous tradition between these modern genres and ancient Greek tragedy and mythology.

Max Credits: 3
Min Credits: 3

45.315 Philosophical Topics

Course Details: A close study of some of the great texts of philosophical literature. In general, one or two major works are selected and subjected to a thorough reading.

Max Credits: 3
Min Credits: 3

45.316 Philosophy and Film

Course Details: This course examines the political and philosophical values and ideas which constitute cinema. It analyzes film as an historical, cultural, commercial, and artistic endeavor. Students will develop the skills to watch film actively and critically.

Max Credits: 3
Min Credits: 3

45.323 Philosophy Classics: Nietzsche

Course Details: A detailed introduction to Nietzsche's thought and its reception. This course will examine Nietzsche's most important works and central concepts such as the Dionysian and Apollonian, the last man, overman, eternal recurrence, genealogy, and will to power.

Max Credits: 3
Min Credits: 3

45.327 Environmental Philosophy

Course Details: An examination of the philosophical foundations of environmentalism. Addresses both the question of ethical duties we owe to animals and to nature, and also the question of man's relation to the natural world.

Max Credits: 3
Min Credits: 3

45.330 Philosophy of Symbolic Logic

Course Details: The first half of this course examines various axiomatic systems, and the student develops both intrasytematic and metasystematic techniques of proof. During the second half of the course, attention is given to certain important philosophical problems which arise from reflection on logical systems, e.g., the cognitive processes of abstraction and instantiation, the general notion of form, and questions of consistency and interpretation.
45.331 Philosophy of the Mind

Course ID: 5538

Course Details: The status of consciousness is the central concern of a philosophy of mind. The course takes as its point of departure a reflection upon the nature and significance of consciousness from the perspective of its advocates (Husserl, Sartre) and its adversaries (Ryle, Skinner). The results of this preliminary inquiry is to provide a foundation for the exploration of other issues: the possibility of an unconscious; the temptation of bad faith; the dynamics of concept formation; and the nature of emotion, imagination, and dreams.

Max Credits: 3
Min Credits: 3

45.334 Engineering and Ethics

Course ID: 5541

Course Details: A philosophical analysis of the ethical dimensions and responsibilities of the engineering profession. Specific case studies and ethical issues are analyzed through the application of some of the basic concepts and principles of traditional and contemporary ethical theories.

Max Credits: 3
Min Credits: 3

45.336 Early Modern Philosophy

Course ID: 5543

Course Details: Examines Early Modern European Philosophy and its religious and scientific context, including movements such as the Mechanical Philosophy, Rationalism, Empiricism, and Transcendental Philosophy. Topics include knowledge and scientific understanding, the human mind and personal identity, and the debate between faith and reason.

Max Credits: 3
Min Credits: 3

45.337 Science & Meaning of Nature

Course ID: 5544

Course Details: The Scientific Revolution in seventeenth century Europe transformed our relationship to the world. This class analyzes the meaning of this transformation, inquiring into such questions as what defines science as a unique discipline, whether science and religion are intrinsically in conflict, and whether the lesson of science is that the universe is merely the result of impersonal laws and blind chance, or whether there is a place for meaning and purpose in the world.

Max Credits: 3
Min Credits: 3

45.339 Neoplatonism in Poetry & Philosophy

Course ID: 30406

Course Details: After defining "Neoplatonism" with reference to Plato's Phaedo, Symposium, and Phaedrus, the course will consider the relationships among Homer's Odyssey, Plotinus's Enneads, Virgil's Aeneid, Augustine's Confessions, and Dante's Divine Comedy. The focus will be on coming home to the "source and origin" after having been away and, as the philosopher Plotinus puts it, having been "a stranger in something strange". Students will be invited to work on other literary and philosophical treatments of this theme in English, Irish or American poetry and writing. A principal concern of the course is language "sung, spoken, and written". Accordingly, the course will applicable to, and count for the Philosophy and Communications track.

Max Credits: 3
Min Credits: 3
45.342 Critical Theory & Society
Course ID: 5548
Course Details: The nature and methods of a critique of society that focuses on the conflicts between the various modes of rationality and rationalization.
Max Credits: 3
Min Credits: 3

45.347 Greek Tragedy & Philosophy
Course ID: 31937
Course Details:
Max Credits: 3
Min Credits: 3

45.348 Eastern Philosophy and Religion
Course ID: 32558
Course Details: A comparative study of the major strand and themes of Eastern thought and philosophies, encompassing principally the Japanese, Chinese, and Indian traditions.
Max Credits: 3
Min Credits: 3

45.351 Problem of Evil
Course ID: 30851
Course Details: Why is there evil and suffering in the world? This course looks at the explanations that have been given in the various religions of the world and considers the strengths and weaknesses of each approach.
Max Credits: 3
Min Credits: 3

45.352 Existence & Anxiety
Course ID: 31936
Course Details: Explores basic questions of human existence in 19th and 20th Century philosophy and literature. Topics include anxiety and alienation; freedom and responsibility; authenticity and bad faith; individuality and mass society; rationality and the absurd; values and nihilism; and God and meaninglessness.
Max Credits: 3
Min Credits: 3

45.354 Philosophy & Rhetoric
Course ID: 5553
Course Details: Recent insights into the limits of traditional logic have confirmed that Aristotle was correct when, in distinguishing between the logical syllogism and the rhetorical enthymeme, he implied that in any field of argument outside the pure mathematical sciences there are no certain starting points and no final conclusions and, accordingly, the more useful model would be public speech and discussion, not inference and deduction. In examining the texts of the ancient masters of rhetoric, Aristotle, Cicero, and Quintilian, this course takes up their reflections on the nature of effective argument forensic, epideictic, and deliberative and thereby attempts to lay bare the foundations of contemporary rhetorical theories.
Max Credits: 3
Min Credits: 3
45.357 Science and Religion

Course ID: 5556

Course Details: A study of the multiple relations between science and religion focussing on the theme of creativity. The problem of the various truth claims of the two systems will be subjected to a close analysis and principles developed to understand how conflicts between the them can be understood and resolved.

Max Credits: 3

Min Credits: 3

45.361 Equality, Justice and the Law

Course ID: 5559

Course Details: This class investigates the American fascination with the “rule of law.” Questions to be considered include the following: What do we mean by the rule of law? What is the relation between law and morality? How does the rule of law promote justice, and what is its connection with the ideal of equality? What is the role of a written Constitution in protecting the rule of law? Special emphasis will be given to the Equal Protection clause of the Constitution and its role in prohibiting discrimination against disadvantaged groups, including racial minorities, women, and the handicapped. We will also consider in detail some theories of constitutional interpretation, including the Original Intent theory.

Max Credits: 3

Min Credits: 3

45.362 Democracy and Its Critics

Course ID: 33499

Course Details: Explores the diverse roots of the democratic ideal and the opportunities and dangers associated with democratic politics. The arguments for and against democracy will be analyzed.

Max Credits: 3

Min Credits: 3

45.365 Capitalism and Its Critics

Course ID: 34779

Course Details: This course explores the historical evolution of capitalism, from its early beginnings in the Enlightenment to the most recent debates about the free market and globalization. The focus will be on the debate over the virtues and vices of capitalism as distinct from other modes of economic and political organization. Concepts to be discussed will include freedom, equality and the distribution of wealth. Readings include Adam Smith, Karl Marx, Max Weber, Joseph S, and others.

Max Credits: 3

Min Credits: 3

45.366 Globalization and Its Critics

Course ID: 35076

Course Details: The course explores globalization as the process of transformation of regional and national phenomena into global ones, analyzing its social, economic, political, and cultural aspects. Supporters view it as the progress of liberalization and democratization that develop peaceful international cooperation; critics see globalization as the expansion of the profit-seeking global corporations that abuse the less developed and vulnerable regions. The course readings include the works of Amartya Sen, Samuel Huntington, Joseph Stiglitz, and other leading economists, sociologists, and philosophers.

Max Credits: 3

Min Credits: 3

45.367 Feminism and Liberalism

Course ID: 35286
Course Details: Liberalism stresses the importance of protecting individual people's right to live their lives however they see fit. Feminism strives to show that women are subject to a variety of injustices that prevent them from being able to live lives that are as good as men's. The aim of this course will be to consider whether liberalism and feminism are compatible, or whether the central ideals of liberalism—ideals like equality, autonomy, and individual rights—actually function to entrench not just sexism but also racism, classism, and other kinds of oppression. Readings will include both historical and contemporary writers such as Isaiah Berlin, Thomas Hobbes, John Locke, Catherine MacKinnon, John Stuart Mill, Martha Nussbaum.

Max Credits: 3
Min Credits: 3

45.368 The Politics of Food

Course ID: 35834

Course Details: This class will examine the moral and political implications of the food we eat. Topics we'll cover include genetically modified organisms, factory farming, animal rights and welfare, agricultural pollution, agricultural subsidies, third world hunger, the obesity epidemic, and the industrial food system and its alternatives.

Max Credits: 3
Min Credits: 3

45.369 History of Moral Philosophy

Course ID: 35841

Course Details: This course explores the history of moral philosophy by examining the writings of key thinkers in the Western philosophical canon, including Leibniz, Hume, Kant and Hegel. We will focus on four basic types of moral reasoning: perfectionism, utilitarianism, intuitionism, and Kantian constructivism. Our goal will be to understand how these thinkers from the modern period of moral philosophy have influenced the way contemporary philosophers think about morality.

Max Credits: 3
Min Credits: 3

45.370 Metaphysics

Course ID: 37719

Course Details: This course examines fundamental issues and topics in contemporary metaphysics. Broadly construed, metaphysics refers to the nature of existence and reality, or more basically, being. Topics in the course include: persistence, personal identity, human ontology, free will, possible worlds and modality, causation and paradoxes.

Max Credits: 3
Min Credits: 3

45.371 Buddhist and Zen Philosophy

Course ID: 33509

Course Details: Explores Buddhist and Zen philosophy and practice from ancient India through its developments in China and Japan to contemporary America. Attention is given to significant philosophical movements such as Abhidharmika, Madhyamika, Yogacara, Huayen, and Chan (Zen).

Max Credits: 3
Min Credits: 3

45.372 Chinese Philosophy

Course ID: 35287

Course Details: An introduction to the Chinese philosophical tradition in translation, especially the classical schools of Confucianism, Daoism, Mohism, and Legalism. Later developments in Buddhist and Neo-Confucian thought will also be explored.

Max Credits: 3
Min Credits: 3
45.373 Arabic and Islamic Philosophy

Course ID: 36790

Course Details: An introductory survey of selected philosophical topics and figures in the Arabic-speaking world, focusing on the development of classical Arabic philosophy (falsafa) through its proponents and critics from al-Kindi (9th century) to Averroes (12th century). The course can also include speculative theology (kalam), mystical philosophy (Sufism), later developments, and contemporary issues.

Max Credits: 3  
Min Credits: 3

45.374 Myth, Ritual and Festival

Course ID: 36908

Course Details: This course aims to analyze the social, cultural, and religious phenomena of the festival or holiday in its connection with myth and ritual. We focus in particular on the groundbreaking work of the Russian literary theorist Mikhail Bakhtin and his analysis of the cross-cultural features of the idea of the festival, for example the Roman Saturnalia, the British May Day festival, and our modern thanksgiving, Christmas, and New Year festivals. We will also consider other important contributions to the study of ritual and festival, including those of James Frazer, mircea Eliade, and Joseph Campbell. A substantial part of the class will be focused on the sociological and historical aspects of the role of festival in modern society. We will also attempt to place the festival and holiday tradition within a larger framework of the role of myth and ritual in religion.

Max Credits: 3  
Min Credits: 3

45.375 Philosophy of Sex and Love

Course ID: 5509

Course Details: The aim of this course is to introduce students to both historical and contemporary discussions surrounding the topics of sex and love.

Max Credits: 3  
Min Credits: 3

45.376 The Ethics of War and Peace

Course ID: 37648

Course Details: This course examines theories about why human beings engage in mass killing, the history of moral deliberation about war in major religious traditions, and modern philosophical analyses of the diverse moral principles that those traditions have bequeathed to us. The course comprises three broad ethical questions. First when, if ever, is recourse to arms legitimate (jus ad bellum)? Second, what constraints should apply to military conduct (jus in bellos)? And third, how should wars end (jus post bellum)? These three questions will be systematically discussed by critically examining a selection of writings by historical and modern secular and religious thinkers.

Max Credits: 3  
Min Credits: 3

45.383 Philosophy of Death and Dying

Course ID: 37720

Course Details: This course is a philosophical and interdisciplinary examination of prominent issues concerning the meaning of life and death and the ethical concerns involved with life, death and end of life issues. Topics in the course include: definitions of death, metaphysics and death, cultural meanings of death, the ethics of killing vs. letting die, euthanasia and suicide, and rights of the dying.

Max Credits: 3  
Min Credits: 3

45.384 Philosophies of Art and Beauty
Course Details: Examines the views of major philosophers on the beautiful and the nature of artistic creativity. An attempt is made to correlate the views of the thinkers with the works of poets, artists, and composers and the statements the latter have made about their work.

Max Credits: 3
Min Credits: 3

**45.401 Bioethics and Genetics Research**

Course Details:

Max Credits: 3
Min Credits: 3

**45.491 Directed Studies**

Course Details: The student, through regular and frequent consultation with an instructor, pursues a special problem in philosophy, the results of which are presented in a 25-30 page paper.

Max Credits: 4
Min Credits: 1

**45.496 Practicum**

Course Details:

Max Credits: 3
Min Credits: 3

**46.101 Introduction to American Politics**

Course Details: An introduction to the politics, structure, and behavior of the American National Political Community

Max Credits: 3
Min Credits: 3

**46.105 Introduction to Public Policy**

Course Details: An introductory survey of the major forces and processes involved in the development of public policy; contemporary issues in public policy will also be considered.

Max Credits: 3
Min Credits: 3

**46.110 Introduction to Politics**

Course Details: An introductory exploration of basic political concepts, ideologies, and themes. Stresses the importance of understanding politics for everyday life.

Max Credits: 3
**46.111 Election of 2012**

Course ID: 30408

Course Details: An examination of the American election process in this presidential election year. Attention especially is given to candidates, political issues, political parties, and financing, among other factors, within the process and their influence in the election outcome. Strengths and weaknesses of the election process and reform proposals and prospects will also be addressed.

Max Credits: 3

Min Credits: 3

**46.112 Introduction to Comparative Political Systems**

Course ID: 5572

Course Details: A cross-cultural analysis of various governmental systems; elements common to all forms of government are emphasized and variations among contemporary political systems are discussed. Balance between developed and Third World countries.

Max Credits: 3

Min Credits: 3

**46.121 Introduction to International Relations**

Course ID: 5573

Course Details: Surveys some recent methods and approaches used in the study of international politics and provides an introduction to current problems of foreign policies of major world powers.

Max Credits: 3

Min Credits: 3

**46.125 Introduction to Peace and Conflict Studies**

Course ID: 36942

Course Details: This course will focus on the causes of conflict, conflict resolution methods, and ways to sustain peace. The course will explain and define each of those areas. A mid-term will be administered to examine the students' grasp of the concepts and key terminology. The second part of the class will emphasize student participation and the application of concepts learned earlier in class. The final is a take home exam that will require the application of theory and praxis in the field of Peace and Conflict Studies.

Max Credits: 3

Min Credits: 3

**46.201 Introduction Political Analysis**

Course ID: 5576

Course Details: Introduces the Political Science major to the scope of politics as a discipline. Highlights value questions through analysis of the political, socio-demographic and constitutional background of selected contemporary public issues and policies.

Max Credits: 3

Min Credits: 3

**46.210 Media & Politics**

Course ID: 5583

Course Details: This course explores the role of the media in American politics and the role of politics in the American media including a survey of general approaches to media analysis and the history of mass communication.
46.218 Introduction to Politics and Sports

Course ID: 5586

Course Details: Analyzes the growing importance of sports in American life. Examines the psychological, political and social impact of sports on society. Discusses how sports have been shaped by such monumental events as war, the civil rights movement, and the changing economy.

Max Credits: 3
Min Credits: 3

46.222 Politics of the Internet

Course ID: 5588

Course Details: This course will examine the influence social media and web connectivity have had on political campaigns, campaign fundraising, political mobilization, and the recent proliferation of democratic movements.

Max Credits: 3
Min Credits: 3

46.230 Law and the Legal System

Course ID: 5590

Course Details: Presents an introduction to the nature of the legal process and the operation of the American legal system. Also discusses considerations of its political and social functions.

Max Credits: 3
Min Credits: 3

46.231 Introduction Political Thought

Course ID: 5591

Course Details: A critical survey of the history of Western political thought from Plato to the present.

Max Credits: 3
Min Credits: 3

46.235 Introduction to the Law and Politics of Constitutional Development

Course ID: 5592

Course Details: An introductory study of constitutional law and politics; analysis of constitutional doctrine and the American constitutional system, with emphasis on contemporary controversies.

Max Credits: 3
Min Credits: 3

46.251 Politics of Identity

Course ID: 30848

Course Details: This interdisciplinary course considers the way we construct self-identity through our affiliation with various cultural and political groups- from the "Red Sox nation" to linguistic, economic, nationalistic and ethnic groups. It examines the central role of nationalism; its symbols, traditions and expectations; the role of the media; and the benefits and risks of our allegiance to these groups.

Max Credits: 3
Min Credits: 3
46.253 Introduction to Public Administration and Policy
Course ID: 5597
Course Details: An examination of the little studied fourth branch of government. Bureaucratic power in the American political system is reconsidered.
Max Credits: 3
Min Credits: 3

46.265 State and Local Politics
Course ID: 5600
Course Details: Examination and study of politics and government at the state and local levels, with emphasis on Massachusetts and New England. Practitioners from state and local government will meet with the class.
Max Credits: 3
Min Credits: 3

46.304 Politics of Development
Course ID: 5580
Course Details: This course considers the politics of the global development process, the actors involved and the contexts within which development occurs.
Max Credits: 3
Min Credits: 3

46.307 American Political Thought
Course ID: 5608
Course Details: A survey of the historical development of American political thought from the colonial era to the present.
Max Credits: 3
Min Credits: 3

46.310 'Isms' in American Politics
Course ID: 5611
Course Details: An examination of major ideological, philosophical and social currents.
Max Credits: 3
Min Credits: 3

46.313 Electoral Politics
Course ID: 37643
Course Details: This course will examine voting behavior in American elections: how voters make decisions, the changing nature of campaigns, the influence of money, media, and polling, and related matters.
Max Credits: 3
Min Credits: 3

46.314 Parties and Interest Groups
Course ID: 37644
Course Details: An examination of party systems and coalitions in the US, their changing nature over time, the history of
realignment, and the relationship of parties to interest groups.

Max Credits: 3
Min Credits: 3

46.316 Politics and Film

Course ID: 5615

Course Details: Analysis of the role of film in creating, expressing, revealing, and responding to social and political ideas and values. Examines a variety of film and film styles and introduces students to elements of film theory, the theory of popular culture and the role of film in forming our ideas about the world.

Max Credits: 3
Min Credits: 3

46.320 Gender Law and Politics

Course ID: 5617

Course Details: Explores legal constructions of gender by examining Supreme Court cases, federal legislation, historical documents, news stories, and scholarly essays on sexual inequality in the United States. Topics include the evolution of the family as a legal (and illegal) reality; political regulation of reproduction and sexual activity; feminist critiques of economic inequality; the rise and fall of affirmative action; the changing role of gender in class consolidation; and ongoing debates about the relationships between public and private life.

Max Credits: 3
Min Credits: 3

46.321 Soccer and Politics

Course ID: 36431

Course Details: This course analyzes the social, political and business aspects of the World Cup, the most popular sporting event in the world. The course will study the evolution of the World Cup, from the 1930's when fascist regimes used the Cup to buttress their doctrines to the emergence of new soccer powers like the U.S.

Max Credits: 3
Min Credits: 3

46.323 Politics and Baseball

Course ID: 36432

Course Details: Introductory look at the interaction between the world of baseball and the social and political structures which influence the sport.

Max Credits: 3
Min Credits: 3

46.324 Politics of Football

Course ID: 36433

Course Details: How the rise of pro football's popularity reflects changes in American society during the 20th century. An examination of how politics, economics and television created a sport that has become an American obsession, and some argue, a new religion.

Max Credits: 3
Min Credits: 3

46.327 The Dynamics of Sexual Politics

Course ID: 5621
Course Details: Starting with the constructionist approach of analyzing the sexual dynamics of ancient civilizations, we will expose how sex has been used as a political tool to further the cause of unrelated agendas, how attitudes about sex have changed from Greco-Roman times to the 1960's sexual revolution, culminating in the current political debate about Vermont's civil union laws. Join us in this academic endeavor to understand our roles as sexual beings both in history and in politics, as well as an exploration of our own attitudes towards differing sexualities.

Max Credits: 3
Min Credits: 3

46.329 Politics of College Sports

Course ID: 36434

Course Details: Current controversies over the role of college sports within in academic environment with particular attention to Title IX, the pivotal law that altered gender in college sports.

Max Credits: 3
Min Credits: 3

46.331 Animal Rights and Animal Welfare

Course ID: 35839

Course Details: This course examines how the structure of the human/non-human animal relationship affects or determines the nature of public policy formation on issues with impacts on non-human animals, both nationally and internationally.

Max Credits: 3
Min Credits: 3

46.332 The Politics of Food

Course ID: 37038

Course Details: The course will examine current debates in food politics over: regulatory politics and the appropriate reach of the state in food labeling, safety, and oversight; genetically modified food, organic and sustainable agriculture, the effects of economic globalization of the food supply chain and the future of the world food system.

Max Credits: 3
Min Credits: 3

46.334 Islam and Politics

Course ID: 36670

Course Details: The course will explain the nature of the relationship between Islam and Politics by examining the rise of the first modern Islamic movement, and by examining other Islamic movements that spread throughout the Muslim world.

Max Credits: 3
Min Credits: 3

46.335 Constitutional Law and Politics

Course ID: 5624

Course Details: A study of constitutional law focused on the principles and structures of American government. The course will discuss the Constitution, the Bill of Rights, the origins of judicial review, and the principles of federalism, natural law, ordered liberty, limited government, separation of powers, equal protection, and due process.

Max Credits: 3
Min Credits: 3

46.356 Public Policy Analysis

Course ID: 5642
Course Details: This course examine issues in and techniques utilized in public policy analysis.

Max Credits: 3
Min Credits: 3

46.374 Democracy and Development

Course ID: 5660

Course Details: Explores the theories and experiences of countries newly converting to democracy in Asia, Africa, Latin America and the former Eastern Bloc. Also examines the strategies and prospects for development among the same countries.

Max Credits: 3
Min Credits: 3

46.375 Politics of Pacific Rim

Course ID: 5661

Course Details: An examination of the politics, policies and institutions of Japan, the "four tigers" and other countries of the Pacific rim area.

Max Credits: 3
Min Credits: 3

46.378 International Political Economy

Course ID: 5662

Course Details: An examination of the politics of global economic relations stressing the role of international institutions, multinational corporations and other international actors on the policies of the nation-state.

Max Credits: 3
Min Credits: 3

46.380 American Foreign Policy

Course ID: 5663

Course Details: A study of the processes of American foreign policy in the contemporary world.

Max Credits: 3
Min Credits: 3

46.384 International Politics of Human Rights

Course ID: 5666

Course Details: This course will address the history, content, structure, law, and politics of international human rights. Using interactive participatory class format students will learn analytical and critical thinking skills as well as written and oral communication skills.

Max Credits: 3
Min Credits: 3

46.387 Politics of International Organizations

Course ID: 33791

Course Details: This course will address the history, functioning, structure and politics of international organizations in world politics. International Governmental Organizations as well as Non-Governmental Organizations on the global and regional level will be analyzed and discussed. In a participatory and interactive class format students will develop analytical and critical thinking skills.
Max Credits: 3
Min Credits: 3

46.395 International Law and Politics

Course ID: 33793

Course Details: This course will address the history, content, functioning and politics of International Law. It will deal with public law as it has developed throughout history and how it guides the politics of states and other actors in international relations.

Max Credits: 3
Min Credits: 3

46.397 Seminar: Labor Law & Politics

Course ID: 5670

Course Details: Consideration of a variety of political, legal and social issues involving labor relations, unions, employment, and dispute resolution, and their place in American society.

Max Credits: 3
Min Credits: 3

46.401 Research Seminar

Course ID: 5673

Course Details: Requires the writing of a substantial paper (or production of an equivalent project.) Typically, students should select a 300 level seminar course from among Departmental offerings that are of interest, all of which involve the writing of one or several papers, and select one paper or topic to expand upon. The student should then register in the Research Seminar section for the appropriate supervising instructor and expand the paper into a more substantial form.

Max Credits: 3
Min Credits: 3

46.402 Women in Islam

Course ID: 5674

Course Details: Focusing upon one of the most important topics in Islam, this course will go beyond conventional stereotypes and explore woman's many and varied roles within Islamic cultures and societies.

Max Credits: 3
Min Credits: 3

46.411 Dynamics Power and Authority

Course ID: 6189

Course Details: This course surveys theories of power, authority, participation, and politics. Building on these theories, students will examine changing social, political, and economic patterns of inequality based on class, race (and related divisions of ethnicity, religion, caste, nationality), and gender. Reviews various approaches to altering these dynamics (business strategy, public policy, community and social movements). Cuts across units of firm, community, region, and nation, along with corresponding governmental institutions, and links theoretical analysis with study of practical problem solving. Instructor-initiated cases drawn from a variety of national experiences. Students will learn techniques of power analysis and prepare a power analysis project.

Max Credits: 3
Min Credits: 3

46.418 American Courts and Judicial Process

Course ID: 33792
Course Details: This course will study the organization of and the processes employed by American Courts in an intensive participation format. Traditional text lessons on the U.S. Court system will be supplemented by simulations and mock trial problems. Using this two track approach, students will learn about the courts and simultaneously develop the analytical, critical reasoning and public speaking skills used in the Judicial system.

Max Credits: 3
Min Credits: 3

46.420 Reading and Simulation Experience International Organization

Course ID: 5684

Course Details: Students take part in a simulation of the proceedings of a regional or international organization, e.g., U.N., O.A.S., O.A.U., or the Arab League. They study all aspects of the selected institution but concentrate on key economic, social and security issues discussed in the body's debates. The course aims to give the student a clearer understanding of the forces and constraints which shape the foreign policies of individual states.

Max Credits: 3
Min Credits: 3

46.422 SMR: Political communication and Media Studies

Course ID: 31968

Course Details: Advanced study in contemporary issues in Political Communication and Media Studies.

Max Credits: 3
Min Credits: 3

46.439 Justice and Trade in the Global Economy

Course ID: 37372

Course Details: We know that we are part of a global economy and that many of the things we buy and consume are produced in other countries. But what do we know of how they are made? Do we understand that there may be hidden costs in the price we pay for goods at the supermarket, in a department store? Understanding the nature of global trade is critical for us to be effective citizens in the world. Perhaps more important is that we understand how goods are produced and traded - what many think of as "fair" trade. The subject of Fair Trade isn't simply limited to the production and sale of coffee and chocolate. Fair Trade principles encompass environmental issues, human rights, and politics. Once aware of the ramifications of consumerism on all parts of the world, including the United States, people can make informed choices about the products they buy, the companies that employ them, and the political views they support. By the end of this course students should understand the major ideas and tools used to comprehend complex international and global trade relations. Students will understand the way in which goods are produced for global markets and the possible human and environmental costs such production entails.

Max Credits: 3
Min Credits: 3

46.444 Advanced Research Methods

Course ID: 36723

Course Details: Both quantitative and qualitative methods will be examined with a focus on locating and utilizing available data to study social questions.

Max Credits: 3
Min Credits: 3

46.445 Politics of Repression and Dissent

Course ID: 36722

Course Details: A focus on the dark side of politics - political repression, including politically motivated imprisonment, torture, murder, and disappearance- and the struggle of critics to bring about change through non-violent and violent demonstrations, general strikes and armed resistance.
Max Credits: 3
Min Credits: 3

46.446 The Politics of Discord between the Arab East and The West

Course ID: 35836

Course Details: The course examines the roots of political discord in the Arab East starting with colonialism and progressing to the contemporary state of dissension. Throughout the course the stress on the effect of this discord on comparative domestic politics and international relations in the region will be examined.

Max Credits: 3
Min Credits: 3

46.491 Directed Study

Course ID: 5688

Course Details: Directed study offers the opportunity to engage in an independent study or research project under the supervision of a department member. Working closely with the instructor, students define and investigate a research problem in an area of special interest and present the results of their investigation through a combination of readings and papers and/or a significant research paper.

Max Credits: 3
Min Credits: 1

46.492 Directed Study In International Organizations

Course ID: 5689

Course Details: Advanced and intensive reading and other activity in connection with the study of selected international organizations.

Max Credits: 3
Min Credits: 3

46.496 Practicum Experience Requirement

Course ID: 5693

Course Details: A program of study and research for political science majors only stressing involvement in and first-hand knowledge and observation of the political life and relationships of national, state and local institutions. The purpose is to acquaint the student in a directed way with political institutions and political behavior. Specific requirements vary depending upon the nature of the program undertaken by the student. The course will be graded S (satisfactory) or U (unsatisfactory).

Max Credits: 3
Min Credits: 3

46.497 Practicum in the Law Requirement.

Course ID: 5694

Course Details: A program of study and research which includes involvement in and first-hand knowledge and observation of the legal system and legal practice. Open only to political science majors and, with certain restrictions, legal studies minors. The course will be graded S (satisfactory) or U (unsatisfactory).

Max Credits: 3
Min Credits: 3

47.101 General Psychology

Course ID: 5697

Course Details: Intended as an introductory course both for non-concentrators and for concentrators, this course surveys the major areas of psychology: the nature of psychology as a science, principles of learning, the relationship between
physiological and psychological processes in humans and animals, sensation and perception, cognitive processes, motivation and emotion, personality and development, adjustment and behavior disorders, and social behavior.

Max Credits: 3  
Min Credits: 3

**47.209 Social Psychology**

Course ID: 5701

Course Details: Presents an introduction to the study of social behavior in interpersonal relationships, groups, organizations, and the community: Diversity in regard to groups of peoples, cultures, and views is emphasized. Topics include non-verbal communication, social attraction, attitudes and attitude change, group dynamics, prejudice, labeling, stereotyping, interpersonal influence, and applications to social problems.

Max Credits: 3  
Min Credits: 3

**47.232 Psychology of Personality**

Course ID: 5703

Course Details: Serves as an introduction to the study of human personality including such topics as self-concept, anxiety and adjustment, and achievement motivation. Psychoanalytic, humanistic, cognitive, and behavioral theories of personality are stressed with consideration of the interplay between theory and research.

Max Credits: 3  
Min Credits: 3

**47.255 Community Psychology**

Course ID: 5705

Course Details: Surveys the nature and practice of community psychology, including principles of community organization and change as seen in such areas as education, mental health, the workplace, health care, justice system, corrections and social services. Students may participate in field research or practice under the direction of an assigned agency, and classroom work will include discussion of the field experiences of the participants.

Max Credits: 3  
Min Credits: 3

**47.260 Child and Adolescent Development**

Course ID: 5706

Course Details: The study of childhood and adolescence. The course begins with an overview of major theoretical perspectives, research methods, and ethical issues in human development. Based on a chronological approach, the course covers prenatal development and birth, infancy, childhood and adolescence, and the transition to adulthood.

Max Credits: 3  
Min Credits: 3

**47.272 Abnormal Psychology**

Course ID: 5711

Course Details: Presents an introduction to the study of various patterns of mental, behavioral, and personality disorders with consideration of issues of diagnosis, etiology, and treatment in terms of contemporary theory, research, and practice.

Max Credits: 3  
Min Credits: 3

**47.273 Brain, Mind & Behavior**
Course Details: Surveys issues and topics dealing with the physiological and evolutionary bases of behavior. Biological systems and processes that influence behavior are considered, with particular emphasis on brain mechanisms. Recent discoveries in the neurosciences will be presented. Methods of research are reviewed.

Max Credits: 3
Min Credits: 3

**47.276 Theories of Learning**

Course ID: 5714

Course Details: Traces the development of theories of learning from earlier global theories to more recent and more specific ones. Behavioral, cognitive, and physiological approaches are compared. Current issues of importance in the study of learning also are stressed.

Max Credits: 3
Min Credits: 3

**47.277 Sensation and Perception**

Course ID: 5715

Course Details: The course focuses on human sensations and perceptions. Students will examine how people know the objects and events of the world through hearing, seeing, smelling, tasting, moving, and touching. Students will also examine the foundations of experiences which correspond to independent measures of the world (veridical) and those which do not (illusory).

Max Credits: 3
Min Credits: 3

**47.278 Cognitive Psychology**

Course ID: 5716

Course Details: Examines the psychological bases of verbal and visual reasoning, logical and creative thought-processes, and linguistic and conceptual behaviors. The nature and limits of knowledge and creative expression are discussed.

Max Credits: 3
Min Credits: 3

**47.305 Psychology and Law**

Course ID: 38082

Course Details: This course is an introduction to many topics representing major fields of study within psychology and law. Topics may include: eyewitness testimony, lie detection, jury selection, child protection, forensic interviews, and the death penalty. In this course, students will be exposed to the diversity of interests among legal psychologists as well as innovative and important ideas, theories, and scientific research findings. Through readings, the study of actual cases, and presentations from guest speakers, students will gain more understanding of how psychologists study and contribute to the legal system.

Max Credits: 3
Min Credits: 3

**47.312 Learning and Behavior**

Course ID: 5718

Course Details: Examines various methods and techniques suitable for the modification of human behavior, based on the principles and findings of experimental studies of animal and human behavior. Considers how such methods can be used in education, mental health and corrections, and self-directed personal change.

Max Credits: 3
47.328 Dynamics of Interpersonal Relations

Course ID: 5720

Course Details: Presents an analysis of psychological dynamics in interpersonal behavior, emphasizing such topics as interpersonal communication, self-disclosure, personal styles of interaction and techniques of change. The primary focus is on the behavior of the students themselves.

Max Credits: 3
Min Credits: 3

47.332 History of Psychology

Course ID: 5721

Course Details: Examines the historical roots of psychology from the pre-scientific psychologies of the ancient Greeks to the twentieth century schools of the introspectionists, the Gestalt psychologists, and psychoanalysts. Historical resolutions of recurring issues are contrasted with modern resolutions.

Max Credits: 3
Min Credits: 3

47.335 Psychology and Women

Course ID: 5723

Course Details: Considers such topics as: the psychology of sex differences; biological bases of psychological sex differences; the nature of female sexuality; clinical theory and practice concerning women; women as mental patients and mental health consumers; implications for psychology and for women's status.

Max Credits: 3
Min Credits: 3

47.336 Culture and Psychology

Course ID: 37477

Course Details: Provides an analysis to the impact of culture, socio-historical, and social influences on psychological processes and outcomes. Students will also learn about techniques for studying the influence of culture including cross-cultural methods and population-specific methods. Through careful analysis of research literature, this class will examine a variety of contexts within the U.S. and internationally. Topics will include identity development, immigration, acculturation, socialization, and social interactions among groups.

Max Credits: 3
Min Credits: 3

47.345 Health Psychology

Course ID: 5724

Course Details: An examination of psychological aspects of human health, both physical and mental, and the processes of adjustment and growth. Consideration is given to the interplay of health and illness with emphasis on psychological methods of overcoming and preventing illness and of enhancing physical and emotional well-being.

Max Credits: 3
Min Credits: 3

47.351 Human Sexuality

Course ID: 5725

Course Details: Addresses the biological, psychosocial, and attitudinal aspects of human sexuality through lectures, discussions, films from a variety of perspectives.
Max Credits: 3

47.352 Psychological Testing

Course ID: 5726

Course Details: A survey of major tests and techniques used to assess cognitive abilities, personality and vocational interests; an introduction to the various professional settings in which testing and assessment methods are used (e.g. school/education, mental health, rehabilitation, employment and personnel selection, criminal justice). Students learn to administer, score, and interpret specific tests and learn how to develop a case study or report based on test data and related information.

Max Credits: 3

47.355 Sport and Exercise Psychology

Course ID: 5727

Course Details: The course will cover topics such as motivation, arousal and anxiety in performance, performance enhancement, youth sport and family interactions, leadership, cooperation and competition, team cohesion, gender issues, exercise and mental health, and psychological factors in injury prevention and rehabilitation.

Max Credits: 3

47.360 Adult Development and Aging

Course ID: 5728

Course Details: Begins with an overview of recent theoretical perspectives on adult development and aging. In chronological sequence, it presents the stages of adulthood and concludes with death and dying. Topics covered include personal, family, and vocational development through adulthood, gender pattern differences, and the impact of changing demographics, including the lengthening of the life span.

Max Credits: 3

47.361 Developmental Psychopathology

Course ID: 5729

Course Details: Examines behavior problems of childhood and adolescence across developmental transitions with a focus on the interaction of risk and protective factors in the child and his or her social context (e.g., family, school, friendships). Problems such as depression, anxiety, conduct disorder, ADHD, learning disabilities, and the consequences of trauma and maltreatment are addressed.

Max Credits: 3

47.362 Psychology of Developmental Disabilities

Course ID: 33583

Course Details: This course examines a range of developmental disabilities, their etiology, consideration of underlying brain function, assessment procedures, and current diagnostic, treatment and educational approaches. In addition, the impact of disability on individuals and the families of those affected, cultural and social aspects of disability, and current practices in service provision will be considered.

Max Credits: 3

47.363 Introduction to Disability Studies
Course ID: 5730

Course Details: This course provides students with a wide range of interests and backgrounds with the opportunity to examine their own mental model (attitudes/values/assumptions) of disability. It includes an overview of the nature of mental retardation and other disabilities and it provides opportunities to explore and understand the historical social response to disability. Students will look at a range of strategies for providing support and intervention and they will learn about how to effect change through a variety of strategies, including advocacy.

Max Credits: 3
Min Credits: 3

47.369 Research II: Statistics

Course ID: 5733

Course Details: An intermediate level course building on competence in quantitative reasoning skills and the fundamentals of research methods, and focusing on descriptive and inferential statistics and their application and interpretation. The course will include basic computational approaches; the primary goal is for students to develop the ability to articulate and apply statistical concepts, and communicate statistical results. The course includes topics in basic inferential statistics from z-scores up to and including chi-square and factorial ANOVA. Students will learn to use a database and conduct statistical analyses using standard software packages.

Max Credits: 3
Min Credits: 3

47.472 Seminar: Personality

Course ID: 30882

Course Details: Focuses on a variety of theoretical conceptualizations of the productive personality, psychodiagnostic tools and techniques and case histories. Students develop and enhance their professional skills with respect to presentation of self, writing, and psychological diagnostic techniques.

Max Credits: 3
Min Credits: 3

47.473 Seminar in Social Psychology

Course ID: 5748

Course Details: Presents an intensive study of one or more of the following special topics in social psychology: small group interaction; social aspects of health and illness; conformity; attitude formation and prejudice; patterns of communication, including nonverbal communication; psychology of sex roles; methods of social action and social change in the community.

Max Credits: 3
Min Credits: 3

47.474 Seminar in Developmental Psychology

Course ID: 5749

Course Details: Presents a careful consideration of selected topics in the area of human development, including the following: psychology of the family and parent-child relations; infant development; adjustment during adulthood; and death and dying, etc.

Max Credits: 3
Min Credits: 3

47.475 Seminar in Clinical Psychology

Course ID: 5750

Course Details: Focuses on such topics as: the nature of psychotherapy and clinical practice; analysis of specific clinical theories of psychopathology and psychotherapy (family systems, transactional analysis, Gestalt, behavioral, psychoanalysis); the nature and causes of specific psychological disorders (schizophrenia, affective disorders, etc.); the nature of mental hospitals; the community mental health movement; clinical methods of assessment; and current topics in personality theory
and research; etc.

Max Credits: 3
Min Credits: 3

**47.477 Seminar: Contemporary Trends**

Course ID: 1242
Course Details: Deals with issues in contemporary areas of psychological practice and/or research; implications for future developments in the field will be covered.

Max Credits: 3
Min Credits: 3

**47.480 Integrative Fieldwork in Developmental Disabilities I**

Course ID: 5752
Course Details: This fieldwork based course examines standards for services to people with developmental disabilities, exploring the forces that support or interfere with realizing current best practice. In this course, students will develop an understanding of the life of an individual with a disability that includes hopes and dreams, vision, the societal context of his/her life, and the services and personal relationships that influence growth and change. Students will learn to implement person centered planning, community membership mapping, and become familiar with professional skills and standards. Fieldwork opportunities include all ages and service delivery models.

Max Credits: 3
Min Credits: 3

**47.481 Integrative Fieldwork in Developmental Disabilities II**

Course ID: 5753
Course Details: This seminar accompanies a human service/education-based field placement and provides a critical examination of organizations and personal leadership in the lives of people with disabilities. Students will explore how formal services, advocacy, and informal community systems impact one another and impact the lives of people with disabilities. Students will examine their own field placements from a variety of theoretical frameworks, using this knowledge to understand personal leadership change opportunities. Students who are considering a career in a human service profession will have the opportunity to learn how vision, mission, community partnerships, funding, human resources, regulations, and families/individuals themselves impact service delivery.

Max Credits: 3
Min Credits: 3

**47.486 Community Service Learning (1, 2, or 3 credits)**

Course ID: 5756
Course Details: Students will take an applied role in the community where they will have the opportunity to provide some form of meaningful service to individuals, groups or communities. Students will meet regularly with a designated faculty member on campus to consider their experiences in the context of current psychological thought. In some instances, the commitment to community service may extend over the course of a full year. Graded as Satisfactory or Unsatisfactory. 1, 2 or 3 credits. This course may be repeated but no more than 9 credits total from any combination of 47.486, 47.488 and 47.491 may be counted toward the degree.

Max Credits: 3
Min Credits: 1

**47.488 Research Service Learning**

Course ID: 36769
Course Details: Students will take an applied role in faculty supervised research where they will provide a meaningful contribution to a research program or particular study. Students will meet regularly with a designated faculty member to discuss the research process and rationale for relevant components of the project including literature review, research design, procedures, data collection, entry, and analysis. In some instances the commitment to research may extend over the
course of a full year. Graded as Satisfactory or Unsatisfactory, 1, 2, or 3 credits. This course may be repeated but no more than 9 credits total from any combination of 47.486, 47.488, and 47.491 may be counted toward the degree.

Max Credits: 3
Min Credits: 1

47.491 Directed Study: Psychology

Course ID: 5757

Course Details: Through frequent consultation with the instructor, the student carries out the investigation of a particularly specialized area of interest. This course may be repeated, but no more than 9 credits from any combination of 47.486, 47.488, and 47.491 may be counted toward the degree.

Max Credits: 3
Min Credits: 3

47.496 Practicum in Psychology

Course ID: 5759

Course Details: A program of practical experience for Psychology majors only. Specific requirements vary, but the Practicum experience enables Junior and Senior level students to work and study in a variety of areas related to psychological practice and research (mental health agencies, community agencies and groups, work settings, schools, prisons, group homes, etc.). Students meet regularly as a class on campus with the designated instructor to discuss their experiences and to learn more about the settings in which psychologists practice and the challenges that psychologists confront. Practicum may be repeated for a maximum of nine credits. Graded Satisfactory or Unsatisfactory. (Field Placement Required)

Max Credits: 3
Min Credits: 3

48.101 Introduction to Sociology

Course ID: 5812

Course Details: Serves as the basic course in sociology. Emphasis is directed at the ways in which social institutions such as government, schools, the economy, social class, and the family develop and influence our lives. It is concerned not only with presenting various ways to understand our relationship to society but also with ways to change it.

Max Credits: 3
Min Credits: 3

48.102 Social Anthropology

Course ID: 5813

Course Details: Using the comparative approach to society, this course examines several distinct cultures as a means of understanding both the universal constants and the variations in human societies.

Max Credits: 3
Min Credits: 3

48.112 Sociology Goes to the Movies

Course ID: 33538

Course Details: This course is designed to give students the opportunity to survey primary sociological texts and view films, offer commentary on and analysis of social behavior.

Max Credits: 3
Min Credits: 3

48.212 Cultures of the World

Course ID: 5819
Course Details: Focuses on a different country or region each time it is given. Students examine the traditional culture, recent history, economic development, class structure, and international relations of the area covered.

Max Credits: 3
Min Credits: 3

48.215 Peacemaking Alternatives
Course ID: 5821
Course Details: Examines various positive alternatives to war and violence, including disarmament, nonviolence, conflict resolution, and the United Nations. Students do volunteer work with an activist agency or interview an activist. The course stresses the historical and contemporary role of peace movements and allied social-change movements such as feminism, civil rights and environmentalism.

Max Credits: 3
Min Credits: 3

48.216 Sociology of War and Peace
Course ID: 30413
Course Details: The purpose of this course is to examine critically the social forces that contribute to war, war's social consequences, and the possibilities for creating a more peaceful world.

Max Credits: 3
Min Credits: 3

48.220 Self-Assessment and Career Development
Course ID: 5822
Course Details: Studies the meaning of work in our society. Class participants will assess their own life experiences and develop plans to integrate interests, values, and abilities into meaningful and realistic life/work options.

Max Credits: 3
Min Credits: 3

48.225 Sociology of Disability
Course ID: 33256
Course Details: This course is organized around several key questions that are used to study the concepts of disability and ability from a variety of sociological and interdisciplinary perspectives. Specifically, the course explores representations of disability in popular culture and medical discourses to discuss disability and ability as social constructs. By looking at various literary and cultural representations, this course investigates constructions of the disabled and abled body, how this becomes politicized, and the implications of these constructions.

Max Credits: 3
Min Credits: 3

48.231 Sociology of the Family
Course ID: 5824
Course Details: Studies the nature of the family in contemporary society, with particular emphasis on the family in America. What functions does the family perform in modern society? How is it changing? How do these changes affect our lives?

Max Credits: 3
Min Credits: 3

48.234 The Study of Minorities
Course ID: 5825
Course Details: Examines the process of immigration and majority-minority relations in the United States over the last century with particular emphasis on the process of adaptation in a pluralistic society. The treatment of minority groups in other societies is examined as well.

Max Credits: 3  
Min Credits: 3

**48.236 Sociological Approaches to the Environment**

Course ID: 33284

Course Details: Focusing on case studies of recent and pending environmental disasters, this course will trace how political, social, economic and cultural arrangements and choices contribute to environmental catastrophes and their resolution. In order to identify possibilities for agency, students will play several environmental games in which they will assume roles in the global economy, governmental and civil society to identify possibilities for agency. As a final project, students will describe a recent disaster identifying both structures that create environmental stresses and the options that might exist for structural changes. The project is intended to develop both critical thinking and communication skills.

Max Credits: 3  
Min Credits: 3

**48.240 Sociology of Gender**

Course ID: 5827

Course Details: This course is an interdisciplinary introduction to the field of gender studies. A variety of topics are presented, such as gender stratification, work and family, sexual identities, media representations of women and men, women's movement, and violence against women. Feminist theories and methods are also introduced.

Max Credits: 3  
Min Credits: 3

**48.245 Work, Labor & Society**

Course ID: 37377

Course Details: This foundational course has two overarching learning objectives: (1) to give students basic empirical knowledge and analytical tools to understand the context of work in the United States at the dawn of the twenty-first century and (2) to give students an understanding of how labor unions work, what has been their impact historically, and what their role is in contemporary society. Lowell and the Merrimack Valley will be used as a lens through which to examine these larger work and labor issues. The course will be explicitly interdisciplinary, drawing on readings from history, sociology, economics, political science, and psychology to offer an introduction to understanding work and labor through an analytic lens. In addition, the course will include a service-learning component in collaboration with the UML Labor Extension Program.

Max Credits: 3  
Min Credits: 3

**48.251 Community Service**

Course ID: 5830

Course Details: Course uses fieldwork approach to understand social problems and to discipline study and career pursuit in the area of public service.

Max Credits: 3  
Min Credits: 3

**48.255 Sociology of Deviance**

Course ID: 5831

Course Details: Analysis of how social institutions define and respond to various forms of social deviance, from individual mental illness to gang violence to illegal acts by governments and corporations. Attention will be paid to the construction and management of deviant identities, the role played by social status, and the social importance of institutions of social control.
48.256 Political Sociology

Course ID: 5832

Course Details: Focuses on the development and use of power in modern society. Emphasis is placed on the relationship of American political institutions to economic institutions, to social class, and to supporting ideologies.

Max Credits: 3
Min Credits: 3

48.276 Sociology of the Gun

Course ID: 5837

Course Details: This course examines the social impact of guns on the American psyche, from deer hunters and intergenerational family bonds to street gangs and broken families, from collectors and recreational users to hospital trauma. Self-defense issues are discussed within the context of the Second Amendment. The conflict between pro-gun and anti-gun special interest groups and the evolution of an American gun culture will be studied.

Max Credits: 3
Min Credits: 3

48.280 Drugs and Society

Course ID: 30844

Course Details: This course is designed to introduce students to the cultural and political qualities of drugs in society. The course provides a historical and cross-cultural overview of the use of organic and simple processed substances, as well as a history of drug policy in the United States.

Max Credits: 3
Min Credits: 3

48.303 Sociology of American Education

Course ID: 5840

Course Details: Course introduces students to ongoing debates in the field of Sociology regarding the American educational system, its structures and functions and how it relates to issues of inequality by race, class and gender. Students are expected to explore, examine and evaluate the current issues relating to the system of education in the United States.

Max Credits: 3
Min Credits: 3

48.305 Sociology of Family Law

Course ID: 5841

Course Details: Examines some social issues in family law, the changes therein, and the social climate and consequences accompanying these. By using the sociological method of inquiry to examine family law cases, the relationship between law and society as instruments of order and change are exemplified.

Max Credits: 3
Min Credits: 3

48.307 Sociology of Immigration

Course ID: 37721

Course Details: The United States is frequently described as a country with a proud history of immigration. As a result, citizens and residents of the U.S. often identify their home as a nation of people who make up a melting pot country. While
useful and insightful, the melting pot metaphor requires comparison with additional explanations of immigration and immigrant experiences. In order to provide deeper comprehension of the topic matter, this course offers sociological examination of immigration processes, laws, and debates. Three areas compose the main portion of class content: historical accounts and theories, legislation, and the social, economical, and political experiences of immigrants.

Max Credits: 3
Min Credits: 3

48.310 Ethnicity in Massachusetts

Course ID: 5844

Course Details: This is an interdisciplinary, distance learning course devoted to understanding specific ethnic groups in Massachusetts, their histories and cultures, and the economic and political realities of their lives as defined by themselves and others. Different groups are studied each year. Groups such as African American, Puerto Rican, Cambodian, Vietnamese, Wampanoag and Mi'skmag will be examined in relation to the topics listed above.

Max Credits: 3
Min Credits: 3

48.315 Public Sociology

Course ID: 33259

Course Details: Public sociology includes sociological initiatives targeting non-university audiences and serving the public good. This course will 1) introduce and critique the various conceptualizations of public sociology linking them to broad schools of sociological theory; 2) explore alternative field models and methods, preparing students for field projects in future semesters; and 3) expose students to sociological practitioners and practices compatible with the mission of the university and department. From a liberal arts perspective, the course stresses critical thinking and communication skills.

Max Credits: 3
Min Credits: 3

48.317 Sociology of Genocide

Course ID: 5846

Course Details: The deliberate destruction of an ethnic group is an historical event and a social process. This course addresses such questions as: Why do genocides occur? Why do people become genocide perpetrators? How do genocides affect survivors and their offspring? How can genocide be prevented? Focus is on Native American, Armenian and Jewish experiences and recent cases of ethnic cleansing.

Max Credits: 3
Min Credits: 3

48.321 Social Theory I

Course ID: 5848

Course Details: This course offers a critical examination of major classical sociological theories. It emphasizes the relationship between the individual and society and the competing pressures for social order and social conflict.

Max Credits: 3
Min Credits: 3

48.322 Social Theory II

Course ID: 5849

Course Details: This course offers a critical examination of major contemporary sociological theories, including critical theory, neo-Marxism, critical race theory, feminist theory, and postmodernism.

Max Credits: 3
Min Credits: 3
48.340 Sociology of Sports

Course ID: 5854

Course Details: Examines the history of modern sports at the amateur and professional levels and international competition. The impact of race, sex, economics, and politics on the institution of sports will also be examined.

Max Credits: 3
Min Credits: 3

48.341 Wealth, Status and Power

Course ID: 5855

Course Details: Focuses on the phenomenon of social class distinctions with particular emphasis on social class in America. The approach is both historical and sociological.

Max Credits: 3
Min Credits: 3

48.345 Urban Sociology

Course ID: 5856

Course Details: Deals with issues related to the quality of life in American cities. Students taking this course may engage in research projects on the city of Lowell and the role of the University of Massachusetts Lowell within that city.

Max Credits: 3
Min Credits: 3

48.351 The Sociology of Health and Health Care

Course ID: 5860

Course Details: With the passage of the Affordable Care Act, the U.S. Health Care system is undergoing a radical change as profound as any in U.S. history including those for minority and woman's rights. A large segment of the population has struggled to obtain even basic health care coverage. The changes taking place are analyzed in a historical and comparative context by examining health care in other countries. Special attention is given to understanding the professions in medicine and the role medical professions have had in shaping medical care. At the micro level, the course examines evolving health care provider/patient relationships to better understand the level of control patients can exert over their health care decisions.

Max Credits: 3
Min Credits: 3

48.355 Black Experience in American Life

Course ID: 5862

Course Details:
Max Credits: 3
Min Credits: 3

48.357 The Sociology of Religion

Course ID: 5863

Course Details: An investigation of religious institutions and experiences. Emphasis is placed on the influence of religion on social change.

Max Credits: 3
Min Credits: 3

48.360 Sociology of Non-Violence
Course ID: 5864
Course Details: An analysis of non-violent efforts to achieve social change through demonstrations, civil disobedience, etc. Movements led by Mahatma Gandhi, Martin Luther King, Jr., and others are examined.
Max Credits: 3
Min Credits: 3

48.361 Sociology of Law

Course ID: 5865
Course Details: The course examines the role of social forces in defining the law. Topics include the legal profession, white-collar crime, and the importance of race, class and gender in the criminal justice system.
Max Credits: 3
Min Credits: 3

48.362 Social Welfare Policy

Course ID: 30414
Course Details: The course examines the development of social welfare policy in the United States as well as alternative strategies for social welfare provision. Particular attention is paid to the role of race/ethnicity, class, and gender in the formation of social welfare policy.
Max Credits: 3
Min Credits: 3

48.371 Sociology of Work

Course ID: 5867
Course Details:
Max Credits: 3
Min Credits: 3

48.380 Sociology of Mass Media

Course ID: 33539
Course Details: Examines ownership and control patterns of electronic and print media and their impact on media content and censorship.
Max Credits: 3
Min Credits: 3

48.382 Social Movements

Course ID: 5868
Course Details: Considers organized action undertaken to alter the social position of a group. Organization, techniques of action, motivation of participants, and group ideologies are studied. Materials from historical, social, psychological, and sociological sources are used.
Max Credits: 3
Min Credits: 3

48.402 Research I Quan. Methods

Course ID: 5873
Course Details: An introduction to methods of social research, with emphasis on quantitative research methods. Presents
basic statistical techniques used in social research as well as the computer software used for analyzing social science data. For majors only.

Max Credits: 3
Min Credits: 3

48.403 Research II Qual. Methods

Course ID: 5874

Course Details: Qualitative research methods. Discusses various strategies employed by qualitative researchers with special emphasis on field research. For majors only.

Max Credits: 3
Min Credits: 3

48.404 Learning from the Field

Course ID: 5875

Course Details: Provides students with the opportunity to directly observe and participate in the operation of a social service organization.

Max Credits: 3
Min Credits: 3

48.405 Feminist Methodologies

Course ID: 34784

Course Details: Despite the recent growth of feminist methodologies, there is no one way of doing feminist methodologies. The growing body of literature in this area addresses the distinctive challenges and strengths of doing this research. Gender Studies scholars especially seek to question the framing of a study, managing of emotions, and ethical dilemmas. We will explore feminist strategies for creating, implementing, and analyzing a project that is grounded in the everyday lives of people while situating them in a social, political, and economic context. We will explore the interdisciplinary intersections where these challenges push at the boundaries of the disciplines of your major field of study. We will also investigate how to use a variety of qualitative approaches while doing a feminist project and the ways in which feminism can enlighten understandings of "traditional" qualitative methods.

Max Credits: 3
Min Credits: 3

48.421 Seminar on the Family

Course ID: 5877

Course Details: Study of the family structures and gender roles in various human societies. Prerequisites: 48.101 plus either 48.231 or 48.241.

Max Credits: 3
Min Credits: 3

48.469 Seminar on Global Society

Course ID: 5882

Course Details: Considers the spread of industrial society globally. Emphasizes economic, political and cultural changes in various parts of the world and in the USA.

Max Credits: 3
Min Credits: 3

48.484 Industry Internship I

Course ID: 5890
Course Details:
Max Credits: 3
Min Credits: 1

48.491 Directed Studies in Sociology

Course ID: 5892

Course Details: The student, through regular and frequent consultation with an instructor, develops a course of directed reading in sociology and defines a problem for individual research. Prerequisite: permission of instructor.

Max Credits: 3
Min Credits: 3

48.492 Directed Studies: Sociology

Course ID: 5893

Course Details: A one-credit, short course available only to qualified seniors. Prerequisite: Permission of Department Chairperson.

Max Credits: 1
Min Credits: 1

48.495 Thesis in Sociology

Course ID: 5894

Course Details: A program of study which affords the advanced student with an additional opportunity to pursue a previously explored problem in greater depth or to initiate a new study. The purpose is to sharpen and refine techniques for scholarly research and presentation in the student's major discipline. Prerequisites: demonstrated proficiency in an area selected for directed study and permission of instructor.

Max Credits: 3
Min Credits: 3

48.496 Practicum Experience

Course ID: 5895

Course Details: A program of on-campus and/or off-campus experience for sociology majors and minors only. Specific requirements vary depending upon department policies and the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a community, social, cultural, or artistic area and for applying techniques of problem solving and/or skills that are appropriate to the student's major discipline. May be repeated to a maximum of six credits. Students are graded satisfactory and unsatisfactory. The practicum experiences may not be substituted for a required course in the major. Prerequisite: permission of Chairperson.

Max Credits: 3
Min Credits: 3

49.201 Economics I (Microeconomics)

Course ID: 5897

Course Details: Studies the principles of production and exchange. An introduction to demand, supply, pricing, and output under alternative market structures. Derived demand and resource markets are introduced.

Max Credits: 3
Min Credits: 3

49.202 Economics II (Macroeconomics)

Course ID: 5898
Course Details: Studies the principles governing the level of national income and employment. Also examines the commercial banking system, monetary and fiscal policy, the international economy, and alternative economic systems.

Max Credits: 3
Min Credits: 3

49.211 Statistics for Business and Economics I

Course ID: 5901

Course Details: Presents descriptive statistics, sophisticated counting techniques and other components of probability, simple random variables and their distribution, bivariate functions, sampling theory properties of estimators.

Max Credits: 3
Min Credits: 3

49.212 Statistics for Business and Economics II

Course ID: 5902

Course Details: Discusses interval estimation, hypothesis testing, analysis of variance, applied regression theory, correlation analysis, and other selected topics.

Max Credits: 3
Min Credits: 3

49.302 Labor Economics

Course ID: 5904

Course Details: An introduction to the economic analysis of behaviors and institutions in the labor market: labor supply and participation, labor demand by firms, wage determination under different institutional settings, and gender, race or ethnicity as determinants of different labor market outcomes. The course presents microeconomic models, empirical findings and their public policy implications on topics such as minimum wage, affirmative action, social insurance programs, workplace safety, and subsidized day care. Prerequisites: 49.201 or instructor's approval.

Max Credits: 3
Min Credits: 3

49.303 Microeconomic Theory

Course ID: 5905

Course Details: Provides an advanced examination of price and production theory and the theory of the consumer and the firm.

Max Credits: 3
Min Credits: 3

49.304 Macroeconomic Theory

Course ID: 5906

Course Details: An analysis of Keynesian and post-Keynesian theory. National income accounts, monetary and fiscal policy, and econometric models.

Max Credits: 3
Min Credits: 3

49.312 Managerial Economics

Course ID: 5911

Course Details: Applies the economic theory and statistical methods to business decision making. Estimation of demand,
production, cost functions and accompanying elasticity estimates, pricing and output decisions, value maximization problems, and capital budgeting.

Max Credits: 3
Min Credits: 3

49.315 Introduction to Environmental Economics

Course ID: 5913

Course Details: This is a renumbering of an existing course, 49.315. The renumbering to the 400 level is to allow Masters students in programs with environmental content to take this course for credit with their advisor's approval. This course introduces students to the economic and policy aspects of environmental quality and natural resource issues. Simple and complex models are used to blend economic theory with environmental facts. Students will learn to derive policy insights from theoretical constructs. The primary objective is to show how the basic principles in economics can play a valuable role in analyzing and evaluating critical environmental issues and help in determining policy guidelines. Standard benefit cost or efficiency criteria will be applied to a wide variety of environmental issues.

Max Credits: 3
Min Credits: 3

49.316 Investments: Instruments and Strategies

Course ID: 36846

Course Details: In this course we will look at different types of investments, from stocks, bonds and real estate to mutual funds, hedge funds and derivatives exploring how and when to use them. Students will create a diversified investment portfolio using an online trading program that incorporates products covered in class. In addition we will look at how different exchanges operate and the role of financial investments in real capital accumulation and rising living standards.

Max Credits: 3
Min Credits: 3

49.317 Capital Markets

Course ID: 5914


Max Credits: 3
Min Credits: 3

49.318 Financial Markets and Monetary Policy

Course ID: 5915

Course Details: The economics of financial intermediation and central bank monetary policy. Evaluation of global financial markets, financial deregulation, bank failures and financial stability, determinants of the level and term structure of interest rates, and the impacts of monetary policy changes on overall levels of output, employment and prices are topics analyzed in this course.

Max Credits: 3
Min Credits: 3

49.319 Public Finance

Course ID: 5916

Course Details: The economics of the public sector. Principles of public expenditure, taxation, and the public debt applied to federal, state, and local governments.

Max Credits: 3
Min Credits: 3
49.325 United States Economic History

Course ID: 5921

Course Details: The evolution of institutions and their functions, and sources of economic development. The contributions of railroads, agricultural population growth, immigration, capital formation and technological progress to economic development. Other areas addressed: rapid industrialization and antitrust laws; evolution of financial institutions, the creation of the Federal Reserve System, crash of 1929, the depression of the 1930s, the New Deal and various banking acts, the labor movement, the growth of international trade.

Max Credits: 3
Min Credits: 3

49.345 Health Economics

Course ID: 5926

Course Details: An introduction to the economic analysis of health care market. The course presents microeconomic models, empirical findings and public policies referring to the following topics: the production and demand for health (the investment/consumption aspects of health and the relationship between socio economic status and health status), the issues of moral hazard and adverse selection in the insurance market, the role of information in the physician-patient relationship, the different regulation and payment systems for providers, the Medicare and Medicaid programs, and the comparisons between the US system and the health systems of other western economies and developing countries. This class aims to help students becoming more informed future citizens and consumers or producers of healthcare. Prerequisites: 49.201 or instructor's approval.

Max Credits: 3
Min Credits: 3

49.401 Special Topics in Economics

Course ID: 33036

Course Details: Special Topics in Economics is a course for advanced undergraduates in Economics. The content will vary from semester to semester depending on the research interests of the Faculty member teaching the course.

Max Credits: 3
Min Credits: 3

49.403 International Trade Theory

Course ID: 5928

Course Details: The classical and modern theories. International payments, exchange and trade controls, and international trade policy determinants. Prerequisites: 49.201, 49.202.

Max Credits: 3
Min Credits: 3

49.407 Econometrics

Course ID: 5931

Course Details:

Max Credits: 3
Min Credits: 3

49.410 Economic Growth and Development

Course ID: 33657

Course Details: In this course, we try to solve the puzzles of why some countries are so rich and some are so poor and why some countries grow so quickly and some grow so slowly. After introducing the basic analytical framework, we will investigate various possible reasons in explaining the observed country differences. Those possible explanations include
differences in countries' investment rates, population growth rates, human capital accumulation rates, production technologies, openness to international trade, and government policies. Issues of income inequality and their effect on economic growth will also be addressed. This course is designed for Economics majors or minors who have fulfilled the following prerequisites, and master level students from other departments, such as the Regional Economic and Social Development Department. Pre-req: 49.201 Economics I (Microeconomics) 49.202 Economics II (Macroeconomics)

Max Credits: 3
Min Credits: 3

49.485 Internship in Economics

Course ID: 5938

Course Details:

Max Credits: 3
Min Credits: 3

49.499 Independent Studies

Course ID: 5940

Course Details: A course to permit the advanced student to do research in topics of special interest in economics under faculty supervision. This course also may be utilized to offer topics to individual students where there are insufficient number of registrants for a regular class. Restricted to Economics majors.

Max Credits: 3
Min Credits: 3

50.101 French 1 and Culture

Course ID: 5949

Course Details: Develops French speaking, listening, reading and writing skills through the discovery of French and Francophone culture in a communicative approach (instruction occurs in French with clarification in English). This class is the 1st of the 4-course French language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

50.102 French 2 and Culture

Course ID: 5950

Course Details: Continuation of French 1 and Culture (or equivalent), which is a pre-requisite. Strengthens French speaking, listening, reading and writing skills acquired in French 1 and Culture through the discovery of French and Francophone culture in a communicative approach (instruction occurs in French with some clarification in English). This class is the 2nd of the 4-course French language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

50.211 French 3 and Culture

Course ID: 5952

Course Details: Enhances the four skills acquired in French 2 and Culture (or equivalent), which is a pre-requisite: speaking, listening, reading and writing through the discovery of French and Francophone culture in a communicative approach (instruction occurs in French with minimal use of English). This class is the 3rd of the 4-course French language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3
50.212 French 4 and Culture

Course ID: 5953

Course Details: This course has French 3 and Culture (or equivalent) as a pre-requisite and is the 4th and last of the 4-course French language program offered at UML. The course strengthens the four skills acquired in prior levels. It emphasizes increased accuracy and depth of students' abilities and knowledge of French and Francophone culture and language in a communicative approach (instruction occurs in French with almost no use of English). Students express themselves orally and in writing at the national standards level of high-intermediate and understand key-concepts when spoken clearly at native speed.

Max Credits: 3
Min Credits: 3

50.301 Survey of French Literature

Course ID: 5962

Course Details: A panoramic survey of French Literature based on the history and civilization of France from the Middle Ages to the XXth (20th) Century, through readings in the original French language of excerpts from milestone novels, theater and poetry. Class conducted in French.

Max Credits: 3
Min Credits: 3

50.302 Survey of Francophone Literature

Course ID: 5963

Course Details: A survey of contemporary Francophone Literature of African, European, and North American French speaking countries since 1960 until today.

Max Credits: 3
Min Credits: 3

50.310 French Speaking World

Course ID: 5964

Course Details: Designed for prospective majors and minors in French as well as for those who have completed four years of high school or two years of college French. The course examines similarities and differences in the ethos of nations of the French-speaking world and in the life-styles of the individuals and groups that make them up. Conducted in French.

Max Credits: 3
Min Credits: 3

50.315 Francophone Community in North America

Course ID: 5965

Course Details: This course introduces the concept of "Francophonie" and describes the origins of the main francophone communities left in North America: Quebec, Acadia and New-Fundland in Canada, and Louisiana and New England (including Lowell) in the U.S. The primary focus of this class is Culture, history and language (different varieties of French spoken by those communities). Class conducted in French.

Max Credits: 3
Min Credits: 3

50.320 Contemporary French Civilization and Culture

Course ID: 5966

Course Details: In this course we look closely at some fundamental issues reflecting the rapidly changing parameters of French culture and society today; the question of national identity and cultural hybridity, the relationship between the evolving types of family relations and new forms of social and political contracts; the crucial personal problems faced by the young,
the poor, the immigrant and the elderly in an increasingly multicultural Hexagone attempting to define its place, role and function within the recently defined Europe unit and the new global world order; the current status of women; the relationship between cities and ghettos, violence and crime; the nature of emerging forms of cultural production within new trends and styles of modernite.

Max Credits: 3
Min Credits: 3

**50.340 Contemporary French Cinema**

Course ID: 5968

Course Details: Provides a critical appreciation of contemporary French cinema (1985-today) aiming at sorting out its eclecticism and focusing on the following aspects: 1) French cultural exception in the European Union: cultural integration and national identity; 2) Representation of the ongoing social and moral changes in contemporary France; 3) The new generation of French filmmakers. Class taught in French.

Max Credits: 3
Min Credits: 3

**50.346 Advanced French Conversation**

Course ID: 5969

Course Details: Advanced oral practice in rapid and idiomatic speech. Topics of contemporary significance are selected from contemporary prose.

Max Credits: 3
Min Credits: 3

**50.348 Advanced French Conversation and Composition**

Course ID: 5970

Course Details: Designed to improve and reinforce proficiency in spoken and written French through regular exercises of oral communication and free composition, through the analysis of literary texts and authentic written and oral materials. Taught in French.

Max Credits: 3
Min Credits: 3

**50.376 French Cinema & Society**

Course ID: 5973

Course Details: Covers the dramatic presentation French society gives of itself during the period of profound social and economic change, from the New Wave and the May 68 events to today's younger generation facing an uncertain tomorrow. Each screening (in French with subtitles) is preceded by an introduction placing the film in its historical context. In English.

Max Credits: 3
Min Credits: 3

**50.380 Francophone Identity through Cinema**

Course ID: 5975

Course Details: Provides a critical appreciation of the notion of Francophone identity through modern and contemporary (1970-today) Francophone cinema from diverse places such as but not limited to North Africa, West Africa (especially Senegal), Canada (especially Quebec) the Caribbean, Belgium, and Switzerland. The course is aiming at showing the evolution of the Francophone identity in the postcolonial period until now and is focusing on the following aspects: 1) The emergence and importance of postcolonial Francophone cinema in the 1970s as a "cinema engage" (especially Sembene Ousmane in Senegal); 2) Contemporary issues of the postcolonial Francophone societies through films; 3) Representations of the cultural diversity in Francophone films; 4) Identity, race and immigration, women's status issues.

Max Credits: 3
**50.491 Directed Studies in French Literature**

Course ID: 5983

Course Details: Individual research projects in French literature. Students, through regular and frequent consultation with their instructor, develop a course of directed study in French literature and define a problem for individual research. The student's findings are presented in a paper of significant proportions.

Max Credits: 3
Min Credits: 3

**50.492 Directed Studies French Composition**

Course ID: 5984

Course Details: Students, through regular and frequent consultation with their instructor, pursue a special program of composition or creative expression.

Max Credits: 3
Min Credits: 3

**50.495 Advanced French Tutorial**

Course ID: 5985

Course Details: A program of directed study which affords the advanced student with an additional opportunity to pursue a previously explored problem in greater depth or to initiate a new problem. The purpose of the course is to sharpen and refine techniques for scholarly research, presentation and creative expression.

Max Credits: 3
Min Credits: 3

**50.496 French Practicum Experience**

Course ID: 5986

Course Details: A program of on-campus and/or off-campus experiences (for French and Modern Language Majors only). Specific requirements vary depending upon faculty policies and the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a community, social, cultural, or artistic area and for applying techniques of problem solving and/or skills which are appropriate to the student's major discipline. May be repeated for a maximum of nine credits. Students are graded "satisfactory" or "unsatisfactory". The practicum experience may not be substituted for a required course in the major.

Max Credits: 3
Min Credits: 3

**51.101 German 1 and Culture**

Course ID: 5988

Course Details: Develops German speaking, listening, reading and writing skills through the discovery of the culture of German speaking countries in a communicative approach (instruction occurs in German with clarification in English). This class is the 1st of the 4-course German language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

**51.102 German 2 and Culture**

Course ID: 5989

Course Details: Continuation of German 1 and Culture (or equivalent), which is a pre-requisite. Strengthens German
speaking, listening, reading and writing skills acquired in German 1 and Culture through the discovery of the culture of German speaking countries in a communicative approach (instruction occurs in German with some clarification in English). This class is the 2nd of the 4-course German language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

**51.211 German 3 and Culture**

Course ID: 5992
Course Details: Enhances the four skills acquired in German 2 and Culture (or equivalent), which is a pre-requisite: speaking, listening, reading and writing through the discovery of the culture of German speaking countries in a communicative approach (instruction occurs in German with minimal use of English). This class is the 3rd of the 4-course German language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

**51.212 German 4 and Culture**

Course ID: 5993
Course Details: This course has German 3 and Culture (or equivalent) as a pre-requisite and is the 4th and last of the 4-course German language program offered at UML. The course strengthens the four skill acquired in prior levels. It emphasizes increased accuracy and depth of students' abilities and knowledge of the culture of German speaking countries in a communicative approach (instruction occurs in German with almost no use of English). Students express themselves orally and in writing at the national standards level of high-intermediate and understand key-concepts when spoken clearly at native speed.

Max Credits: 3
Min Credits: 3

**51.492 Directed Study in German Composition**

Course ID: 6002
Course Details: Individual research projects for modern language majors. Students, through regular and frequent consultation with their instructor, develop a course of directed study in literature and culture and define a subject for individual research. The student's findings are represented in a paper of significant proportion.

Max Credits: 3
Min Credits: 3

**51.495 Advanced German Tutorial**

Course ID: 6003
Course Details: A program of directed study which affords Modern Language majors an additional opportunity to pursue a previously explored topic in greater depth or to initiate an additional topic. The purpose of this tutorial is to sharpen and refine techniques of scholarly research, presentation and creative expression.

Max Credits: 3
Min Credits: 3

**52.101 Italian 1 and Culture**

Course ID: 6005
Course Details: Develops Italian speaking, listening, reading and writing skills through the discovery of the culture of Italian speaking countries in a communicative approach (instruction occurs in Italian with clarification in English). This class is the 1st of the 4-course Italian language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
52.102 Italian 2 and Culture

Course Details: Continuation of Italian 1 and Culture (or equivalent), which is a pre-requisite. Strengthens Italian speaking, listening, reading and writing skills acquired in Italian 1 and Culture through the discovery of the culture of Italian speaking countries in a communicative approach (instruction occurs in Italian with some clarification in English). This class is the 2nd of the 4-course Italian language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

52.211 Italian 3 and Culture

Course Details: Enhances the four skills acquired in Italian 2 and Culture (or equivalent), which is a pre-requisite: speaking, listening, reading and writing through the discovery of the culture of Italian speaking countries in a communicative approach (instruction occurs in Italian with minimal use of English). This class is the 3rd of the 4-course Italian language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

52.212 Italian 4 and Culture

Course Details: This course has Italian 3 and Culture (or equivalent) as a pre-requisite and is the 4th and last of the 4-course Italian language program offered at UML. The course strengthens the four skill acquired in prior levels. It emphasizes increased accuracy and depth of students’ abilities and knowledge of the culture of Italian speaking countries in a communicative approach (instruction occurs in Italian with almost no use of English). Students express themselves orally and in writing at the national standards level of high-intermediate and understand key-concepts when spoken clearly at native speed.

Max Credits: 3
Min Credits: 3

52.315 Islam and Medieval Europe

Course Details:

Max Credits: 3
Min Credits: 3

52.325 Italian American Literature and Culture

Course Details: Discusses the most prominent authors and works of Italian-American Literature as they, by using the ethnic setting, are able to convey universal human concerns and themes. The discussion on Italian-American ethnic issues will include such films as The Godfather, Moonstruck, The Sicilian, Goodfellas, and The Untouchables. Conducted in English.

Max Credits: 3
Min Credits: 3

52.330 Italian Women Writers

Course Details: Studies women writers of Italy by giving attention to the genres of narrative, poetry, theater and
autobiography. Authors are selected according to their impact on issues affecting women, gender studies, feminism, avant-garde, modernism, social relations and psychological discourse. Conducted in English.

Max Credits: 3
Min Credits: 3

52.373 Italian Humanism

Course ID: 6022

Course Details: A study of the waning of the Middle Ages and the dawning of the Renaissance as seen through the work of Petrarch and Boccaccio. Emphasis is on the study of sources and the influence of Petrarch and Boccaccio upon the literatures of western Europe. Conducted in English.

Max Credits: 3
Min Credits: 3

52.378 Italian Cinema and Culture

Course ID: 6025

Course Details: A guide to contemporary Italian studies through literary and cultural approaches. The works of central figures in contemporary Italian letters are examined in view of their impact on Italian life. Emphasis is given to poets, novelists, the new cinema, the influences of existentialism, and the impact of America on Italian literature. Conducted in Italian/English.

Max Credits: 3
Min Credits: 3

52.491 Directed Study in Italian Literature

Course ID: 6027

Course Details: Individual research projects for modern language majors. Students, through regular and frequent consultation with their instructor, develop a course of directed study in Italian literature and define a subject for individual research. The student’s findings are presented in a paper of significant proportions.

Max Credits: 3
Min Credits: 3

52.492 Directed Studies Italian Composition

Course ID: 6028

Course Details: Individual research projects for modern language majors. Students, through regular and frequent consultation with their instructor, pursue a special topic of composition or creative expression.

Max Credits: 3
Min Credits: 3

52.495 Advanced Italian Tutorial

Course ID: 6029

Course Details:

Max Credits: 3
Min Credits: 3

52.496 Italian Practicum Experience

Course ID: 6030

Course Details:

Max Credits: 3
Min Credits: 3

53.105 Chinese 1 and Culture

Course ID: 6035

Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 105, 106 and 205, 206 levels must be elected in the prescribed sequence.

Max Credits: 3

Min Credits: 3

53.106 Chinese 2 and Culture

Course ID: 6036

Course Details: Continuation of 53.105 Chinese 1 and Culture. Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 103, 104 and 205, 206 levels must be elected in the prescribed sequence.

Max Credits: 3

Min Credits: 3

53.108 Business Chinese I and Culture

Course ID: 37490

Course Details: This introductory language and culture course prepares non-Chinese speakers for potential future business engagements either in China or with Chinese speakers in the United States. Effective communication and cultural competency in standard/Mandarin Chinese are emphasized. Students will be exposed to various aspects of Chinese culture appropriate for informal as well as business social settings. Topics include, but are not limited to, self-introduction, traveling, lodging, dining, shopping, banking, seeing a doctor, making friends, and doing business. Authentic language materials (vocabulary, Pinyin, sentence structures, conversations) are presented and taught in a second language acquisition environment with interactive activities that are relevant to proper social etiquette.

Max Credits: 3

Min Credits: 3

53.109 Business Chinese II

Course ID: 37754

Course Details: This language and culture course is a continuation of Business Chinese I. The course prepares non-Chinese speakers for potential future business engagements either in China or with Chinese speakers in the United States. Effective communication and cultural competency in standard/Mandarin Chinese are emphasized. Students will be exposed to various aspects of Chinese culture appropriate for informal as well as business social settings. Topics include, but are not limited to, self-introduction, traveling, lodging, dining, shopping, banking, seeing a doctor, making friends, and doing business. Authentic language materials (vocabulary, Pinyin, sentence structures, conversations) are presented and taught in a second language acquisition environment with interactive activities that are relevant to proper social etiquette.

Max Credits: 3

Min Credits: 3

53.115 Arabic 1 and Culture

Course ID: 6042

Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 115, 116 and 215, 216 levels must be elected in the prescribed sequence.

Max Credits: 3

Min Credits: 3
53.116 Arabic 2 and Culture
Course ID: 6043
Course Details: This course is for students who have completed 53.115 Arabic 1 and Culture. Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 115, 116 and 215, 216 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.135 Cambodian 1 and Culture
Course ID: 6044
Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 135, 136 and 235, 236 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.136 Cambodian 2 and Culture
Course ID: 33186
Course Details: This course continues the oral practice, reading, writing, grammar and cultural studies begun in 53.135. Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 135, 136 and 235, 236 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.205 Chinese 3 and Culture
Course ID: 6049
Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 105, 106 and 205, 206 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.215 Arabic 3 and Culture
Course ID: 6057
Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 117, 118 and 215, 217 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.216 Arabic 4 and Culture
Course ID: 32067
Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 115, 116 and 215, 216 levels must be elected in the prescribed sequence.
Max Credits: 3
53.235 Cambodian 3 and Culture
Course ID: 32059
Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 135, 136 and 235, 236 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.236 Cambodian 4 and Culture
Course ID: 32060
Course Details: This course is a continuation of 53.235 Cambodian 3 and Culture, which is a pre-requisite. Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 135, 136 and 235, 236 levels must be elected in the prescribed sequence.
Max Credits: 3
Min Credits: 3

53.300 Modern Chinese Literature and Culture
Course ID: 37524
Course Details: This course offers an insight into Chinese culture and society by examining different genres of modern and contemporary Chinese Literature -- the novel, poetry, essay, and drama -- since the early Twentieth Century. Readings in English translations of representative works by major writers/essayists/poets/playwrights will be complemented by selected feature films and documentaries. The survey of Chinese literature will be put in the context of a series of sociopolitical changes in China that informed the production of these works.
Max Credits: 3
Min Credits: 3

53.490 Directed Study in Chinese Culture
Course ID: 37627
Course Details: Students through regular consultation with the Instructor develop a course of directed study or independent study in Chinese Culture. Students findings are presented in a paper of significant proportion.
Max Credits: 3
Min Credits: 3

53.495 Advanced Tutorial in Chinese Culture
Course ID: 37628
Course Details: A program of directed study to give an opportunity to a student to explore problems in Chinese Culture in greater depth or to initiate additional problems in Chinese Culture.
Max Credits: 3
Min Credits: 3

54.101 Spanish 1 and Culture
Course ID: 6061
Course Details: Develops Spanish speaking, listening, reading and writing skills through the discovery of the culture of Spanish speaking countries in a communicative approach (instruction occurs in Spanish with clarification in English). This class is the 1st of the 4-course Spanish language program offered at UML. Language courses are sequential and must be taken accordingly.
Max Credits: 3
Min Credits: 3

54.102 Spanish 2 and Culture

Course ID: 6062

Course Details: Continuation of Spanish 1 and Culture (or equivalent), which is a pre-requisite. Strengthens Spanish speaking, listening, reading and writing skills acquired in Spanish 1 and Culture through the discovery of the culture of Spanish speaking countries in a communicative approach (instruction occurs in Spanish with some clarification in English). This class is the 2nd of the 4-course Spanish language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

54.103 Medical Spanish

Course ID: 36649

Course Details: This course is designed to develop basic conversational skills necessary to communicate with patients in a health care setting. Students will acquire a basic linguistic and cultural foundation enabling them to interview and manage patients in clinical settings using Spanish; to take a history and perform a physical exam using Spanish, and to interpret health concerns of Spanish-speaking populations. The course is designed for health care professionals.

Max Credits: 3
Min Credits: 3

54.211 Spanish 3 and Culture

Course ID: 6065

Course Details: Enhances the four skills acquired in Spanish 2 and Culture (or equivalent), which is a pre-requisite: speaking, listening, reading and writing through the discovery of the culture of Spanish speaking countries in a communicative approach (instruction occurs in Spanish with minimal use of English). This class is the 3rd of the 4-course Spanish language program offered at UML. Language courses are sequential and must be taken accordingly.

Max Credits: 3
Min Credits: 3

54.212 Spanish 4 and Culture

Course ID: 6066

Course Details: This course has Spanish 3 and Culture (or equivalent) as a pre-requisite and is the 4th and last of the 4-course Spanish language program offered at UML. The course strengthens the four skill acquired in prior levels. It emphasizes increased accuracy and depth of students' abilities and knowledge of the culture of Spanish speaking countries in a communicative approach (instruction occurs in Spanish with almost no use of English). Students express themselves orally and in writing at the national standards level of high-intermediate and understand key-concepts when spoken clearly at native speed.

Max Credits: 3
Min Credits: 3

54.301 Introduction to Spanish Literature

Course ID: 6075

Course Details: Studies the history of Spain's literature in its general trends and through its major writers revealing the complicated series of interactions, conflict, and influences which have molded the unique character of the nation. Conducted in Spanish.

Max Credits: 3
Min Credits: 3
54.303 Introduction to Latin American Literature and Culture II
Course ID: 6077
Course Details: A continuation of 53.302, Latin American Literature and Culture I. Conducted in Spanish
Max Credits: 3
Min Credits: 3

54.310 Spanish Civilization and Culture
Course ID: 6078
Course Details: Considers Spanish culture and civilization up to the present. Through audiovisual aids, current newspapers and selected readings, the student will explore the Spanish way of being, thinking, and living. Emphasis is placed on the main contributions of Spain to the Western world.
Max Credits: 3
Min Credits: 3

54.313 Fieldwork in the Spanish Community
Course ID: 6079
Course Details: Involves individual assignments under the sponsorship of local service agencies servicing the Spanish-speaking community involving individual family and group contact. Written and oral reports will be in Spanish.
Max Credits: 3
Min Credits: 3

54.315 Latin American Civilization and Culture
Course ID: 6080
Course Details: Considers significant intellectual, artistic, historical, and sociopolitical aspects of Latin America from the beginning of its history. Through audiovisual aids and selected readings, the student will explore the Latin American way of being and expressing.
Max Credits: 3
Min Credits: 3

54.320 Special Topics in Spanish Studies
Course ID: 6081
Course Details: Focuses on a limited topic of special interest in culture, civilization, or literature. May be taught in English or in Spanish. Course content and approach will vary depending on instructor.
Max Credits: 3
Min Credits: 3

54.330 Spanish and Latin-American Women Writers
Course ID: 6082
Course Details: Studies women writers of the Spanish speaking world. Emphasis is given to their contribution to the development of Spanish literature and culture as well as their vision of the world and their concerns for the rights of women and humanity. Conducted in Spanish only.
Max Credits: 3
Min Credits: 3

54.347 Advanced Spanish Conversation
Course ID: 6087

Course Details: The course aims at developing advanced oral proficiency in rapid idiomatic speech. Topics of contemporary significance are selected for discussions. Required for Spanish Majors.

Max Credits: 3
Min Credits: 3

54.351 Latin American Theater

Course ID: 6089

Course Details: Examines Latin American theatrical works as forms of socially accepted resistance and politically charged art forms. The course will consider plays and performances that challenge governments, inequities, and the status quo. In this course, students will study a variety of Latin American plays, as well as performances and political acts that explore these issues.

Max Credits: 3
Min Credits: 3

54.371 Hispanic Literature & Film

Course ID: 6090

Course Details:

Max Credits: 3
Min Credits: 3

54.401 Spanish Selected Authors

Course ID: 6093

Course Details: Presents an intensive study of the works by a few Spanish and/or Latin American authors.

Max Credits: 3
Min Credits: 3

54.409 Twentieth Century Spanish Literature

Course ID: 6098

Course Details: Studies the famous generation of 1927 and the major literary trends during and after the Spanish Civil War.

Max Credits: 3
Min Credits: 3

54.410 Realism and the Nineteenth Century Spanish Novel

Course ID: 6099

Course Details: Offers a study of fundamental aspects of life, thought, land itself and its sense of history as reflected in the literary masterpieces of Valera, Galdos, Alarcon, Pereda, and others. An analysis of the literary techniques and fiction of the Realism will be included.

Max Credits: 3
Min Credits: 3

54.416 The Latin American Novel

Course ID: 6102

Course Details: A study of the development of the Latin American novel. Three major works of Latin American short story writers such as Borges, Cortazar, Marquez, Rulfo.
Max Credits: 3
Min Credits: 3

54.491 Directed Studies in Spanish Literature
Course ID: 6105
Course Details:
Max Credits: 3
Min Credits: 3

54.492 Directed Study in Latin America
Course ID: 6106
Course Details:
Max Credits: 3
Min Credits: 3

54.493 Directed Studies in Spanish Composition
Course ID: 6107
Course Details: Students, through regular and frequent consultation with their instructor, pursue a special program of composition or creative expression.
Max Credits: 3
Min Credits: 3

54.496 Spanish Practicum Experience
Course ID: 6109
Course Details: A program of on-campus and/or off-campus experiences for Spanish or Modern Language majors only. Specific requirements vary depending upon faculty policies and the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a community, social, cultural, or artistic area and for applying techniques of problem solving and/or skills which are appropriate to the student's major discipline. May be repeated for a maximum of nine credits. Students are graded satisfactory, or unsatisfactory. The practicum experience may not be substituted for a required course in the major.
Max Credits: 3
Min Credits: 3

56.320 Special Topics in Latin Study
Course ID: 6128
Course Details: Depends on faculty and student interests associated with Latin literature, composition and culture.
Max Credits: 3
Min Credits: 3

57.201 Regions: Merrimack Valley
Course ID: 6132
Course Details: The ways people produce, distribute, and consume the world's resources profoundly influence the problems we experience in this and other regions of the world. Problems occur most particularly in the areas of work, community, and environment. The goal of this interdisciplinary course is to explore such regional problems and possible solutions within national and global contexts, as well as historical. In the area of work, we will discuss what is necessary to create good jobs, characterized by decent pay and benefits, worker involvement in decision making, and healthy workplaces free from discrimination. In the area of community, we will address such things as patterns of immigration and the interactions between community stability and institutions such as education, family, political leadership, and religion. In the area of environment, we
will explore issues surrounding the reduction of pollution that infects our communities and living spaces (e.g., the tradeoff between environmental improvement and economic growth). The course will stress experiential learning (via field trips and small group activities) and will include films as well as readings and presentations from various disciplines. (General Education Course (BS))

Max Credits: 3
Min Credits: 3

57.211 Sustainable Development

Course ID: 6134

Course Details: This course examines workplace and regional factors that shape the prospects for sustainable prosperity and worker and community empowerment. The course begins by reviewing recent trends in the distribution of income and wealth and the industrial structure of the New England economy. The historical dynamics shaping work organization and regional development are examined. Several industry case studies are selected because of their importance to the regional and national economy. The case studies provide focus for studying the strategic choices made by firms in mature industries and newly emerging regions; the basis of competitive advantage for Japanese firms and the response of American rivals; and the influence of the product cycle and regional institutions on capture or retention of emerging and mature industries. The final section of the course focuses on the prospects for sustainability of the organization of production and its environmental impact, incentives for skill development and technological innovation, and shared prosperity. A central course objective is to foster an understanding of the links between the workplace and region in the pursuit of sustainable development and shared prosperity.

Max Credits: 3
Min Credits: 3

57.220 Designing the Future World

Course ID: 33440

Course Details: All purposeful human activity involves design. Every day we are surrounded by the products of design processes—buildings, cars, entertainment, corporations, schools, even laws and regulations. They make our lives easier in many ways, but they may also create significant social and environmental problems. In the past, designers often did not consider the impact of their designs on society, or ignored the negative consequences. Our culture and legal system usually permitted, or even encouraged, this irresponsibility. Today, a small group of scholars, businessmen and women, and activists are rethinking how we design the things around us, with the goal of addressing the most pressing social and environmental issues. This class will introduce students to some of these issues, the people who are confronting them, and the ways in which all of us can contribute to designing a better Future World. With a series of hands on projects, coupled with readings and other resources, students will work to design aspects of the future. In the process you will learn about possible solutions to complex, important problems, but also learn valuable life skills such as problem framing, problem solving, critical thinking, active learning, communication, and simple construction methods. No previous experience is required-only curiosity and eagerness to learn.

Max Credits: 3
Min Credits: 3

57.408 The Budget as a Policy, Planning and Information Tool

Course ID: 33622

Course Details: In simple terms, an organization’s budget is its financial plan of operations based on expected income and anticipated expenses for a given period. The budget involves the priority ranking of desired ends and the selection of means to reach those ends in an environment of competing demands and limited resources. Budgeting is an ongoing process of gathering information, applying that information to the allocation of scarce resources as well as to the evaluation of the achievement of desired ends. The budget is also a policy document used to both communicate organizational goals and to promote their realization. This course will examine the various forms financial plans can take in local government entities and not-for-profit organizations. It will focus on the budget as a policy, planning and information tool for managing practitioners. It will begin with an overview of the legal, procedural and practical framework of budgeting in the public and nongovernmental organization (NGO) sectors, examine closely the applications of the various stages of the budget process, delve into modern strategic program management and conclude with case studies of both a municipal jurisdiction and a regional community action agency.

Max Credits: 3
Min Credits: 3

57.420 Gender, Work and Public Policy
Course ID: 33616

Course Details: This seminar course, "Gender, Work and Public Policy" will explore the relationship between human rights, gender and work issues in the 21st century. We will examine how current and future reality can be shaped by related public policies. Today we live in a period of global transition comparable to the period that followed the Industrial Revolution. It presents us with enormous challenges and opportunities regarding factors we will address in class: economic globalization, government restructuring, work-family balancing, environmental safety at work, gender inequalities and the connection between human rights and dignity at work. We will especially look at public policies that can either impede or advance better overall equality of work-life and family life.

Max Credits: 3
Min Credits: 3

57.475 Community Conflict Resolution

Course ID: 6173

Course Details: This course gives students an understanding of the main issues and solutions involved in community level conflict resolution; e.g., in neighborhoods, workplaces, and other institutions. It develops students' skills in practicing conflict resolution and/or evaluating programs in the field of dispute resolution. It is important to understand why conflict happens and how to resolve conflict.

Max Credits: 3
Min Credits: 3

57.491 Directed Studies: Regional Economic and Social Development

Course Details: Directed Studies: Regional Economic and Social Development

Max Credits: 3
Min Credits: 3

57.496 Practicum In Regional Economic and Social Development

Course Details: Practicum In Regional Economic and Social Development

Max Credits: 3
Min Credits: 3

58.101 Art Appreciation

Course Details: The course introduces the student to the technical, aesthetic and historical aspects of architecture, sculpture, and painting. An analysis of the visual elements used in fine arts such as color, line, shape, texture, and principles of design are developed through slide lectures, museum visits and assigned readings. In addition, students investigate the purposes of art and visual communication and develop a heightened sense of critical thinking that allows them to investigate successfully different modes of representation, styles and media in a multicultural society.

Max Credits: 3
Min Credits: 3

58.105 Comparative Arts

Course Details: This course studies the aesthetic, artistic and intellectual similarities between art history and music history. Discussion of the arts focuses on the development in examining the human creativity and expression through the arts: from ancient times as art and morality followed in the Renaissance as art and sciences continued in the Enlightenment as art and society contrasted in the nineteenth century as art and entertainment. Furthermore, this course surveys some of the fundamental aspects of music and art, such as the nature of aesthetic judgment, the task of art and music criticism, including
formalist, representational, and contemporary theories on viewing, analyzing, and interpreting the arts. In addition, with a comparative analysis between the modes of visual and aural representation, visual and aural perception, this course analyzes the principal forms and genres of the visual and aural elements of art history and music history, providing an understanding for human creativity and expression. Spring, alternate years.

Max Credits: 3
Min Credits: 3

58.203 History of Art I: Prehistoric to Medieval Art

Course ID: 6221

Course Details: A survey of the origins and development of painting, sculpture and architecture from prehistoric times to the Medieval period. Emphasis is placed on representative works of art from Ancient Egypt and Near East, Antiquity, Byzantine and Medieval, and Early Renaissance Europe. Methodological problems of interpretation, formal analysis and aesthetic principles are studies in these art works.

Max Credits: 3
Min Credits: 3

58.204 History of Art II: Renaissance to Modern Art

Course ID: 6222

Course Details: A survey of the origins and development of painting, sculpture, and architecture from Renaissance times to the Modern period. Emphasis is placed on representative works of art from the Renaissance, Baroque, Rococo, Nineteenth Century Movements-Neoclassicism, Romanticism, Impressionism, Cubism, Dadaism, Surrealism and Abstract Art. The aim of the course is to introduce the student to basic critical and art historical methods as well as the analysis of style and content within sequential cultural contexts.

Max Credits: 3
Min Credits: 3

58.206 History of Architecture

Course ID: 6224

Course Details: A survey of the major technical and stylistic developments in ecclesiastical and secular architecture from Prehistory to the present day studied with an emphasis on the major monuments (Parthenon, Pantheon, Gothic Cathedrals, St. Peter's, Versailles Palace, Eiffel Tower, Guggenheim Museum). Spring, alternate years.

Max Credits: 3
Min Credits: 3

58.211 Nineteenth Century Art

Course ID: 6225

Course Details: A study of the nineteenth century European painting, sculpture, and architecture are analyzed, including the art of Neoclassicism, Romanticism, Realism, Impressionism, Post-Impressionism, Symbolism and Art Nouveau.

Max Credits: 3
Min Credits: 3

58.221 Twentieth Century Art

Course ID: 6226

Course Details: A study of American and European movements in painting, sculpture, and architecture from 1900 to the present. Emphasis is placed on Fauvism, Cubism, Expressionism, Surrealism, International Style, Pop, Op Art, Minimal Art, Photorealism, and Post-Modernism.

Max Credits: 3
Min Credits: 3
58.225 History of Picturing

Course ID: 6227

Course Details: This course surveys the major trends and functions of imaging and picturing, as well as its societal impact as it becomes a pervasive cultural and aesthetic entity since the invention of photograph, film and video. Lectures trace the chronological development of the medium; analyze images, culture and integrate discussions pertaining to the role of imaging as it affects the process of visual information as well as how imaging and picturing can affirm existing cultural structures or shape the course of new aesthetic images and ideas.

Max Credits: 3
Min Credits: 3

58.231 Greek and Roman Art

Course ID: 6228

Course Details: A study of Greek painting, sculpture, and architecture from the Cycladic to the Hellenistic period, and an examination of Roman Art from the Etruscan age to the beginning of Christian art. Emphasis is placed on the Greek Classical period and the Roman Empire.

Max Credits: 3
Min Credits: 3

58.313 American Art

Course ID: 6234

Course Details: The study of American painting, sculpture, and architecture from the Colonial period to the end of the nineteenth century seen in relation to European developments and American social and technological changes. Emphasis is placed on New England architecture.

Max Credits: 3
Min Credits: 3

58.314 American Architecture

Course ID: 32950

Course Details: This course begins with a discussion of native American building traditions and proceeds chronologically from the 17th through the 20th centuries. Students will gain a familiarity with the major movements in American architecture (such as Colonial, Greek Revival, Victorian, Arts and Crafts, City Beautiful, International Style, Postmodern) as well as the leading architects such as Frank Lloyd Wright and Frank Gehry. The architecture is discussed in its historical context with attention to the inventions, materials and aesthetic assumptions that made it possible.

Max Credits: 3
Min Credits: 3

58.315 Modern Architecture

Course ID: 37141

Course Details: This course will examine global architecture from the 19th century to the present. It addresses the major movements, "-isms", architects, publications, schools, and technological innovations that contributed to varied (and often conflicting) notions of "Modern architecture." Growing nationalism and politics, travel and colonial occupation, the effects of war, and changing conceptions of nature and science, all transformed the built environment. This course will provide a better understanding not only of individual works but also of the ways architecture manifests important themes such a nationalism, regionalism, functionalism, rationalism, and the most current theme, happiness.

Max Credits: 3
Min Credits: 3

58.321 Italian Renaissance Art

Course ID: 6235
Course Details: A study of painting, sculpture, and architecture in Florence, Rome and Venice during the fifteenth and sixteenth centuries. Special emphasis on the formation of the High Renaissance style and the role of representative artists of the period, such as Leonardo, Michelangelo and Raphael in Central Italy; Giorgione and Titian in Venice.

Max Credits: 3
Min Credits: 3

58.330 Italian Mannerism

Course ID: 6237

Course Details: A study on the impact of the High Renaissance in the sixteenth century, the subsequent development of early Mannerism in central Italy and the formation of the Proto-Baroque style in Venice and Northern Italy, the establishment of the courtly Mannerist style. The role of representative artists such as Anguissola, Pontormo, Rosso, Parmigianino, Bronzino, Beccafumi, Fontana, Vasari, Veronese, Bandinelli, Cellini, Palladio, Peruzzi and Ammanati is emphasized.

Max Credits: 3
Min Credits: 3

58.331 Asian Art

Course ID: 6238

Course Details: The purpose of this course is to provide a general overview of the art of the traditional cultures of Asia, China, India and Japan. This survey provides a critical and historical examination of these cultures.

Max Credits: 3
Min Credits: 3

58.332 Baroque Art in Italy

Course ID: 6239

Course Details: The development of painting, sculpture and architecture in Italy during the seventeenth century with special emphasis on Rome and Venice. The role of representative artists (Caravaggio, Bernini, Borromini, Pietro da Cortona, Artemisia Gentileschi, Elisabetta Sirani and Longhena) is emphasized.

Max Credits: 3
Min Credits: 3

58.340 Women and Art

Course ID: 6241

Course Details: Investigation of the various ways women have been portrayed in the visual arts from antiquity to the present. A chronological examination of selected female artists and their milieu from the Middle Ages to the twentieth century.

Max Credits: 3
Min Credits: 3

58.345 Pre-Raphaelite Art

Course ID: 6242


Max Credits: 3
Min Credits: 3

58.353 History of Public Art in the Modern Era

Course ID: 37451
Course Details: This course serves as an introduction to the history of public art in the modern and contemporary world. The history of public art is examined in relation to such concerns as the definition of public space, community involvement in the creative process, the institutional and economic support system for the arts, the modern understanding of memorial sculpture, and the use of the visual arts to foster public dialogue and cultural exchange.

Max Credits: 3
Min Credits: 3

58.360 Museum Issues

Course ID: 6246

Course Details: The art museum in the United States is a unique social institution because of its blend of public and private support and its intricate involvement with artists, art historians, collectors, the art market, and the government. This course will study the art museum? s history and status in our society today. Special consideration will be given to financial, legal and ethical issues that face art museums in our time. Short papers, oral reports and visits with directors, curators and other museum officials in nearby museums will be included along with a detailed study of a topic of ones choice.

Max Credits: 3
Min Credits: 3

58.370 Art History and Film

Course ID: 6247

Course Details: Examination of issues of content, theory and criticism in the traditional, modern and contemporary lives of artists; autobiographies, biographies and historiographies as source of filmic expression. Focus on the interpretation and transformation of art historical records into filmic vision as revealed in set and costume design, music, camera technique and other aesthetic elements of film, as well as how such elements function to extend and convey directorial vision to movements in art history.

Max Credits: 3
Min Credits: 3

58.490 Art History Seminar

Course ID: 6248

Course Details: Study of particular artist, style or selected art historical problem. Topics to be announced. Course may be repeated.

Max Credits: 3
Min Credits: 3

58.491 Art History Seminar

Course ID: 6249

Course Details: Study of particular artist, style or selected art historical problem. Topics to be announced. Course may be repeated.

Max Credits: 3
Min Credits: 3

58.494 Directed Study in Art History

Course ID: 6251

Course Details: An individual supervised research project relating to stylistic, thematic or methodological issues in Art History, the result to be presented in a significant paper.

Max Credits: 3
Min Credits: 1
58.495 Advanced Tutorial in Art History

Course ID: 6252

Course Details: A program of directed study affords the advanced student with an additional opportunity to pursue a previously explored problem in greater depth or to initiate and investigate an additional problem. The purpose is to sharpen and refine skills for scholarly research and presentation.

Max Credits: 3
Min Credits: 3

58.496 Practicum Experience in Art History

Course ID: 6253

Course Details: A program of on-campus and/or off-campus experiences for Art History students only. Specific requirements will vary depending upon department policies and the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a community, social, cultural or artistic area and for applying techniques of problem solving and/or credits. Students will be graded satisfactory or unsatisfactory.

Max Credits: 3
Min Credits: 3

59.101 Values and Creative Thinking

Course ID: 6257

Course Details: Values and Creative Thinking is a course designed specifically for freshmen. Throughout the semester you will be asked to examine your personal value system and how it relates to your education. The purpose of this course is to help you identify those individual qualities that you can use to achieve your highest academic potential. Specifically, this course is intended to help you develop greater self-awareness and confidence; creative and critical thinking skills; career planning skills designed to help you understand the full spectrum of available careers; an understanding of different computer technologies and multimedia techniques; an awareness of the role of values in determining your experiences and perspectives; problem solving and group decision making skills relating to issues that affect the quality of your life.

Max Credits: 3
Min Credits: 3

59.103 Freshman Honors Seminar II

Course ID: 35037

Course Details: (Spring Semester) Introduce students to the culture of Lowell through field trips, discussion, and active engagement. Students will demonstrate understanding through written reflection papers and participation in a photography exhibit, Eyes on Lowell. There will be some readings but the primary text will be the City of Lowell.

Max Credits: 2
Min Credits: 2

59.105 Comparative Arts

Course ID: 6258

Course Details: This course studies the aesthetic, artistic and intellectual similarities between art history and music history. By comparing modes of visual and aura representation, the course focuses on the development of human creativity and expression through the arts, from ancient times as 'art and morality' followed in the Renaissance as 'art and sciences' continued in the Enlightenment as 'art and society' contrasted in the nineteenth century as 'art and enlightenment'.

Max Credits: 3
Min Credits: 3

59.109 First Year Experience Seminar

Course ID: 35355
Course Details:
Max Credits: 1
Min Credits: 1

59.111 Foundations in Cultural Studies
Course ID: 34823
Course Details: This course explores a series of fundamental issues in the interdisciplinary field of cultural studies, addressing the breadth as well as the limits of the term culture. It will relate to languages, visual and performing arts, film, sports, food, music, and fashion, using case studies from different historical and geographical contexts.
Max Credits: 3
Min Credits: 3

59.115 Lowell as Text
Course ID: 35840
Course Details: First year seminar for students interested in exploring Lowell, past and present, and using the city to investigate various other issues beyond local.
Max Credits: 3
Min Credits: 3

59.203 History of Art I: Prehistoric to Medieval Art
Course ID: 6221
Course Details: A survey of the origins and development of painting, sculpture and architecture from prehistoric times to the Medieval period. Emphasis is placed on representative works of art from Ancient Egypt and Near East, Antiquity, Byzantine and Medieval, and Early Renaissance Europe. Methodological problems of interpretation, formal analysis and aesthetic principles are studies in these art works.
Max Credits: 3
Min Credits: 3

59.204 History of Art II: Renaissance to Modern Art
Course ID: 6222
Course Details: A survey of the origins and development of painting, sculpture, and architecture from Renaissance times to the Modern period. Emphasis is placed on representative works of art from the Renaissance, Baroque, Rococo, Nineteenth Century Movements-Neoclassicism, Romanticism, Impressionism, Cubism, Dadaism, Surrealism and Abstract Art. The aim of the course is to introduce the student to basic critical and art historical methods as well as the analysis of style and content within sequential cultural contexts.
Max Credits: 3
Min Credits: 3

59.208 Cultural Studies I
Course ID: 6265
Course Details: In this course, students gain an understanding of how the arts progress through examining earlier historical periods and using close studies of examples from different parts of the world. We will examine the Renaissance in Europe, the Hindu to Islamic period in the empires of Southeast Asia, dynastic changes in China, and the rise of Buddhism in South Asia.
Max Credits: 3
Min Credits: 3

59.209 Cultural Studies II
Course ID: 6266

Course Details: This course examines later cultural progressions around the world. These will include Classical, romantic and Modern periods in European arts and the cultural influences of colonial interactions on both the European powers and the colonized. We will also examine cultural arts in the era of technologies and the beginning of the modern era (such as recording and reproduction, architecture and technology), cultural globalization, and subcultures of the 20th century.

Max Credits: 3
Min Credits: 3

59.225 History of Picturing

Course ID: 6227

Course Details: This course surveys the major trends and functions of imaging and picturing, as well as its societal impact as it becomes a pervasive cultural and aesthetic entity since the invention of photograph, film and video. Lectures trace the chronological development of the medium; analyze images, culture and integrate discussions pertaining to the role of imaging as it affects the process of visual information as well as how imaging and picturing can affirm existing cultural structures or shape the course of new aesthetic images and ideas.

Max Credits: 3
Min Credits: 3

59.248 Values in American Culture

Course ID: 1248

Course Details: Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists. Deals with the development and interrelationship of American views on individualism, nature, science, technology, democracy, ethnicity, and the American dream. Readings begin with the Puritans and end with contemporary essayists.

Max Credits: 3
Min Credits: 3

59.300 Art History, Music & Culture

Course ID: 30428

Course Details: This course studies the aesthetic, artistic and intellectual similarities between art history and culture in western and non-western civilizations. Discussion of the arts focuses on the development in examining the human creativity and expression through the arts. Furthermore, this course surveys some of the fundamental aspects of art history and culture, such as the nature of aesthetic judgment, the task of art and music criticism, including formalist, representational, and contemporary theories on viewing, analyzing, and interpreting the arts.

Max Credits: 3
Min Credits: 3

59.303 Society and Technology

Course ID: 6281

Course Details: How safe is safe enough? Who really was Dr. Frankenstein? Was it possible not to create the A bomb? In this course we study decision-making capabilities crucial to survival in a technological age and examine the many value issues involved in understanding the nature of technological risk and its impact on modern society. Focusing on questions of scientific responsibility and societal safety, this course examines the changing attitudes toward technology and values.

Max Credits: 3
Min Credits: 3

59.315 Islamic Culture and Contemporary Society

Course ID: 6292

Course Details: This course examines the relationship between Islam, politics and culture in the contemporary Muslim world. This course will introduce students to the emergence and spread of Islam and the place the 'Muslim brotherhood' holds in the
imagination of many Muslims. Students will gain a deeper understanding of the social, political and cultural complexity of the Muslim world. We will cover such regions as the Middle East, Africa, South and Southeast Asia as well as various places in the 'western' world. Topics will include the rise of political Islam, the various cultural expressions of Muslims, and the variation and divergences across Muslim cultures. **This course could be taken by students from a variety of departments/majors: Islamic Studies, Political Science, History, Asian Studies, Cultural Studies, and Liberal Arts**

Max Credits: 3
Min Credits: 3

59.316 The Uses of Multimedia I

Course ID: 6293

Course Details: The Uses of Multimedia explores how multimedia is used on the Internet as well as providing a forum and a lab for the creation of multimedia web pages. The course meets twice a week, Tuesdays and Thursdays. Includes lectures, demos and hands-on activities and the creation of student multimedia projects on the web.

Max Credits: 3
Min Credits: 3

59.325 Technology & Labor in American Industry

Course ID: 6297

Course Details:

Max Credits: 3
Min Credits: 3

59.331 Greek & Roman Art

Course ID: 6302

Course Details: A study of Greek painting, sculpture, and architecture from the Cycladic to the Hellenistic period, and an examination of Roman Art from the Etruscan age to the beginning of Christian art. Emphasis is placed on the Greek Classical period and the Roman Empire.

Max Credits: 3
Min Credits: 3

59.332 Baroque Art in Italy

Course ID: 6239

Course Details: The development of painting, sculpture and architecture in Italy during the seventeenth century with special emphasis on Rome and Venice. The role of representative artists (Caravaggio, Bernini, Borromini, Pietro da Cortona, Artemisia Gentileschi, Elisabetta Sirani and Longhena) is emphasized.

Max Credits: 3
Min Credits: 3

59.340 Women and Art

Course ID: 6241

Course Details: Investigation of the various ways women have been portrayed in the visual arts from antiquity to the present. A chronological examination of selected female artists and their milieu from the Middle Ages to the twentieth century.

Max Credits: 3
Min Credits: 3

59.345 Pre-Raphaelite Art

Course ID: 6242

Max Credits: 3
Min Credits: 3

59.349 Literature, Politics and Genocide in Cambodia

Course ID: 36699

Course Details: This course will examine various literary and political responses to the Cambodian genocide, particularly personal accounts or literary testimony by survivors and government sanctioned legal proceedings. The course will consider how the literary and political responses to the Cambodian genocide have at different times paralleled, complimented and opposed each other. The course will also ask whether their overall effect contributes to or detracts from the serving of justice and the process of healing for the survivors. To pursue these questions, we will read selections from novels and poetry written by Cambodian survivors side by side with accounts of political activities of the Cambodian government and the international community to bring the perpetrators of the genocide to justice.

Max Credits: 3
Min Credits: 3

59.356 Village Empowerment: Overcoming Global Poverty

Course ID: 35736

Course Details: Using the village empowerment Peru Project at UML as a framework and case study, students will explore solutions to overcoming poverty in the world. Poverty in public health, education, income, infrastructure and the tools to overcome these are topics to be addressed. A service-learning group project is required to address the specific needs of communities in the Village Empowerment Project. Instructors are from colleges of engineering, management, health, art and science, and government.

Max Credits: 3
Min Credits: 3

59.360 Museum Issues

Course ID: 6246

Course Details: The art museum in the United States is a unique social institution because of its blend of public and private support and its intricate involvement with artists, art historians, collectors, the art market, and the government. This course will study the art museum’s history and status in our society today. Special consideration will be given to financial, legal and ethical issues that face art museums in our time. Short papers, oral reports and visits with directors, curators and other museum officials in nearby museums will be included along with a detailed study of a topic of one’s choice.

Max Credits: 3
Min Credits: 3

59.363 Introduction to Disability Studies

Course ID: 6307

Course Details: This course provides students with a wide range of interests and backgrounds with the opportunity to examine their own mental model (attitudes/values/assumptions) of disability. It includes an overview of the nature of mental retardation and other disabilities and it provides opportunities to explore and understand the historical social response to disability. Students will look at a range of strategies for providing support and intervention and they will learn about how to effect change through a variety of strategies, including advocacy.

Max Credits: 3
Min Credits: 3

59.369 Art, History and Film

Course ID: 30431

Course Details: Examination of issues of content, theory and criticism in the traditional, modern and contemporary lives of
artists; autobiographies, biographies and historiographies as source of filmic expression. Focus on the interpretation and transformation of art historical records into filmic vision as revealed in set and costume design, music, camera technique and other aesthetic elements of film, as well as how such elements function to extend and convey directorial vision to movements in art history.

Max Credits: 3
Min Credits: 3

59.370 Washington Center Term

Course ID: 6308

Course Details:
Max Credits: 12
Min Credits: 1

59.372 Italian Mannerism

Course ID: 6237

Course Details: A study on the impact of the High Renaissance in the sixteenth century, the subsequent development of early Mannerism in central Italy and the formation of the Proto-Baroque style in Venice and Northern Italy, the establishment of the courtly Mannerist style. The role of representative artists such as Anguissola, Pontormo, Rosso, Parmigianino, Bronzino, Beccafumi, Fontana, Vasari, Veronese, Bandinelli, Cellini, Palladio, Peruzzi and Ammanati is emphasized.

Max Credits: 3
Min Credits: 3

59.373 Italian Humanism

Course ID: 6022

Course Details: A study of the waning of the Middle Ages and the dawning of the Renaissance as seen through the work of Petrarch and Boccaccio. Emphasis is on the study of sources and the influence of Petrarch and Boccaccio upon the literatures of western Europe. Conducted in English.

Max Credits: 3
Min Credits: 3

59.382 Theatre History I: Ancient Greece through the 18th Century

Course ID: 33541

Course Details: A survey of ancient to early modern theatre in its historical and social contexts, tracing changes and developments in acting styles, theatre architecture, scenic practices, dramatic literature, and the audience. The course examines how theatre both reflects and shapes the changing beliefs and priorities of a culture.

Max Credits: 3
Min Credits: 3

59.383 Theatre History II: Nineteenth Century to the Present

Course ID: 33542

Course Details: A survey of theatre in its historical and social contexts from the 19th century to the present, focusing on innovations in design and technology, the advent of the director, the emergence of modern schools of acting, and the creation of new forms of theatre to suit the changing needs of a modern world.

Max Credits: 3
Min Credits: 3

59.396 Environmental Studies Practicum

Course ID: 33369
Course Details: This course is the service learning capstone for the Environmental Studies Minor (soon to be created, after approval of this course). It emphasizes the cross-disciplinary examination of contemporary environmental issues, starting from the premise that they are multi-dimensional - biophysical, cultural, economic, ethical, historical, technical, etc. It requires only a few class meetings and otherwise involves students in work with local and regional environmental agencies and organizations. This service work is meant to encourage students to make connections between theory and practice, as well as to expand the conceptual and practical tool kit they need to understand environmental controversies and work toward sustainability.

Max Credits: 4
Min Credits: 1

59.421 Italian Renaissance Art

Course ID: 6235

Course Details: A study of painting, sculpture, and architecture in Florence, Rome, and Venice during the fifteenth and sixteenth centuries. Special emphasis on the formation of the High Renaissance style and the role of representative artists of the period, such as Leonardo, Michelangelo and Raphael in Central Italy; Giorgione and Titian in Venice.

Max Credits: 3
Min Credits: 3

59.459 Play Production

Course ID: 37386

Course Details: Introduction to the design and technical aspects of theatre through hands-on experience working on campus productions. Focus on basic principles of set, lighting, props, costume, makeup, and sound production. May be repeated for credit.

Max Credits: 3
Min Credits: 3

59.470 Directed Study in Peace and Conflict

Course ID: 6318

Course Details:

Max Credits: 3
Min Credits: 3

59.471 Project in Peace and Conflict

Course ID: 6319

Course Details:

Max Credits: 3
Min Credits: 3

59.480 Integrative Fieldwork in Developmental Disabilities I

Course ID: 6321

Course Details: This course provides for an in-depth exploration of values, and attitudes of participant. It also offers students the chance to deepen their capacity to identify with people with developmental disabilities and for investigating the reality of disenfranchisement. Finally, it provides a forum for discussion of fieldwork experience and to integrate such experience with what they have learned in their Psychology and related courses. (Field Placement Required)

Max Credits: 3
Min Credits: 3

59.481 Integrative Fieldwork in Developmental Disabilities II
Course Details: This course is a continuation of 47.480. The classroom experience accompanies the field placement and provides a critical examination of the nature of community and advocacy in the lives of people with disabilities. Students are provided with a forum to explore personal values and attitudes relative to community and to identify key elements of healthy communities. Strategies for supporting people with disabilities to assume valued, community roles will be identified. (Field Placement Required)

Max Credits: 3
Min Credits: 3

59.496 Directed Study in Peer Tutoring

Course Details:

Max Credits: 9
Min Credits: 1

59.499 Directed Studies in Cultural Studies

Course Details: An individual supervised research project relating to cultural studies. A significant research paper is required for completion of this course.

Max Credits: 6
Min Credits: 3

60.301 Intermediate Accounting I

Course Details: Examines the generally accepted accounting principles relating to the preparation of financial statements. The student will study, in depth, the valuation and disclosure problems associated with the assets of the enterprise. The accounting framework and pronouncements of the Financial Accounting Standards Board are emphasized.

Max Credits: 3
Min Credits: 3

60.302 Intermediate Accounting II

Course Details: Presents the in-depth study of the valuation and disclosure issues associated with corporate liabilities and stockholders’ equity. Emphasis is placed on the statements of the Financial Accounting Standards Board.

Max Credits: 3
Min Credits: 3

60.303 Accounting Information Systems

Course Details: Presents accounting as a system designed to meet the needs of external and internal users. Accounting information system concepts are emphasized. Topics include accounting transaction cycles, internal controls, and systems development processes.

Max Credits: 3
Min Credits: 3

60.321 Cost Accounting
Course Details: An examination of the manufacturing function from the view of the cost accountant. Managerial control of the elements of product costs will be studied with an emphasis on cost accumulation systems both historical and estimated.

Max Credits: 3
Min Credits: 3

60.331 Cost Management Systems

Course ID: 6337

Course Details: This course is an upper-level management accounting course for non-accounting majors. It takes a decision-oriented approach and focuses on the manager's view, as opposed to the accountants view, of the decision process and its related information needs. Traditional cost accounting and new cost management models will be explored and contrasted, but the emphasis will be on management systems which examine a proactive role in planning, managing, and reducing costs.

Max Credits: 3
Min Credits: 3

60.401 Advanced Financial Accounting I

Course ID: 6344

Course Details: Explores issues in accounting for large, multinational business entities. Consolidation, mergers, home office/branch accounting, international accounting topics, partnership and nonprofit organizations are also examined.

Max Credits: 3
Min Credits: 3

60.421 Auditing

Course ID: 6347

Course Details: An examination of the purposes of financial statement audits. The following topics will be examined in depth: auditing standards, professional ethics, legal responsibilities, internal control, audit evidence, financial statement disclosures and audit reports.

Max Credits: 3
Min Credits: 3

60.431 Federal Income Taxes

Course ID: 6349

Course Details: Deals with the basic rules and regulations of the Internal Revenue Code as it affects the individual and the corporation. An understanding of the code is developed through lectures, assigned readings, research, and the solution to a wide variety of problems.

Max Credits: 3
Min Credits: 3

60.479 Accounting Internship

Course ID: 6355

Course Details: Arrangements must be made with department internship coordinator.

Max Credits: 3
Min Credits: 3

60.499 Independent Studies

Course ID: 6356
Course Details: An opportunity for students to carry out individualized study relating to the field of accounting under the supervision of a member of the accounting faculty.

Max Credits: 3
Min Credits: 3

**61.300 Investments**

Course ID: 6384

Course Details: Introduction to the principles of investment. Security analysis of stocks and bonds for markets, industries and firms. Primary and secondary capital markets, money markets, and other investment alternatives in terms of risk-return tradeoffs. Options and futures as investment alternatives. Emphasis is on fundamental and technical analyses.

Max Credits: 3
Min Credits: 3

**61.301 Business Finance**

Course ID: 6385

Course Details: Principles of financial management, including working and fixed capital, sources of funds, financial statements, financial planning and capital structure.

Max Credits: 3
Min Credits: 3

**61.303 Methods of Financial Analysis**

Course ID: 6387

Course Details: The techniques of financial analysis in depth. Topics covered include cash management, credit scoring, receivables monitoring, inventory management, financial statements analysis and forecasting, financial distress prediction, mergers and acquisitions techniques and other selected topics.

Max Credits: 3
Min Credits: 3

**61.421 Portfolio and Security Analysis**

Course ID: 6392

Course Details: Advanced course on investment theory and applications. Topics covered include stock market behavior, portfolio and capital market theories, and securities analysis.

Max Credits: 3
Min Credits: 3

**61.431 Capital Planning**

Course ID: 6393

Course Details: Advanced study of the principles of financial analysis. Covers topics such as acquisition of long-term assets, capital budgeting models, and the analysis of mutually exclusive projects.

Max Credits: 3
Min Credits: 3

**61.434 Investment Management**

Course ID: 6396

Course Details:
Max Credits: 3
Min Credits: 3

**61.479 Current Topics in Finance**

Course ID: 35274

Course Details: This course expands the student's knowledge in the area of financial decisions for the sustainable growth of business organizations through investments in real assets and financial assets. Topics include investing in real assets under conditions of uncertain cash flows or inflation or projects have differing lives; decisions on whether to "Buy" or "lease." The topics also include investing in financial assets through Mergers, Takeovers and Acquisitions. Other related topics are disinvesting through Divestitures; avoidance of Financial Distress and Bankruptcy etc.

Max Credits: 3
Min Credits: 3

**61.489 Internship In Finance**

Course ID: 6399

Course Details: Opportunity for students to earn academic credit through the integration of professional on-the-job experience and related academic work. Project jointly supervised by a faculty member and representative of the employing organization.

Max Credits: 3
Min Credits: 3

**61.491 International Finance**

Course ID: 6400

Course Details: Financial aspects of international business operations. Evaluation of risks associated with multinational operation and managerial decision making under conditions of financial uncertainty.

Max Credits: 3
Min Credits: 3

**61.499 Independent Study Finance**

Course ID: 6401

Course Details: An opportunity for students to carry out individualized study relating to the field of finance under the supervision of a member of the faculty.

Max Credits: 3
Min Credits: 1

**62.201 Marketing Principles**

Course ID: 6426

Course Details: The role of marketing in the economy. The elements of the marketing mix—product, price, distribution, and promotion—are discussed in the context of social and political constraints on marketing activity.

Max Credits: 3
Min Credits: 3

**62.302 Marketing Research**

Course ID: 6428

Course Details: Analysis of the information gathering function of marketing management. Design, execution and evaluation of marketing research.

Max Credits: 3
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<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Course Details</th>
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<tbody>
<tr>
<td>62.303</td>
<td>International Marketing</td>
<td>The marketing aspect of international business. Cultural dynamics, economics, political and legal constraints as they affect international marketing institutions and practices.</td>
</tr>
<tr>
<td>62.311</td>
<td>Marketing Opportunity Analysis</td>
<td>Focuses on the strategic role of marketing and the functions, which leads the business to new products and new markets. Emphasis on market development and product development.</td>
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<tr>
<td>62.312</td>
<td>Marketing Tactics</td>
<td>Focuses on tactical process of managing the marketing mix. Emphasis on market penetration. Term project: marketing plan. Career relevance: understand the role of the marketing communications specialist, appreciate sales and service support activities.</td>
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<tr>
<td>62.313</td>
<td>Sales and Customer Relations</td>
<td>Focuses on the concept of customer value, operating decisions in sales, customer service, and account management. Focus is given on calculating the value of a good or service to the customer, professional selling and sales forecasting, retail and wholesale operations, purchasing, and logistics.</td>
</tr>
<tr>
<td>62.402</td>
<td>Buyer Behavior</td>
<td>Applications of behavioral theories and techniques to the understanding of consumer and organizational purchasing processes.</td>
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<tr>
<td>62.407</td>
<td>Retailing</td>
<td>Development, organization and management of various types of retailing institutions. Evaluation of retail locations and contemporary retailing problems.</td>
</tr>
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62.496 Current Topics in Marketing

Course ID: 6446

Course Details: Topics of current interest in Marketing. Subject matter to be announced in advance. For a current semester course title, please log on to ISIS, the Inter-Campus Student Information System.

Max Credits: 3
Min Credits: 3

62.498 Marketing Internship

Course ID: 6448

Course Details: Specific projects undertaken by senior marketing students under joint supervision of department internship coordinator and representative from the business organization hosting the internship. Enrollment restricted to marketing seniors selected by internship coordinator. P/NC (free elective credit) only.

Max Credits: 3
Min Credits: 3

62.499 Independent Study in Marketing

Course ID: 6449

Course Details: An opportunity for the student to carry out individualized study relating to the field of Marketing under the supervision of a member of the faculty

Max Credits: 3
Min Credits: 3

63.210 Operations Analysis Techniques

Course ID: 6486

Course Details: Introduction to quantitative methods for analyzing business problems. Analytic methods include decision analysis, linear programming, queuing and simulation. Applications address issues in areas such as marketing, production, finance and logistics.

Max Credits: 3
Min Credits: 3

63.300 Application Systems Development

Course ID: 6487

Course Details: Provides an understanding of the fundamental concepts of software application development for business in an object-oriented, Graphical User Interface (GUI) environment utilizing structured programming concepts. Course involves hands-on application development in a 4GL environment.

Max Credits: 3
Min Credits: 3

63.301 Management Information Systems

Course ID: 6488

Course Details: Structure and foundations of information systems for management from both a user's and designer's perspective.

Max Credits: 3
Min Credits: 3

63.303 Database Management Systems
Course ID: 34607

Course Details: An introduction to databases and Database Management Systems (DBMS). Topics include basic concepts of database technology, an introduction to SQL, techniques for logical and physical database design, interaction with a commercial DBMS, and data warehousing.

Max Credits: 3

Min Credits: 3

63.307 Systems Analysis and Design

Course ID: 6491

Course Details: An overview of the information system and systems development life cycle (SDLC). Emphasis on tools and techniques that analyst can use to document information systems. Current, classical and structured tools for describing data flow, data structure, process flow, file design, input and output design and program applications will be discussed.

Max Credits: 3

Min Credits: 3

63.308 Enterprise Systems Management

Course ID: 35576

Course Details: This course, a MIS elective, focuses on implementation of Enterprise Resource Planning systems (ERPs) and its impact on business change process in organizations. ERPs integrate information and applications, spanning the functional boundaries within an organization. The goals of the course are to help students understand ERP systems and their underlying components and technologies, and the business change process with ERP in organizations. The course covers people and technical issues during the pre-implementation, implementation and post-implementation stages of the ERP systems life-cycle.

Max Credits: 3

Min Credits: 3

63.371 Operations Management

Course ID: 6492

Course Details: Principles of production/operations management. Nature and function of production systems; operational planning and control; plant layout; materials handling; inventory and quality control.

Max Credits: 3

Min Credits: 3

63.402 Global Operations and Supply Chain Management

Course ID: 36450

Course Details: A supply chain consists of all of the activities and organizations required to produce and deliver a good or service from raw materials to the final end user. Global Operations and Supply Chain Management (GOSCM) involves the coordination of this complex network of organizations and flows of materials, funds, and information among and between the stages of a supply chain. GOSCM integrates the traditional business functions of operations, marketing, logistics, finance, and information systems in an international business context. The course traces the flow of products and services from development through delivery to the final user and will address topics such as global sourcing strategies, managing demand and supply uncertainties, distribution strategies, logistics network design for global operations, global strategic alliances, and the role of information technology and Enterprise Resource Planning (ERP) in managing global supply chains.

Max Credits: 3

Min Credits: 3

63.404 Data Communications and Networks

Course ID: 6496

Course Details: A comprehensive overview of concepts and practice in Business Data Communications and Networking.
Explores the principles and applications of data communications in organizations from familiar applications into the more technical aspects of telecom architecture. Analyzes the various types of telecom networks, and how they are designed and configured, including issues involving the management and decision-making process within the telecom department. Students provided with hands-on network administration and configuration experience with a LAN administrator.

Max Credits: 3
Min Credits: 3

**63.407 Electronic Business**

Course ID: 6499

Course Details: This course familiarizes students with current and emerging electronic commerce technologies using the Internet. Focus is on both Web Design and E-Business. The web design portion provides a foundation for designing dynamic interactive websites for electronic commerce. It addresses planning and developing well-designed websites that combine effective navigation with the balanced use of graphics, text, color, and database access. The electronic business section covers both the theory and practice of doing business over the Internet including issues relating to Internet technology for business advantage; managing electronic commerce funds transfer; reinventing the future of business through electronic commerce; business opportunities in electronic commerce; electronic commerce website design; social, political and ethical issues associated with electronic commerce; and business plans for technology ventures.

Max Credits: 3
Min Credits: 3

**63.408 Current Topics in Management Information Systems**

Course ID: 6500

Course Details: This course addresses one or more current topics to the field of Information Systems. Topics can change at each course offering. Typically, the course will focus on an emerging information technology, discussing fundamental concepts and the technology's application to and effect on business. Examples of possible topics are expert systems, hypermedia and hypertext systems, factory automation systems, and the planning for and management of information resources. Subject matter to be announced in advance. Visit the current semester schedule on the Continuing Studies website for more details.

Max Credits: 3
Min Credits: 3

**63.409 Directed Study in Management Information Systems**

Course ID: 6501

Course Details:

Max Credits: 3
Min Credits: 3

**63.469 Logistics and Transportation**

Course ID: 37423

Course Details: This case-based course will examine methods and strategies for managing and controlling material movement, with particular emphasis on international operations, from the purchase of production materials to the control of work in process to the distribution of the finished product. Strategies that will be discussed include the design of international distribution networks, the use of third-party logistics providers, and the creation of links between logistic systems and marketing to create competitive advantage. The course will also explore tactical issues that must be managed to pursue a logistics strategy successfully, including choices regarding means of transportation, packaging, and inventory policies. Underlying themes of the course will be the use of information technologies (such as electronic data interchange and bar coding) and mathematical models to support logistics decision-making.

Max Credits: 3
Min Credits: 3

**63.470 Advanced Topics in Service Management**

Course ID: 37422
**Course Details:** This course is intended to provide students with the necessary tools and understanding for managing service operations. Service firms represent the fastest-growing sector of the economy. This course will focus on the various aspects involved in the management of service operations. The service operations are managed differently to their intangibility, time-sensitivity, high levels of customer involvement and lack of engineering standards. This course will explore topics such as design and delivery of services, the measurement of productivity and quality, managing capacity and demand, redesign of service delivery processes, management of technology, and others.

**Max Credits:** 3  
**Min Credits:** 3

**63.471 Managerial Quality Control**

Course ID: 6502

Course Details: Views quality control from the total or company-wide perspectives. It contains traditional material on statistical process control (SPC), quality cost, quality assurance, quality information systems, as well as the recent management theories and ideas of Deming, Jurand, Ishikawa, and Taguchi.

**Max Credits:** 3  
**Min Credits:** 3

**63.479 Directed Study in Operations Management**

Course ID: 6507

Course Details: Topics of current interest in operations management. Subject matter to be announced in advance.

**Max Credits:** 3  
**Min Credits:** 3

**63.489 Internship in Management Information Systems**

Course ID: 6508

Course Details: Opportunity for students to earn academic credit through the integration of professional work experience with related academic work. Project jointly supervised by a faculty member and representative of the employing organization.

**Max Credits:** 3  
**Min Credits:** 3

**64.361 Starting a New Venture**

Course ID: 33876

Course Details: This course is designed for students with a curiosity and interest in starting a new business. In this course, students will explore the entrepreneurship process including how entrepreneurs discover and evaluate the sources and opportunities for new business ventures; how they assemble the resources, how they operate and grow a new business; and finally how they harvest their hard work as successful entrepreneurs. The course covers a variety of topics associated with launching and running a new business venture, such as marketing, financing, building the venture team, legal and regulatory issues, and social and environmental issues.

**Max Credits:** 3  
**Min Credits:** 3

**64.362 Corporate Entrepreneurship**

Course ID: 33877

Course Details: This course focuses on entrepreneurship in established companies. In order to compete in today's dynamic business environment, organizations need to spur and promote entrepreneurial thinking and actions as a way of remaining innovative and competitive. Thus, the course explores how the entrepreneurship process works within an existing organization, including the identification of strategies companies engage to rejuvenate their business, markets and industries. Students will also study how individuals can play a role in promoting entrepreneurial activities in their organizations.

**Max Credits:** 3
**64.463 Managing Innovation**

**Course ID:** 33878

**Course Details:** A critical issue for entrepreneurs and managers is how to translate opportunity into competitive advantage. This course examines theories of innovation and their application to real-world business opportunities. A particular focus is placed on emerging scientific and technical innovations and the opportunities and challenges they present to both existing businesses and new venture entrepreneurs. Students examine innovation strategies, planning models, evaluation models, licensing and the commercialization process required to launch new businesses around innovative products and technologies.

Max Credits: 3  
Min Credits: 3

**64.464 Finance for Emerging Business Enterprises**

**Course ID:** 33879

**Course Details:** Course content covers financial aspects of an entrepreneurial venture from its start to a potential sale. Major sources of financing covered in the course include venture capital, private placement, bank credit, and public financing. Other financial concepts covered include organization of the business, financial forecasting, financial analysis, firm valuation and acquisitions.

Max Credits: 3  
Min Credits: 3

**64.480 Current Topics in Entrepreneurship**

**Course ID:** 36214

**Course Details:** Topics of current interest in entrepreneurship. Subject matter to be announced in advance. For a current semester course title please log on to iSiS, the Inter-Campus Student Information System.

Max Credits: 3  
Min Credits: 3

**64.489 Internship in Entrepreneurship**

**Course ID:** 35773

**Course Details:** Opportunity for students to earn academic credit through the integration of professional work experience with related academic work. Project jointly supervised by a faculty member and representative of the employing organization.

Max Credits: 3  
Min Credits: 3

**66.100 First Year Management Seminar - 1**

**Course ID:** 34934

**Course Details:** This seminar will provide students with an introduction to those concepts that will help them succeed as university students during that first month and for the remainder of their academic careers. Some of the issues that will be addressed are: time management, appropriate and healthy personal life-styles, personal financial planning, the services provided by Career Services, the Centers for Learning, as well as the Tutoring Lab. Furthermore, students will be exposed to the College of Management's functional areas and learning objectives.

Max Credits: 1  
Min Credits: 1

**66.101 First-Year Management Seminar - 2**

**Course ID:** 35081
Course Details: The purpose of the First-Year Management - 2 (FYMS - 2) is to deepen students' understanding and appreciation of the functional areas within the College of Management along with their understanding of themselves as learners in the College. This will be accomplished through the administration of self-assessment tools such as the Myers Briggs Type Indicator (MBTI), participation in an online business simulation addressing the business functional areas and through participation on in-class and virtual teams.

Max Credits: 1
Min Credits: 1

66.210 Professional Communications
Course ID: 32962
Course Details: This course provides students with the theory and practice of successful oral and written communication in business. Emphasis is on the development and improvement of communication skills needed for today's fast-paced organizations. Such skills include written communication in short memos and reports, including the use of conferencing technology to convey information. Additionally, the course focuses on oral communication through presentations and discussions as well as the use of current presentation software.

Max Credits: 3
Min Credits: 3

66.301 Organizational Behavior
Course ID: 6612
Course Details: Examination of individuals, groups, and organizations from a behavioral and structural perspective. Topics include employee motivation and satisfaction, communication, power and politics, the dynamics of groups and teams, conflict management, and organizational design and change.

Max Credits: 3
Min Credits: 3

66.310 Human Resources Management
Course ID: 6613
Course Details: Current issues in the management of human resources. Recruitment, selection, work force training and development, reward systems, employee health and safety, legal issues, managing diversity, performance evaluation, and human resource planning.

Max Credits: 3
Min Credits: 3

66.410 Negotiation Strategy and Process
Course ID: 6637
Course Details: Analysis and application of the key factors that shape and characterize different negotiation situations; the analytical skill to diagnose potential areas of difference and select appropriate strategies to address them; the interpersonal skills to tactically manage the specific communication and decision-making behaviors during the actual bargaining; and the ability to recognize how one's own personality, value system and perceptions affect the choice of tactics and behavior.

Max Credits: 3
Min Credits: 3

66.415 Managing Teams and Projects
Course ID: 6638
Course Details: Provides students with the knowledge and skills to effectively manage in the more flexible, team-oriented environments increasingly found in contemporary organizations. Emphasis on the dynamics of groups and how they are transformed into productive teams; strategies for systematic goal setting; building team structure; using the team as a basis for problem-solving; facilitating team processes. The course focuses on today's smaller, "self-renewing" organizations, as well as on more traditional work group settings.
Max Credits: 3
Min Credits: 3

66.420 Leadership Processes

Course ID: 6639

Course Details: Examines leadership as a dynamic influence process in organizations. The role of leader characteristics and styles, matching leadership behavior and situations, issues in power and politics, empowerment and participation, conditions for leadership effectiveness.

Max Credits: 3
Min Credits: 3

66.435 Comparative Management

Course ID: 6650

Course Details: Comparison of management concepts, systems and practices in different societies, and institutional settings. The impact of economic, social, political, and cultural variables on management styles, processes and organizational structures.

Max Credits: 3
Min Credits: 3

66.445 Contemporary Management Development

Course ID: 6653

Course Details: Provides students the opportunity to develop the skills and capabilities needed to select, gather, synthesize and use new information to enhance their professional growth and development.

Max Credits: 3
Min Credits: 3

66.450 Labor, Diversity, and Human Resource Management

Course ID: 6654

Course Details: In this course we examine solutions to two emerging questions: how do we manage, motivate, and reward the increasingly diverse American work force, and what part will American labor unions play in this process. We will study these issues using a variety of sociological, psychological, economic, legal, managerial, and comparative materials, but the focus will remain on the options available to the human resource manager.

Max Credits: 3
Min Credits: 3

66.480 Current Topics in Management

Course ID: 6668

Course Details: Topics of current interest in management. Subject matter to be announced in advance. For a current semester course title, please log on to ISIS, the Inter-Campus Student Information System.

Max Credits: 3
Min Credits: 3

66.489 Internship In Management

Course ID: 6670

Course Details: Opportunity for students to earn academic credit through the integration of professional work experience with related academic work. Project jointly supervised by a faculty member and representative of the employing organization.

Max Credits: 3
**66.490 Strategic Management**

Course ID: 6671

Course Details: An integration of knowledge in the various functional areas of management toward solution of problems affecting the character and success of the total enterprise. Corporate strategy and its implementation via appropriate policies.

Max Credits: 3
Min Credits: 3

**66.499 Independent Study in Management**

Course ID: 6679

Course Details: An opportunity for the student to carry out individualized study relating to the field of management under the supervision of a member of the faculty.

Max Credits: 3
Min Credits: 3

**69.3CE Cooperative Education Work Experience I**

Course ID: 37568

Course Details: This zero credit course is specifically designated for undergraduate Business students who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program and have secured their first, full-time co-op employment. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an Industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0
Min Credits: 0

**69.4CE Cooperative Education Work Experience II**

Course ID: 37801

Course Details: This zero credit course is specifically designated for Business undergraduate students who are participating in the voluntary Business co-op curricular option, and have successfully secured their second, full-time co-op employment. The co-op experience is designed to provide students the opportunity to develop and enhance their business and professional skills within a business or industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by their Co-op Coordinator.

Max Credits: 0
Min Credits: 0

**69.210 Professional Development Seminar**

Course ID: 36956

Course Details: The Professional Development Seminar is designed to provide students with the necessary structure, resources, and support to successfully secure and engage in their first cooperative education experience. Through a variety of teaching methodologies and assignments, students will participate in a sequence of learning activities including self-assessment, industry research, and the development of co-op learning objectives. Students will prepare to engage in the job search process through resume writing, strategic interviewing, professional networking and through learning professional behavior and presentation skills. The goal of the course is to assist each student in developing a sound plan of action to successfully participate in the cooperative education experience.

Max Credits: 1
Min Credits: 1
**69.310 Co-op Assessment 1**

Course ID: 36957

Course Details: The primary goal of this seminar is to assist students in the overall assessment of their overall cooperative education experience. Through facilitated small group discussion, individual consultation and hands on practice, students will have an opportunity to identify and articulate their technical and professional skills, and explore how these skills and their co-op employment might be translated and leveraged into future work environments and their academic program at UML.

Max Credits: 1

Min Credits: 1

**69.410 Co-op Assessment 2**

Course ID: 36958

Course Details: This seminar is designed to support and assist students in the continued assessment of their cooperative education experience. Through a deepening of their work in Co-op Assessment 1, students will review their overall performance in the cooperative education program, while continuing to demonstrate their technical and professional skills through written work and public presentations to multiple audiences. It is expected that students will clearly define their future academic and career goals, enhance their professional networks, and develop a future plan to support their engineering aspirations.

Max Credits: 1

Min Credits: 1

**70.100 Artbotics**

Course ID: 33786

Course Details: This course is designed for students in a variety of majors to explore the intersection between Art and Computer Science, especially Robotics, through community-based public exhibitions and service-learning experience. In this project-driven class, you will learn founding principles in both the fields of Art and Computer Science, and put them into practice by creating interactive, tangible exhibits that are displayed in public settings. The knowledge and experience gained during the class will be further deepened by the service learning experience of mentoring high school students in the community. The course will also include guest lectures from practitioners in Art and Computer Science.

Max Credits: 4

Min Credits: 4

**70.101 Art Concepts I (studio)**

Course ID: 6823

Course Details: Art Concepts I will focus on learning the visual language of the creative process through an examination of the principles of two-dimensional visual organization. These fundamental basics form the underlying structure of all studio and communication arts. Through slide lecture, guest lecturers, field trips, and studio projects, students will begin to understand the many forms that visual expression takes. The course will develop creative problem solving skills and students will learn to respond to personal challenge. Students will also be instructed in the principles of professional execution and be introduced to diverse modes of thought, media, and aesthetic expression.

Max Credits: 3

Min Credits: 3

**70.102 Art Concepts II**

Course ID: 6824

Course Details: Art Concepts II will focus on learning the visual language of the creative process through an examination of the principles of three-dimensional visual organization. These fundamental basics form the underlying structure of architecture, environmental graphic design, product design and sculpture. Through slide lecture, guest lecturers, field trips, and studio projects, students will begin to understand the many forms that three dimensional expression takes. The course will develop creative problem solving skills and students will learn to respond to personal challenge. Students will also be instructed in the principles of professional execution and be introduced to diverse modes of thought, media, and aesthetic expression. Art majors only. Fall and Spring.
Max Credits: 3  
Min Credits: 3  

70.113 Digital Foundations

Course ID: 35096

Course Details: This course explores the computer as a tool of the visual language. Topics included are raster and vector-based image making, art for the internet & mobile devices, and current image capture and output methods. This course will introduce Photoshop, Illustrator, Flash and a basic programming with the aim of expanding the artist's toolkit. Lectures, readings, and discussions will provide an overview of history and contemporary ideas on the use of computers in art.

Max Credits: 3  
Min Credits: 3  

70.117 Artbotics

Course ID: 33571

Course Details: Artbotics focuses on exploring the intersection among art, computer science, and robotics. The course is project-driven, and includes public exhibitions and service learning. Students will learn founding principles in both the fields of art and computer science, and put them into practice by creating interactive, tangible exhibits that are displayed in public settings. In the service learning component, students will mentor local high school students in the same topics. The course will also include guest lectures from practitioners in the fields.

Max Credits: 4  
Min Credits: 4  

70.201 Form And Content

Course ID: 6827

Course Details: Form and Content is considered the capstone course of the Art Foundations Requirement. Through a variety of studio assignments and individual projects students will explore the integration of humanities related concepts and develop an understanding of how visual artists think, live and function in the twenty first century. As part of the course requirements students will participate in the foundations exhibition at the end of the semester. Art majors only. Fall and Spring.

Max Credits: 3  
Min Credits: 3  

70.230 Typography

Course ID: 6830

Course Details: The study of lettering concepts and techniques, including the history of letters, styles and families of type, letter design, hand-drawn to computer-based lettering approaches and their effect and uses in communication. Emphasis will be on creative and aesthetic communication. Fall, alternate years.

Max Credits: 3  
Min Credits: 3  

70.231 Typography II

Course ID: 30372

Course Details: Continuation of 70.230

Max Credits: 3  
Min Credits: 3  

70.245 Desktop Publishing: Layout and Production

Course ID: 6832

Course Details: Introduces students to the complexities involved in preparing their designs for print: electronic page layout
and design, proofing, specifying inks, trapping, cropping, overprinting, printing separations, proofing, and more. Students will learn about the differences between preparing their design work electronically or manually and will learn more about the different printing processes that are available. Printing terminologies and printing industry standards will be covered. Field trips may be made to area printing companies for demonstrations on the print production process.

Max Credits: 3
Min Credits: 3

70.255 Drawing - Form and Space

Course ID: 6835
Course Details: Provides a foundation in basic drawing concepts using a variety of media and approaches. The emphasis is on building visual literacy and its application to the realm of ideas. A wide range of assignments are given to develop graphic expression.
Max Credits: 3
Min Credits: 3

70.259 Papermaking

Course ID: 6836
Course Details: The papermaking course is designed to explore paper, not just as a surface to receive an image, but as a material capable of being an artistic expression in and of itself. The course will explore the processes and techniques of making images in handmade paper, making images on handmade paper, making visual designs out of handmade paper and casting handmade paper into three-dimensional sculptural forms. Spring, alternate years.
Max Credits: 3
Min Credits: 3

70.261 Photography I

Course ID: 6837
Course Details: A foundation course that covers the basic camera and darkroom techniques as well as aesthetic principles. Emphasis will be on black and white film and paper emulsions. Students learn to develop and print their own photographs. Fall and Spring.
Max Credits: 3
Min Credits: 3

70.262 Digital Imaging and Photography: Photoshop

Course ID: 6838
Course Details: This course will offer the student a transition between traditional photographic imaging and digital photographic imaging. The course will cover the fundamentals of digital scanning, digital capture and image manipulation. Image preparation for other media will also be explored. Basic familiarity with the Mac OS and/or Windows platforms required. 6 Contact Hours required for Day School students.
Max Credits: 3
Min Credits: 3

70.264 Computer Graphics & Illustration

Course ID: 6840
Course Details: Students will produce a number of illustrations, starting with the traditional approach to illustration and then rendering their concepts using computer illustration and imaging software. Topics include methods for rendering artwork, capturing an expressive illustrative style, and portraying different moods or messages within the illustration. Students will learn to illustrate effectively using the many tools available to them within several software applications.
Max Credits: 3
Min Credits: 3
70.265 Computer Art I

Course ID: 6841

Course Details: An aesthetics and communications course using the computer as the primary tool for translating art ideas into physical form. The emphasis will be on practical usages of existing Macintosh software as a means of creation.

Max Credits: 3
Min Credits: 3

70.266 Alternative Photo Processing

Course ID: 31970

Course Details: Alternative Photo Processing give the serious photography student an opportunity to learn historic and contemporary alternative processes such as Cyanotype, Van Dyke Brown, Kallitype, Palladium, and Image Transfers. Alternative methods of creating negatives utilizing photocopiers, inkjet printers, Cliché Verre, and Acrylic Lifts will give students the opportunity to make handmade photographs with and without a camera.

Max Credits: 3
Min Credits: 3

70.267 Printmaking

Course ID: 6842

Course Details: An introduction to basic printmaking processes and aesthetics with the emphasis on etching. The approach is concept oriented, emphasizing experimentation and exploration on an individual level to communicate ideas. Fall.

Max Credits: 3
Min Credits: 3

70.269 Color

Course ID: 6843

Course Details: A course in the systematic study of color and color theory to sharpen visual acuity, stimulate creativity and develop a greater facility in the use of color. Spring.

Max Credits: 3
Min Credits: 3

70.271 Painting I

Course ID: 6844

Course Details: Presents oil painting techniques as vehicles for serious creative expression. A variety of assignments will be given to help the student build proficiency in the use of color, paint handling, and subject matter.

Max Credits: 3
Min Credits: 3

70.273 Water Media Studio

Course ID: 6845

Course Details: The technical and creative use of water based media as they apply to fine arts and graphic design. Assignments in acrylic, gouache, watercolor, and ink are designed to stimulate independent thinking. A final self-assigned project is required.

Max Credits: 3
Min Credits: 3

70.275 Sculpture
Course ID: 6846
Course Details: The exploration of three-dimensional form through the use of basic materials, methods and approaches. Assignments will include expressive problems based on human and non-objective form relationships. Spring.
Max Credits: 3
Min Credits: 3

70.281 Ceramics I

Course ID: 6848
Course Details: Introduces the student to the basic hand-building techniques, wheel throwing, and ceramic sculpture. The course will also examine clay, the material, glaze techniques, and firing processes.
Max Credits: 3
Min Credits: 3

70.291 Graphic Design I

Course ID: 6849
Course Details: Exercises, lectures and projects will introduce students to graphic design principles and techniques. Course will begin with a fundamental study of image, form, and space relations, then cover such topics as working with grids, typography basics, page layout, the introduction of color, rendering techniques, history, and more. Students will be assigned a series of projects to enhance their visual communication skills.
Max Credits: 3
Min Credits: 3

70.297 Studio Workshop

Course ID: 6850
Course Details: Presents a study of studio problems in visual structures and organization, as well as an exploration of various media and techniques. Topics will vary. This course may be repeated.
Max Credits: 3
Min Credits: 3

70.298 Book Arts

Course ID: 6851
Course Details: Book Arts will engage students in the design and fabrication of handmade, one-of-a-kind artists books. A wide variety of material and processes will be investigated. Students will learn how to produce compelling book structures for visual and graphic content. The course will introduce students to the history of Eastern and Western methods of bookmaking as well as the contemporary practice of one-of-a-kind conceptual artists books. The three-dimensional possibilities of bookmaking will also be explored.
Max Credits: 3
Min Credits: 3

70.299 Studio Workshop

Course ID: 6852
Course Details: In this course you will learn how to develop your own ideas and artistic voice. Using the tools available to graphic designers and artists, you will work independently on several projects. You will explore visual representation through literal applications, metaphors, visual poetry, and studies in abstraction. The theme for the semester being autobiography, you will gather information from your personal lives to inform each project. Research and project development are important components of the course.
Max Credits: 3
70.325 Ceramics II
Course ID: 35291
Course Details: Building on Ceramics I as an introductory course, Ceramics II will ask the student to explore functional and nonfunctional ceramic form. Students will be expected to challenge themselves with scale, advanced glaze methods and they will become familiar with kiln firings. Historical and contemporary issues in ceramics will be covered through lectures, slide presentations and critiques.

Max Credits: 3
Min Credits: 3

70.355 Drawing II
Course ID: 6855
Course Details: The emphasis is on giving form to ideas through building a solid sense of visual literacy. Assignments include a wide range of color media, surface, and subject matter with the focus on the psychological and structural use of color, creative experimentation, and the development of personal style. Fall and spring.

Max Credits: 3
Min Credits: 3

70.359 Sculpture II
Course ID: 6858
Course Details: A course allowing the student to further develop his or her techniques and understanding of sculptural form, leading to a more personal vocabulary. Conventional techniques will be extended to cover more contemporary materials and methods. Spring, alternate years.

Max Credits: 3
Min Credits: 3

70.361 Photography II
Course ID: 6860
Course Details: An advanced course in black and white photography that includes instruction in technique and vision. Emphasis will be on development of a cohesive body of work in photography.

Max Credits: 3
Min Credits: 3

70.362 Advanced Digital Imaging
Course ID: 6861
Course Details: Students will continue to develop their creative conceptualization skills and practice using advanced-level techniques in Photoshop as they create a number of visually compelling images. Projects will address visual problem solving for commercial applications and digital imaging as an emerging medium in fine art. Students should have basic knowledge of Photoshop and design composition skills prior to registering for this course.

Max Credits: 3
Min Credits: 3

70.365 Computer Art II
Course ID: 6862
Course Details: Designed to focus on advanced projects using the Macintosh platform. Focus is on design, layout, animation and video.

Max Credits: 3
Min Credits: 3

**70.369 Monotypes**

Course ID: 6864

Course Details: Exploration of the one-of-a-kind "painter's print". Emphasis is on the development of personal expression through a variety of assignments and techniques. Three portfolios of prints are required, two with assigned topics, and one with a self-assigned theme. Fall, alternate years.

Max Credits: 3
Min Credits: 3

**70.370 Figure Drawing**

Course ID: 6865

Course Details: The study of the draped and undraped figure from life, stressing both sound observation and the creative use of human form as a vehicle for personal expression. A variety of assignments, graphic media, and approaches will be given in order to help explore both philosophical and aesthetic issues. Fall, alternate years.

Max Credits: 3
Min Credits: 3

**70.371 Painting II**

Course ID: 6866

Course Details: Designed to allow students to develop individual style and approach to content through a series of self-initiated paintings. Students will work closely with the instructor to develop a cohesive series that has a sound philosophical and aesthetic basis. Spring, alternate years.

Max Credits: 3
Min Credits: 3

**70.372 2D Animation**

Course ID: 6867

Course Details: This course will provide students with the fundamental understanding about the process and the concepts in animation for narrative and experimental expression. Preproduction including scripting and storyboarding will be especially emphasized. Hybrid techniques in both traditional and digital animations including hand-drawing, stop-motion, rotoscoping, pixilation as well as tweening will be introduced. Static and kinetic aesthetics of moving images will be explored through the review of historic and contemporary animations, and through the production. Students from this course will make a much smoother transition to 3D animation courses, Language of Video, Interactive media as well as Web Design/Art. The course will also introduce the student to historical and contemporary perspectives related to the discipline.

Max Credits: 3
Min Credits: 3

**70.373 Professional Photography**

Course ID: 6868

Course Details: A professional level course in advertising product and studio portrait photography. Students will learn view camera techniques as well as principles of lighting using strobe equipment. Fall, alternate years.

Max Credits: 3
Min Credits: 3

**70.374 Introduction to 3D Modeling and Animation**

Course ID: 6869
Course Details: This course will focus mainly on the forms, materials, and composition of 3D computer graphics in the various environments. Students will explore the possibility of 3D computer graphics for creative expression as well as innovative visual communications such as animation, game, sculpture, print and design. Rendering, lighting and camera as well as material and texturing techniques will be also explored. The course will also introduce the student to historical and contemporary perspectives related to the discipline.

Max Credits: 3
Min Credits: 3

70.375 Language of Video

Course ID: 6870

Course Details: An introductory course in video camera principles and editing functions. Utilizing writing and still photography, students will explore the language of video in both images and sound as they produce factual documents and/or personal fiction.

Max Credits: 3
Min Credits: 3

70.376 3D Animation I

Course ID: 6871

Course Details: Students will learn the fundamentals of computer generated 3D modeling and animation. The emphasis will be on virtual sculpting, digital cinematography as well as the fundamental process of animation production including script & concept development, storyboarding, modeling, animating, rendering and post-production. Various independent short animations will be screened for aesthetic and critical inquiry along with the lectures dedicated to the production techniques. The course will also introduce the student to historical and contemporary perspectives related to the discipline.

Max Credits: 3
Min Credits: 3

70.378 Interactive Media

Course ID: 6873

Course Details: This course will introduce the student to the processes of game conceptualization and game prototyping. Immersive and interactive media will be explored. Interactive, engaging game design will be emphasized. Conceptual drawings, storyboarding, 3D modeling and multimedia authoring will be employed. Proficiency in 3D model building and familiarity with Mac OS and/or Windows platforms required.

Max Credits: 3
Min Credits: 3

70.379 Website Design

Course ID: 6874

Course Details: This course will focus on the creation of visual content for the web and will explore what constitutes a visually exciting and engaging site. Other topics that will be covered are: file formats, compression, web color strategies, and platform standards. Basic familiarity with Mac OS and/or Windows platforms required.

Max Credits: 3
Min Credits: 3

70.381 Advanced Game Design

Course ID: 6876

Course Details: This advanced level course is designed for students who have completed Interactive Game Design and who are interested in exploring interactive game strategies and multilevel game design. Basic familiarity with Mac OS and/or Windows platforms required.

Max Credits: 3
**70.384 Advanced Web Design**

Course ID: 6877

Course Details: This advanced-level course is designed for students who have completed Website Development (90.238) and Website Design (70.379). The course will cover advanced topics such as user-centered design, information architecture, testing, and usage analysis. Students will have the opportunity to further develop their design, development, and conceptualization skills.

Max Credits: 3  
Min Credits: 3

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**70.385 Streaming Media for the Web**

Course ID: 6878

Course Details: This is an advanced course for those with intermediate or advanced ability in World Wide Web technology who want to explore the use of continuous feed, streaming audio, video, and 3D virtual worlds. The course will examine current technologies with special attention to emerging protocols and standards for audio and video publishing. Basic familiarity with Mac OS and/or Windows platforms required.

Max Credits: 3  
Min Credits: 3

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**70.389 Web Design III**

Course ID: 30373

Course Details: 

Max Credits: 3  
Min Credits: 3

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**70.390 Illustration Studio**

Course ID: 6879

Course Details: This course provides students with a variety of experiences involving skills and techniques including computer use related to the execution of illustrations for children's books, fashion drawings, record albums, book jackets, folders, posters, and magazines. Field trips, discussions related to job opportunities and preparation of portfolios are integral parts of the instruction. Fall.

Max Credits: 3  
Min Credits: 3

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**70.391 Graphic Design II**

Course ID: 6880

Course Details: Students will be assigned a variety of advanced-level projects dealing with areas such as logo design, publication design, interactive screen design, direct mail projects, corporate identity systems, poster design, and more. Projects in this class are designed to better develop the students' ability to take a project to its final stage and render it as a professional portfolio piece.

Max Credits: 3  
Min Credits: 3

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**70.395 Advertising Design Studio**

Course ID: 6882

Course Details: Instruction in lettering, layout of commercial media as well as in the creative aspects of advertising is an integral part of the course. Practical problems, field trips, and technical guidance from preliminary layouts to finished work
will help prepare students for the commercial art field. Spring.

Max Credits: 3
Min Credits: 3

70.397 Art and Copy

Course ID: 6883

Course Details: The real world of advertising incorporates selling words and memorable images in a dynamic visual/verbal design unit. As copywriters and art directors, students learn to think pictures and see words as they prepare advertising campaign concepts for a variety of products and media, including print and television. Spring, alternate years.

Max Credits: 3
Min Credits: 3

70.398 Documentary Image

Course ID: 6884

Course Details: In a world of increasing manipulation, documentary photographs still astound us with their visual truths. In this course, students will utilize words and images “the primary tools of the photojournalist” to explore the significant issues of our time. Works by Fenton, O’Sullivan, Gardner, Riis, Hine, Bourke-White, Lange, Smith, Davidson, Salgado, Mark and others are studied for content, style, and inspiration. Fall, alternate years.

Max Credits: 3
Min Credits: 3

70.400 Portfolio Production Seminar

Course ID: 6886

Course Details: This course is designed to help students to organize their work into a professional package and prepare it for presentation. Students may decide to rework existing portfolio pieces or complete additional design projects to enhance their existing portfolios and fully demonstrate their design capabilities. Mock interviews will be conducted in which students will have an opportunity to discuss their work. Includes an end-of-semester portfolio review.

Max Credits: 3
Min Credits: 3

70.425 Ceramics III

Course ID: 35288

Course Details: Ceramics III will require students to develop a personal visual voice in clay, resulting in a focused coherent body of work. Students will be expected to develop productive studio habits, continue to explore advanced glaze methods and participate in kiln firings.

Max Credits: 3
Min Credits: 3

70.461 Photography Workshop

Course ID: 6887

Course Details:
Max Credits: 3
Min Credits: 3

70.471 Painting III

Course ID: 30837

Course Details: The focus of this class is to give individual students the opportunity to work in an independent manner,
expand their ideas and develop the ability to articulate both conceptually and formally the needs of their own work. The class combines studio work, presentations, visiting lecturers and individual and group critiques, with an emphasis on understanding and embracing risk as a necessary component of a painter's studio practice. Critiques are designed to provide feedback, encourage, challenge, and nurture each student's vision. Assignments are given on an individual basis. Students are expected to support their work by research of both historical and contemporary art.

Max Credits: 3
Min Credits: 3

70.475 Sculpture III

Course ID: 30834

Course Details:
Max Credits: 3
Min Credits: 3

70.490 Graphic Design III

Course ID: 31971

Course Details:
Max Credits: 3
Min Credits: 3

70.491 Advanced Studio

Course ID: 6889

Course Details: In order to enable students to expand expression in areas of their choice, they may repeat any studio course that is the most advanced offered in that given subject. They will be given more freedom within assignments and be expected to perform on a more advanced level.
Max Credits: 3
Min Credits: 3

70.492 Advanced Studio

Course ID: 6890

Course Details: In order to enable students to expand expression in areas of their choice, they may repeat any studio course that is the most advanced offered in that given subject. They will be given more freedom within assignments and be expected to perform on a more advanced level. Fall and Spring.
Max Credits: 3
Min Credits: 3

70.494 Directed Study

Course ID: 6891

Course Details: A special problem in studio art is investigated through conferences and studio work.
Max Credits: 3
Min Credits: 3

70.495 Advanced Tutorial

Course ID: 6892

Course Details: A program of directed studies which affords the advanced students an opportunity to pursue a previously explored problem in greater depth. The purpose is to sharpen and refine skill, content and presentation.
70.497 Senior Studio

Course ID: 6894

Course Details: This course is designed to culminate four years of art experience for the BFA studies. The development of personal approach to media and idea is emphasized. Each student will be responsible for developing a self-assigned thematic concern. No assignments will be made by the instructor who will act only as an advisor and coordinator. Course evaluation is by the Senior Studio Review Committee. Enrollment restricted to majors in BFA program. Fall and Spring.

Max Credits: 3
Min Credits: 3

71.100 Fundamentals of Musicianship

Course ID: 6896

Course Details: A study of the visual and aural symbolics of music and their application to the comprehension of the architectural, organizational, and aural elements of music literature.

Max Credits: 3
Min Credits: 3

71.101 Music Theory 1

Course ID: 6897

Course Details: An intensive study of the theoretical language of music. Stresses part writing in S.A.T.B. and basso continuo realization with a free instrumental part which utilizes free voice leading relative to the use of non-harmonic activity and the harmonic principles through first and second inversion triads. Instruments of the string section are covered, and appropriate listening assignments are given. Original composition in the style being studied is required.

Max Credits: 3
Min Credits: 3

71.102 Music Theory 2

Course ID: 6898

Course Details: Serves as a continuation of the practices of 71.101 relative to part writing (both vocal and instrumental) including secondary triads, the Neapolitan sixth, modal interchange, dominant sevenths in inversion and root position, modulation, and secondary dominants. Instrumentation covers the woodwind section, and original composition in the style being covered is required.

Max Credits: 3
Min Credits: 3

71.103 Aural Skills 1

Course ID: 6899

Course Details: Development of basic sight singing, listening, and dictation skills as they relate to music theory and analysis. Activities include singing (using moveable do/tonic do solmization), listening, and dictation (melodic, harmonic and rhythmic) of diatonic music. Music majors only. Coreq. 710.101

Max Credits: 1
Min Credits: 1

71.104 Aural Skills 2

Course ID: 6900

Course Details: Development of basic sight singing, listening and dictation skills as they relate to music theory and analysis.
Activities include singing (using moveable do/tonic do solmization), listening, and dictation (melodic, harmonic and rhythmic) of more diatonic music. Music majors only. Prerequisite: 71.101 and 71.103. Coreq. 71.102

Max Credits: 1
Min Credits: 1

71.105 Freshman Chorus

Course ID: 35560

Course Details: A vocal ensemble consisting of all first-year music students, the Choir aims to build a community among those students by having them all share a common experience. Whether they have an extensive musical background or are novice musicians with little or no formal training, the First-Year Choir is intended to help students overcome the natural apprehensions that are associated with the first year of college. Additionally, the Choir will encourage ALL students to be comfortable singing in front of their peers and instructors, thereby making their experience in Aural Skills less daunting.

Max Credits: 0
Min Credits: 0

71.108 Musicianship & Analysis I

Course ID: 37726

Course Details: An intensive, critical and integrated study of musical concepts. Through applied experiences composing, improvising, writing, performing, listening, and analyzing, students will explore and develop competencies in hearing, understanding and applying concepts of musical sound, timbre, and texture; time, shape, and form; pulse; meter; rhythmic subdivision; melodic contour; plainchant; pentatonic melodies; and interlocking melodic systems.

Max Credits: 5
Min Credits: 5

71.109 Musicianship & Analysis 2

Course ID: 37727

Course Details: An intensive, critical and integrated study of musical concepts. Through applied experiences composing, improvising, writing, performing, listening, and analyzing, students will explore and develop competencies in hearing, understanding and applying concepts of asymmetrical meters; rhythmic subdivision (expanded); major and minor scales; two-voice melodies; drones and pedal points; root/fifth relationships; functional bass lines; triadic harmony; and song forms.

Max Credits: 5
Min Credits: 5

71.110 Basic Music Theory

Course ID: 6901

Course Details: Studies the symbolics of music and their application to the comprehension of the architectural, organizational, and aural elements of music literature. Non-Music majors only.

Max Credits: 3
Min Credits: 3

71.201 Music Theory 3

Course ID: 6902

Course Details: A continuation of practices of Music Theory II relative to part writing both vocal and instrumental including remote modulation and satellite keys, the diminished seventh, augmented sixth, ninth, eleventh, and thirteenth extensions, sequential secondary dominants and secondary sevenths. Instrumentation covers the brass section; original work in the style being covered and in various formal configuration is required.

Max Credits: 3
Min Credits: 3
71.202 Music Theory 4

Course ID: 6903

Course Details: A study of twentieth century music theory via a compositional approach relative to tertial, quartal, and secundal vertical sonorities, and linear combinations featuring modal and synthetic scale resources as well as serial and preserial atonality.

Max Credits: 3
Min Credits: 3

71.203 Aural Skills 3

Course ID: 6904

Course Details: Presents an intensive application of requisite skills to chromatic and non-diatonic music, changing and composite meters, displaced accents, cross rhythms, and a vertical approach to reading often necessary in the study of scores. Advanced tonal as well as tonal literature is considered. Harmonic dictation continues to follow the sequence and progress of 71.201.

Max Credits: 1
Min Credits: 1

71.204 Aural Skills 4

Course ID: 6905

Course Details: A concentration on the techniques employed in solving the notation and musical problems of the music of the 20th century. The consideration include synthetic and nonwestern scales, pitch sets and twelve-tone serialism.

Max Credits: 1
Min Credits: 1

71.335 Arranging

Course ID: 6915

Course Details: Analysis and practical application of techniques of scoring for vocal and instrumental combinations in varied configurations. Scoring projects for in-class performance, effective arranging of music in a variety of styles, and problem solving for the arranger will be included.

Max Credits: 3
Min Credits: 3

71.495 Directed Study in Music Theory

Course ID: 6933

Course Details: Individual work under the supervision of a member of the music theory faculty on a wide variety of topics approved by the instructor and the theory faculty. Permission of chairperson required.

Max Credits: 3
Min Credits: 3

72.001 Applied Music

Course ID: 6951

Course Details:

Max Credits: 0
Min Credits: 0

72.100 Recital Attendance
Course ID: 6955

Course Details: Required attendance at scheduled Thursday Recital Hours and ten concerts/recital each semester from those listed on the Department of Music Performance Calendar. Seven semesters required of all music majors.

Max Credits: 0
Min Credits: 0

**72.101 Applied Keyboard 1**

Course ID: 6956

Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.

Max Credits: 2
Min Credits: 2

**72.102 Applied Keyboard 2**

Course ID: 6957

Course Details:

Max Credits: 2
Min Credits: 2

**72.111 Applied Voice 1**

Course ID: 6958

Course Details: Studio instruction in graduated sequence with voice as the principal instrument.

Max Credits: 2
Min Credits: 2

**72.112 Applied Voice 2**

Course ID: 6959

Course Details: Studio instruction in graduated sequence with voice as the principal instrument.

Max Credits: 2
Min Credits: 2

**72.121 Applied Woodwinds 1**

Course ID: 6960

Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.

Max Credits: 2
Min Credits: 2

**72.122 Applied Woodwinds 2**

Course ID: 6961

Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.

Max Credits: 2
Min Credits: 2

**72.131 Applied Brass & Percussion 1**
Course ID: 6962
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument.
Max Credits: 2
Min Credits: 2

72.132 Applied Brass & Percussion 2

Course ID: 6963
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument.
Max Credits: 2
Min Credits: 2

72.141 Applied Strings 1

Course ID: 6964
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

72.142 Applied Strings 2

Course ID: 6965
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

72.152 Performance Keyboard 1

Course ID: 6968
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.162 Performance Voice 1

Course ID: 6969
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.172 Performance Woodwinds 1

Course ID: 6970
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.182 Performance Brass & Percussion 1
Course ID: 6971
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.192 Performance Strings 1
Course ID: 6972
Course Details: Studio instruction in graduated sequence with strings as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.201 Applied Keyboard 3
Course ID: 6973
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.
Max Credits: 2
Min Credits: 2

72.202 Applied Keyboard 4
Course ID: 6974
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.
Max Credits: 2
Min Credits: 2

72.211 Applied Voice 3
Course ID: 6975
Course Details: Studio instruction in graduated sequence with voice as the principal instrument.
Max Credits: 2
Min Credits: 2

72.212 Applied Voice 4
Course ID: 6976
Course Details: Studio instruction in graduated sequence with voice as the principal instrument.
Max Credits: 2
Min Credits: 2

72.221 Applied Woodwinds 3
Course ID: 6978
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.
Max Credits: 2
Min Credits: 2

72.222 Applied Woodwinds 4
Course ID: 6979
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.231 Applied Brass & Percussion 3**

Course ID: 6980
Course Details:
Max Credits: 2
Min Credits: 2

**72.232 Applied Brass & Percussion 4**

Course ID: 6981
Course Details:
Max Credits: 2
Min Credits: 2

**72.241 Applied Strings 3**

Course ID: 6982
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.242 Applied Strings 4**

Course ID: 6983
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.251 Performance Keyboard 2**

Course ID: 6985
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.252 Performance Keyboard 3**

Course ID: 6986
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.261 Performance Voice 2**

Course ID: 6987
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.262 Performance Voice 3

Course ID: 6988
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.271 Performance Woodwinds 2

Course ID: 6989
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.272 Performance Woodwinds 3

Course ID: 6990
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.281 Performance Brass & Percussion 2

Course ID: 6991
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.282 Performance Brass & Percussion 3

Course ID: 6992
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.291 Performance Strings 2

Course ID: 6993
Course Details: Studio instruction in graduated sequence with strings as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.292 Performance Strings 3
Course ID: 6994
Course Details:
Max Credits: 3
Min Credits: 3

**72.301 Applied Keyboard 5**

Course ID: 6995
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.302 Applied Keyboard 6**

Course ID: 6996
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.311 Applied Voice 5**

Course ID: 6997
Course Details: Studio instruction in graduated sequence with voice as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.312 Applied Voice 6**

Course ID: 6998
Course Details: Studio instruction in graduated sequence with voice as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.321 Applied Woodwinds 5**

Course ID: 6999
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.322 Applied Woodwinds 6**

Course ID: 7000
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.331 Applied Brass & Percussion 5**

Course ID: 7001
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.332 Applied Brass & Percussion 6**

Course ID: 7002
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.341 Applied Strings 5**

Course ID: 7003
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.342 Applied Strings 6**

Course ID: 7004
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.351 Performance Keyboard 4**

Course ID: 7005
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.352 Performance Keyboard 5**

Course ID: 7006
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.361 Performance Voice 4**

Course ID: 7007
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.362 Performance Voice 5**

Course ID: 7008
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.371 Performance Woodwinds 4
Course ID: 7009
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.372 Performance Woodwinds 5
Course ID: 7010
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.381 Performance Brass & Percussion 4
Course ID: 7011
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.382 Performance Brass And Percussion 5
Course ID: 7012
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.391 Performance Strings 4
Course ID: 7013
Course Details: Studio instruction in graduated sequence with strings as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.392 Performance Strings 5
Course ID: 7014
Course Details: Studio instruction in graduated sequence with strings as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

72.401 Applied Keyboard 7
Course ID: 7015
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.
Max Credits: 2
Min Credits: 2

72.402 Applied Keyboard 8

Course ID: 7016
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument.
Max Credits: 2
Min Credits: 2

72.411 Applied Voice 7

Course ID: 7017
Course Details: Studio instruction in graduated sequence with voice as the principal instrument.
Max Credits: 2
Min Credits: 2

72.412 Applied Voice 8

Course ID: 7018
Course Details: Studio instruction in graduated sequence with voice as the principal instrument.
Max Credits: 2
Min Credits: 2

72.421 Applied Woodwinds 7

Course ID: 7019
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.
Max Credits: 2
Min Credits: 2

72.422 Applied Woodwinds 8

Course ID: 7020
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument.
Max Credits: 2
Min Credits: 2

72.431 Applied Brass And Percussion 7

Course ID: 7021
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument.
Max Credits: 2
Min Credits: 2

72.432 Applied Brass And Percussion 8

Course ID: 7022
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.441 Applied Strings 7**

Course ID: 7023
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.442 Applied Strings 8**

Course ID: 7024
Course Details: Studio instruction in graduated sequence with strings as the principal instrument.
Max Credits: 2
Min Credits: 2

**72.451 Performance Keyboard 6**

Course ID: 7031
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.452 Performance Keyboard 7**

Course ID: 7032
Course Details: Studio instruction in graduated sequence with keyboard as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.461 Performance Voice 6**

Course ID: 7033
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.462 Performance Voice 7**

Course ID: 7034
Course Details: Studio instruction in graduated sequence with voice as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.471 Performance Woodwinds 6**

Course ID: 7035
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors
Max Credits: 3
Min Credits: 3

**72.472 Performance Woodwinds 7**

Course ID: 7036
Course Details: Studio instruction in graduated sequence with woodwind as the principal instrument for performance majors
Max Credits: 3
Min Credits: 3

**72.481 Performance Brass And Percussion 6**

Course ID: 7037
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.482 Performance Brass And Percussion 7**

Course ID: 7038
Course Details: Studio instruction in graduated sequence with brass or percussion as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.491 Performance Strings 6**

Course ID: 7039
Course Details: Studio instruction in graduated sequence with strings as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**72.492 Performance Strings 7**

Course ID: 7040
Course Details: Studio instruction in graduated sequence with strings as the principal instrument for performance majors.
Max Credits: 3
Min Credits: 3

**73.100 Observation Lab I**

Course ID: 33187
Course Details: All students who are registered for 73.151 Introduction to Music Education are required to sign up for Observation lab 1 and complete 15 hours of school observations outlined by course Instructor.
Max Credits: 0
Min Credits: 0

**73.141 Introduction To Brass Pedagogy 1**
Course ID: 7092
Course Details: Intensive class instruction toward the development of basic performance proficiency on brass instruments and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.
Max Credits: 1
Min Credits: 1

73.142 Introduction to Brass Pedagogy 2

Course ID: 7093
Course Details: A continuation of 73.141. Intensive class instruction toward the development of basic performance proficiency on brass instruments and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.
Max Credits: 1
Min Credits: 1

73.143 Introduction to Guitar Pedagogy

Course ID: 7094
Course Details: Intensive class instruction toward the development of basic performance proficiency on the guitar and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.
Max Credits: 1
Min Credits: 1

73.144 Introduction to Woodwind Pedagogy I

Course ID: 7095
Course Details: Intensive class instruction toward the development of basic performance proficiency on woodwind instruments and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.
Max Credits: 1
Min Credits: 1

73.145 Introduction to Woodwind Pedagogy 2

Course ID: 7096
Course Details: A continuation of 73.144. Intensive class instruction toward the development of basic performance proficiency on woodwind instruments and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.
Max Credits: 1
Min Credits: 1

73.151 Introduction To Music Education

Course ID: 7097
Course Details: Designed to provide the student with an overview of the principles and practices of music education in today's public schools. Students will observe regular classrooms and music instruction at all levels of N-12 education. This course is a prerequisite for all professional education courses in music education and includes the component of required pre-practicum fieldwork.
Max Credits: 2
Min Credits: 2

73.162 Introduction to Percussion Pedagogy
73.200 Observation Lab 2

Course ID: 33188

Course Details: All students who are registered for 73.410 Globas Music for the Classroom are required to sign up for Observation Lab 2 and complete 20 hours of school observations outlined by course instructor.

Max Credits: 0
Min Credits: 0

73.212 Special Topics: Sound Thinking

Course ID: 35114

Course Details: Special Topics: Sound Thinking is an interdisciplinary elective for sophomore-level undergraduates that explores issues of sound production, musical form, or music in multimedia, depending on faculty and student interest. It is co-taught by Music and Computer Science faculty.

Max Credits: 3
Min Credits: 3

73.241 Introduction to Strings Pedagogy 1

Course ID: 7104

Course Details: Intensive class instruction toward the development of basic performance proficiency on string instruments and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.

Max Credits: 1
Min Credits: 1

73.242 Introduction to String Pedagogy 2

Course ID: 7105

Course Details: Intensive class instruction toward the development of basic performance proficiency on string instruments and the development of pedagogical skills and techniques for beginning instruction and demonstration purposes.

Max Credits: 1
Min Credits: 1

73.244 Introduction to Voice Pedagogy 1

Course ID: 7107

Course Details: Intended to cultivate the fundamental principles of singing. The psychology of singing and the psychology of the singing voice are considered as they apply to tone production and resonance.

Max Credits: 1
Min Credits: 1

73.245 Introduction to Voice Pedagogy 2

Course ID: 7108

Course Details: A continuation of Voice Pedagogy 1. Intended to cultivate the fundamental principles of singing. The psychology of singing and the psychology of the singing voice are considered as they apply to tone production and
resonance.

Max Credits: 1
Min Credits: 1

**73.300 Observation Lab 3**

Course ID: 31889

Course Details:

Max Credits: 0
Min Credits: 0

**73.301 Technology in Music Education**

Course Details: Introduction to the role of computers and technology in music education programs. Course includes the development of computer literacy, including knowledge of word processing, database and spreadsheet applications as essential to educators, and explores MIDI, the Internet, music software, recording, multimedia and other technologies as educational tools.

Max Credits: 3
Min Credits: 3

**73.394 Choral Repertoire and Rehearsal Techniques**

Course Details: Examination of appropriate choral repertoire for the secondary school level and effective choral rehearsal techniques. Covers auditioning, warmups, choral tone, diction, score preparation, and development of fundamental musicianship skills necessary for a successful choral ensemble. Serves as a choral laboratory setting for the practice of score preparation and rehearsal techniques.

Max Credits: 3
Min Credits: 3

**73.400 Observation Lab 4**

Course Details: All students who are registered to 73.430 General Music Methods 2 are required to sign up for Observation Lab 4 and complete 20 hours of school observations outlined by course Instructor.

Max Credits: 0
Min Credits: 0

**73.410 Global Music for Classroom**

Course Details: Focus on the music education profession's response to multiculturalism in education as evidenced through the National Music Standards and an examination of resources and methodologies for teaching and understanding the music of diverse cultures, styles, and genres. As one of the core professional music education courses, the course includes the component of pre-practicum fieldwork. There will be an additional research project for Graduate Students enrolled in 73.500.

Max Credits: 3
Min Credits: 3

**73.420 General Music Methods 1**

Course ID: 7121
Course Details: A course designed to present the basic fundamentals of general music pedagogy, including lesson planning and the writing of instructional objectives. The course discusses basic principles of curriculum and instruction, assessment, learning styles, and developmental psychology. These are related to state curriculum frameworks and National Music Standards 1-5. As one of the core professional music education courses, the course includes the component of pre-practicum fieldwork in selected settings.

Max Credits: 3  
Min Credits: 3

**73.430 General Music Methods 2**

Course ID: 7123

Course Details: Investigation of some of the most popular methods of teaching general music, including Orff, Kodaly, Dalcroze, and comprehensive musicianship. Discussion of contemporary issues including music in special education, multicultural music education, and National Music Standards 6-9. As one of the core professional music education courses, the course includes the component of fieldwork in selected settings.

Max Credits: 3  
Min Credits: 3

**73.492 Instrumental Repertoire and Rehearsal Techniques**

Course ID: 7139

Course Details: Examination of appropriate instrumental repertoire for the secondary level and effective instrumental rehearsal techniques. Includes study of rehearsal planning, score preparation, and the development of fundamental musicianship skills necessary for a successful instrumental ensemble.

Max Credits: 3  
Min Credits: 3

**73.493 Instrumental Ensemble Lab**

Course ID: 7140

Course Details: Designed to supplement the experiences of the instrumental methods courses. Students gain experience performing on secondary instruments, planning lessons for beginning and intermediate level instrumental ensembles, and conducting in these settings.

Max Credits: 1  
Min Credits: 1

**73.494 Choral Ensemble Lab**

Course ID: 7141

Course Details: Designed to supplement the experiences of the choral and vocal methods courses. Students gain experience by planning lessons for elementary and secondary school level vocal ensembles and conducting in these settings.

Max Credits: 1  
Min Credits: 1

**73.496 Directed Study: Music Education**

Course ID: 7143

Course Details: Individual work under the supervision of a member of the music education faculty on a specific topic approved by the instructor and the music education faculty. Permission of Coordinator of Music Education required.

Max Credits: 3  
Min Credits: 3

**74.101 European Art Music**
Course ID: 7194

Course Details: An aural introduction to the various types of European concert music from the 18th through the 20th century. This course emphasizes aural acquaintance with literature and genre and consists of in-class listening and discussion designed to enhance the aural experience. Required of all first year music majors as a prerequisite to Music History 1 and 2.

Max Credits: 1
Min Credits: 1

74.102 Introduction To Non European Musics

Course ID: 7195

Course Details: An introduction to selected world musics from a contextual perspective which explores music as an integral part of both society and culture and its function in labor, ritual and celebration. Aspects of instrumental classification, spontaneity and improvisation, as well as elements of music as both organized sound and silence in all cultures will be considered. This includes timbre, melody, rhythm, harmony, form, and texture. Required of all first year music majors as a prerequisite to Music History 1 and 2.

Max Credits: 1
Min Credits: 1

74.104 Musical Practices I

Course ID: 37724

Course Details: Musical Practices I includes the basic study of musical elements, vocabularies, and concepts in Western musical traditions, supplemented with global perspectives. Students will develop critical inquiry skills to study how music is experienced throughout Western culture, broadening the student's understanding of different musical structures, diverse arenas of production, while exploring professional, creative outlets for this knowledge. At the same time common conventions of musical style will be examined which tie the Western tradition together regardless of when or where the music originated.

Max Credits: 1
Min Credits: 1

74.105 Musical Practices 2

Course ID: 37725

Course Details: Musical Practices 2 builds upon the basic study of musical elements, vocabularies, and concepts established in Musical Practices 1, extending the exploration of these principles in more depth, with a primary focus on non-western musical traditions and cultural practices.

Max Credits: 1
Min Credits: 1

74.161 Music of Western Civilization

Course ID: 7198

Course Details: A survey of music from earliest times to the present. Significant forms, styles, composers, and aesthetic concepts are examined. Open to non-music majors only.

Max Credits: 3
Min Credits: 3

74.262 Survey of Music History 2

Course ID: 7204

Course Details: Analyzes musical forms and styles from 1750 to present.

Max Credits: 3
Min Credits: 3

**74.301 American Music**

Course ID: 7206

Course Details: An historical, cultural and contextual survey of diverse styles of concert and vernacular music in the United States from the colonial era to the present. Open to music and non-music majors.

Max Credits: 3

Min Credits: 3

**74.311 American Musical Theatre**

Course ID: 7209

Course Details: African-American concert Music is a survey of orchestral works by Black classical composers starting from the 1890s through the Harlem Renaissance to present-day composers. Open to music majors and non-music majors.

Max Credits: 3

Min Credits: 3

**74.355 Jazz**

Course ID: 7212

Course Details: An intense study of the history of jazz from its origins to the present, covering a wide selection of styles and schools of jazz in various ensemble configurations.

Max Credits: 3

Min Credits: 3

**74.386 History of Rock Music**

Course ID: 7223

Course Details: Traces the roots of American popular music from its origins and influences from the earliest European song forms to American folk songs, Gospel, Country, Rhythm and Blues, Jazz, and other popular forms up through current trends as related to the development of the music industry and other socio-musical influences of the commercial song from the 1500s to the present.

Max Credits: 3

Min Credits: 3

**74.456 Film Music**

Course ID: 35562

Course Details: A study of music in sound cinema from the 1920s to the present. The course focuses on the expressive, formal, and semiotic function that film music serves, either as sound experienced by the characters, as another layer of commentary to be heard only by the viewer, and/or some mixture of the two. Composers to be studied include Max Steiner, Bernard Hermann, Jerry Goldsmith, John Williams, Danny Elfman, and others, as well as film scores that rely upon a range of musical styles, including classical, popular, and non-Western. The singularly most important goal of the course will be to study how music functions in a given film, regardless of its musical style. In the process, ancillary ideas will emerge including discovering how music establishes psychological moods, guides emotions, and reveals aspects of the narrative structure of the film. By the end of the course, the student will have gained a greater understanding of both music and film and it is likely that students will never watch or listen another movie in quite the same way.

Max Credits: 3

Min Credits: 3

**74.464 Music Of Classic Era**

Course ID: 7232
Course Details: A study of the solo, chamber, symphonic and operatic literature from 1720-1827.

Max Credits: 3
Min Credits: 3

**74.495 Directed Study: Music History**

Course ID: 7239

Course Details: Individual work under the supervision of a member of the music history faculty. May be repeated with permission of the chairperson.

Max Credits: 3
Min Credits: 3

**75.131 Introduction To Keyboard 1**

Course ID: 7258

Course Details: The emphasis is placed on such keyboard skills as the playing of several scale forms, basic chord progressions, harmonization of melodies, accompaniment patterns, basic solo literature, development of keyboard reading necessary to a working knowledge of the keyboard and basic improvisational concepts.

Max Credits: 1
Min Credits: 1

**75.132 Introduction To Keyboard 2**

Course ID: 7259

Course Details: A study of more advanced chord progressions, ensemble keyboard playing, patriotic songs, more advanced accompaniment patterns and advanced solo literature and a continuation of the use of improvisational techniques.

Max Credits: 1
Min Credits: 1

**75.233 Conducting 1**

Course ID: 7262

Course Details: Training in basic baton technique and related study for instrumental and choral conducting.

Max Credits: 2
Min Credits: 2

**75.234 Conducting 2**

Course ID: 7263

Course Details: Continuation of 75.233 exploring more advanced choral and instrumental conducting techniques.

Max Credits: 2
Min Credits: 2

**75.255 Piano Accompanying 1**

Course ID: 7267

Course Details: This course is designed for both piano and non-piano majors. A discussion of concepts of form with special emphasis on working together with and being sensitive to other musicians will be emphasized. Accompaniments will consist of music for instrumental and vocal soloists and ensembles and will include simple harmonizations and improvisations based on melodies from folk, classical, jazz, and popular music. Techniques of adjustment and cooperation in performance will also be discussed.

Max Credits: 1
Min Credits: 1

75.256 Piano Accompanying 2

Course ID: 7268

Course Details: A continuation of Piano Accompanying 1 utilizing more advanced music literature from the genres as well as a refining of the philosophies of sensitivity and working with other musicians.

Max Credits: 1
Min Credits: 1

75.361 Jazz Improvisation 1

Course ID: 7279

Course Details: A study of basic jazz structures, motives, chord progressions, scales, melodic analysis, use of some approach techniques, tensions and their application to improvisation. Includes in class performance by small instrumental and/or vocal groups.

Max Credits: 3
Min Credits: 3

75.394 Performance Seminar I

Course ID: 7284

Course Details: The study and performance of selected works from the repertoire of each of the five primary areas of performance; keyboard, voice, woodwinds, strings, and brass/percussion. Emphasis will be placed on student and faculty performance, leading to detailed consideration of the relationship between the demands of the composer and the problems of the performer and the manner in which these concerns influence the musical and artistic judgments necessary to achieve a quality performance.

Max Credits: 3
Min Credits: 3

75.453 Instrumental Pedagogy

Course ID: 34653

Course Details: This course is directed toward the development and refinement of instrumental repertoire and pedagogy. The course will examine the application of musical content and learning sequences to the teaching of instrumental music to students at all levels. It will include the study of teaching methods and materials for use in private and group instruction. Observation of studio and class teaching and supervised teaching experience will also be included. This course is directed toward meeting the NASM undergraduate pedagogy component.

Max Credits: 3
Min Credits: 3

75.463 Vocal Pedagogy

Course ID: 7286

Course Details: Course will introduce students to the basics of teaching singing. It will include an overview of the anatomy of the respiratory and vocal mechanism and their application to singing; the categorization of voice types with suggestions for repertoire for young solo singers; an overview of vocal exercises for various technical goals and the diagnosis of common vocal problems and how to treat them. The class will also cover the child and adolescent voice and include in-class supervised teaching.

Max Credits: 3
Min Credits: 3

75.474 Practical Intonation

Course ID: 7290
Course Details: The study of orchestral and band instruments relative to intonation. The development of conceptual awareness relative to the various characteristics of pitch, which are inherent in the design of the various instruments. Identification of problematic intonation and procedures to alleviate problems through performance.

Max Credits: 3
Min Credits: 3

75.493 Performance Seminar 1

Course ID: 7293

Course Details: The study and performance of selected works from the repertoire of each of the five primary areas of performance; keyboard, voice, woodwinds, strings, and brass/percussion. Emphasis will be placed on student and faculty performance, leading to detailed consideration of the relationship between the demands of the composer and the problems of the performer and the manner in which these concerns influence the musical and artistic judgments necessary to achieve a quality performance.

Max Credits: 3
Min Credits: 3

75.494 Performance Seminar 2

Course ID: 7294

Course Details: Designed as a "master class" experience for students in each of the five primary areas of performance, keyboard, voice, woodwinds, strings, and brass/percussion, with a separate section for each area wherever possible. Class sessions will consist of student performance of selected literature followed by critical analysis from faculty and peers. Each section will be supervised by the appropriate area coordinator and will also involve invited guest performers selected from faculty, applied faculty and other noted artists.

Max Credits: 3
Min Credits: 3

75.495 Directed Study: Research In Performance

Course ID: 7295

Course Details: Permission of chairperson required.

Max Credits: 3
Min Credits: 1

76.010 Ensemble 1

Course ID: 7311

Course Details:

Max Credits: 1
Min Credits: 1

76.020 Ensemble 2

Course ID: 7312

Course Details:

Max Credits: 2
Min Credits: 2

76.101 University Orchestra

Course ID: 7313
Course Details: Open to all students by audition. Works from the orchestral repertoire are studied and publicly performed with additional opportunities for solo accompaniment.

Max Credits: 2
Min Credits: 2

76.103 Wind Ensemble

Course ID: 7315

Course Details: Open to all students by audition. Compositions are selected from a wide repertoire of wind ensemble literature for study and performance. Opportunity for solo performance with wind ensemble accompaniment.

Max Credits: 2
Min Credits: 2

76.105 Concert Band

Course ID: 7316

Course Details: Open to all students by audition. Selected band repertoire studied and performed.

Max Credits: 2
Min Credits: 2

76.106 Marching Band

Course ID: 7317

Course Details: Open to all students of the University, without regard for major field of study. The marching band performs at University events and at selected band festivals throughout New England. Custom musical arrangements and visual designs are featured. No audition required.

Max Credits: 2
Min Credits: 2

76.108 Studio Orchestra

Course ID: 7318

Course Details: Open to all students by audition. A wide spectrum of jazz orchestration and solo performance is studied and performed.

Max Credits: 2
Min Credits: 2

76.147 Ensemble Performance 1

Course ID: 7319

Course Details: This ensemble provides students with an introduction to the skills, knowledge, and attitudes necessary for satisfactory ensemble performance, namely: adequate technical facility for successful ensemble participation; functional knowledge of musical grammar and syntax in reference to its application in ensemble performance; proper application of aural and rhythmic skills in an ensemble setting; music sensitivity in relation to ensemble performance; and a knowledge of the protocols of ensemble preparation and performance. Emphasis on utilization of major scales and chords through application in both classical and jazz styles.

Max Credits: 2
Min Credits: 2

76.148 Ensemble Performance 2

Course ID: 7320

Course Details: Ensemble Performance 2 is an introduction to the fundamentals of the jazz idiom, jazz theory, and jazz
improvisation. Topics include correct interpretation of jazz rhythm and articulation, basic jazz theory, and the development of improvised melodies. Students will play in small ensembles, or "combos", in this course. Students are expected to have at least an intermediate level of skill on their instruments at the time they begin this course.

Max Credits: 2
Min Credits: 2

**76.149 Ensemble Performance 3**

Course ID: 7321

Course Details: Introduction to multiple styles of American popular music: more advanced harmony and rhythm; improvising on common chord progressions; semi-independent combos.

Max Credits: 2
Min Credits: 2

**76.150 Ensemble Performance 4**

Course ID: 7322

Course Details: Performing advanced jazz and pop compositions; advanced improvisation; semi-independent combos.

Max Credits: 2
Min Credits: 2

**76.151 Brass Ensemble**

Course ID: 7323

Course Details: Open to all students by audition. Provides a wide range of performance experience through varied brass literature.

Max Credits: 1
Min Credits: 1

**76.153 Percussion Ensemble**

Course ID: 7324

Course Details: Open to all students by audition. Exploration of the growing body of literature for percussion ensemble. Public performance.

Max Credits: 1
Min Credits: 1

**76.154 Classical Guitar Ensemble**

Course ID: 7325

Course Details:

Max Credits: 1
Min Credits: 1

**76.156 Electric Guitar Ensemble**

Course ID: 7327

Course Details: Open to all students by audition. Provides study and performance of literature for guitar, lute, etc. Required of all guitar majors each semester.

Max Credits: 1
Min Credits: 1
76.158 Piano Ensemble
Course ID: 7328
Course Details: Open to all students by audition. Provides performance experiences through varied piano ensemble literature for one and two pianos.
Max Credits: 1
Min Credits: 1

76.159 Mixed Chamber Ensemble
Course ID: 7329
Course Details: Open to all students by audition. Offers a wide range of performance experience through a selection of literature for varying combinations of instruments.
Max Credits: 1
Min Credits: 1

76.160 String Ensembles
Course ID: 7330
Course Details: Open to all students by audition. Provides experience in the performance of string orchestra literature.
Max Credits: 1
Min Credits: 1

76.161 Small Jazz Ensemble
Course ID: 7331
Course Details: Open to all students by audition. Provides experience in the performance of jazz literature for groups ranging from four to eight members.
Max Credits: 1
Min Credits: 1

76.162 Jazz Laboratory Ensemble
Course ID: 7332
Course Details: Open to all students by audition. Provides students with a clear understanding of the skills, knowledge and attitudes necessary to satisfactory ensemble performance and practical experience in the application of such skills, knowledge and attitudes.
Max Credits: 1
Min Credits: 1

76.164 World Music Ensemble
Course ID: 37357
Course Details: An immersion into the music of non-western cultures, this course will provide instrumental and vocal instruction, as well as an introduction to the theory and cultural contexts that shape the practice of traditional music. The ensemble will meet weekly, with the goal of a public performance at the close of the semester.
Max Credits: 1
Min Credits: 1

76.170 Contemporary Electronic Ensemble
Course ID: 7335
Course Details: Explores the electronic production and manipulation of music in a live ensemble setting. Students will incorporate synthesis, signal processing, sampling, etc. into a musical framework. Besides performing from the constantly expanding repertoire of electronic music, students will be encouraged to create original compositions and arrangements for the ensemble. A public performance will be given at the end of each semester.

Max Credits: 1
Min Credits: 1

**76.201 Chamber Singers**

Course ID: 7336

Course Details: A small, select choir open to all singers by audition. Performs music ranging from the present day to the Middle Ages.

Max Credits: 2
Min Credits: 2

**76.202 University Choir**

Course ID: 7337

Course Details: Open to all students by audition. Includes the study and performance of a wide variety of choral compositions.

Max Credits: 2
Min Credits: 2

**76.210 Opera Workshop**

Course ID: 7339

Course Details: 

Max Credits: 1
Min Credits: 1

**76.251 Choral Union**

Course ID: 7340

Course Details: A large chorus open to the campus and the community without audition. Performs larger works in the choral repertoire including oratorios, masses, motets and opera.

Max Credits: 1
Min Credits: 1

**77.201 Computers In Music Business**

Course ID: 7372

Course Details: An introduction into the use of Macintosh, DOS, and other computer systems and software applications used within the Music Industry. Topics will include programs, input devices, disk drives, I/O ports, peripherals, communication networks, operating systems, the Internet, MIDI, sound cards, interactive multi-media, and the use of such applications as: word processors, spreadsheets, data bases, desk top publishing.

Max Credits: 3
Min Credits: 3

**77.301 Music Business 1**

Course ID: 7373

Course Details: A systematic look at career options in the Music Industry. Topics discussed include: songwriting, music
publishing, national and international copyright law, music licensing, artist management, and concert promotion.

Max Credits: 3
Min Credits: 3

**77.302 Music Business 2**

Course ID: 7374

Course Details: A systematic look at career options in the Music Industry. Topics include: music merchandising, arts administration, record promotion, marketing, and distribution, radio and television broadcasting, advertising and jingle production, and film scoring.

Max Credits: 3
Min Credits: 3

**77.303 Music Publication and Copyright**

Course ID: 7375

Course Details: A thorough study of the legal environment within the Music Industry. Topics discussed include: music publishing, national and international copyright law, live performance, managers & agents, music organizations, recording agreements, music publishing, film and television music production, music merchandising, and other contractual obligations.

Max Credits: 3
Min Credits: 3

**77.304 Music Promotion and Merchandising**

Course ID: 7376

Course Details: A thorough study of the principles and application of marketing, promotion, and distribution of products within the Music Industry. Case studies of various music products and companies will be studied and analyzed.

Max Credits: 3
Min Credits: 3

**77.401 Music Business Seminar**

Course ID: 7378

Course Details: Prepares students to undertake their Internship by providing an in-depth study of how to prepare successfully to enter a career path.

Max Credits: 3
Min Credits: 3

**77.404 Music Business Entrepreneur**

Course ID: 7381

Course Details:

Max Credits: 3
Min Credits: 3

**77.495 Directed Studies In Music Business**

Course ID: 7383

Course Details: Permission of coordinator required.

Max Credits: 3
Min Credits: 3
**77.499 Music Business Internship**

Course ID: 7384  
Course Details: Music Business Internship  
Max Credits: 6  
Min Credits: 6

**78.301 Music, Technology and Society**

Course ID: 7387  
Course Details: Examines how recording technology has changed music and the relationships of music and society. The course studies and evaluates the application of technology to making music, to music listening, to styles of music, and to music's roles in society, other art forms, and media. The evolving importance of technology in music over the past century is charted through the study of musical examples and through viewing how human values are reflected in this century's timely music. Studies will be based on assigned readings, lectures and discussions, examination of current and historically significant music recordings, motion pictures and media pieces for this artistry, their use of available technology, and their impact on human values and society.  
Max Credits: 3  
Min Credits: 3

**78.305 Survey: Music Technology**

Course ID: 7388  
Course Details: The use of technology in music listening, performance, analysis, composition, recording and music study will be presented. The dimensions and applications of technology will be discussed as related to aesthetics, the musician's experiences, musical style, and the musical experience. Basic introduction to the technologies of audio recording. Course includes required reading, listening, session participation. Music Majors Only.  
Max Credits: 3  
Min Credits: 3

**78.310 Introduction To Recording**

Course ID: 7389  
Course Details: The theory and usage of audio-recording/reproduction components are explored at a basic level and supplemented by hands-on experience. The aesthetics of recording media and their influence on society are discussed in relation to the artistic and commercial functions of the media. Individual research on a subject of interest to the student is required.  
Max Credits: 3  
Min Credits: 3

**78.350 Video Production**

Course ID: 7390  
Course Details: An introductory course in the fundamentals of video technology and production; encompassing signal transmission, tape formats, transduction, optical characteristics of lenses and cameras, production equipment and procedures, and post-production equipment and techniques; hands-on experience via video and audio for video projects. Permission of Coordinator and Chair.  
Max Credits: 3  
Min Credits: 3

**78.360 Critical and Analytical Listening**

Course ID: 7391  
Course Details: The recognition and identification of timbral modifications and spatial characteristics. Aural analysis of
historically significant and current music recordings for recording techniques, musical balance, performance intensity, sound quality and imaging. Development of critical listening skills and sound evaluation techniques.

Max Credits: 3
Min Credits: 3

78.390 Acoustics & Psychoacoustics

Course ID: 7392

Course Details: The physical attributes of sound and acoustic measurement; displacement, time, velocity, acceleration, force, energy, resonance, wave shapes and spectral energy distribution are examined for most instruments; acoustic properties of the ear and enclosed environments; acoustic measurements and instruments. The interrelationships and differences of physical acoustics and psychoacoustics are stressed.

Max Credits: 3
Min Credits: 3

78.410 Recording Production

Course ID: 7393

Course Details: Intermediate audio production. Planning and executing recording sessions which involve a variety of musical ensembles under diverse recording conditions; live-performance/concert recordings; multi-track recording, overdub, and remix procedures; application of informed musical judgment to the mixing process; and research in recording techniques. Laboratory required. Permission of Coordinator and Chair.

Max Credits: 3
Min Credits: 3

78.411 Audio Theory

Course ID: 7394

Course Details: Advanced audio theory. An in-depth examination of the principles and operating specifications of the major components of the modern recording studio: mastering and multi-track recorders, mixing consoles, microphones, monitoring systems, and signal processing equipment. Recording projects and technical research. Laboratory required. Permission of Coordinator and Chair.

Max Credits: 3
Min Credits: 3

78.420 Sound Synthesis 1

Course ID: 7395

Course Details: Sound synthesis equipment and techniques are studied and supplemented with sound synthesis studio laboratory work. The course will cover practices and principles of analog and digital sound synthesis and their historic origins, related audio equipment and applications, theories of sound samplers and sequencers, and an introduction to MIDI applications in sound synthesis and recording production. Permission of Coordinator and Chair.

Max Credits: 3
Min Credits: 3

78.421 Sound Synthesis 2

Course ID: 7396

Course Details: Advanced sound synthesis techniques are studied and supplemented with sound synthesis studio laboratory work. The course will cover MIDI implementation in analog and digital sound synthesis, the historic origins of computer music and electro-acoustic music, live electronic music performance, audio equipment and applications of MIDI-based and functional devices and processors, advanced music production and sound synthesis via MIDI. Permission of Coordinator and Chair.

Max Credits: 3
78.430 Computer Applications in Music

Course ID: 7397

Course Details: Applications of computers to audio production is emphasized in studies of computer generated and controlled sound sources and devices, algorithmic composition, computer music, digital signal processing, advanced MIDI applications and programming, and computer synchronization of audio and video. Laboratory work required. SRT majors and minors. Permission of Coordinator and Chair.

Max Credits: 3
Min Credits: 3

78.440 Multitrack Production

Course ID: 7398

Course Details: 24-track recording. Session planning and preparation, tracking process; microphone techniques and applications; incorporating processing; planning the mix and sound stage; MIDI applications, rough mixdown. Recording project required.

Max Credits: 3
Min Credits: 3

78.441 Advanced Multitrack Production

Course ID: 7399

Course Details: Advanced production techniques; tape machine calibration; automation and final mixdown; digital multitracking; SMPTE applications; premastering and mastering. Recording project required.

Max Credits: 3
Min Credits: 3

78.450 The Recording Industry

Course ID: 7400

Course Details: A detailed survey of the many career options of the audio-recording industry: position duties and responsibilities. Guest lecturers from diverse careers in the industry share their experiences, disciplines, and backgrounds. Permission of Coordinator and Chair.

Max Credits: 3
Min Credits: 3

78.460 Audio For Visuals

Course ID: 7401

Course Details: This course is designed to introduce students to the theory and practice of video post-production on non-linear digital editing platforms. These systems include Audio Vision, ProTools, and Sonic Solutions. Students are required to complete audio tracks for several video shorts and will learn about such diverse topics as SMMPTE, word clock, digital sync, DSP, blackburst, genlock, S/P-DIF, AES/EBU, digital recording and mixing, ADR, music beds, cues, FX, Foley recording, and random access theory and techniques. Permission of Coordinator and Chair

Max Credits: 3
Min Credits: 3

78.470 Recording Studio Repair and Maintenance

Course ID: 7402

Course Details: Hands-on experience in repair and maintenance techniques. Common minor repairs and routine maintenance of recording equipment; test equipment and tools; power supplies, op-amps, and low-noise amplifiers;
distortion; analog and digital hardware; and interface considerations. Permission of Coordinator and Chair

Max Credits: 3
Min Credits: 3

**78.493 Internship in SRT**

Course ID: 7405

Course Details: Practical experience in audio-recording under the supervision of a professional firm. At least twenty hours per week for fifteen weeks is spent working at an entry-level position for a firm involved in audio.

Max Credits: 6
Min Credits: 6

**78.494 Senior Project In Sound Recording Technology**

Course ID: 7406

Course Details: Advanced projects developed in consultation with faculty advisor. Typical projects include production of a complete record album, investigation of experimental recording techniques, and original research in recording technology. To be completed in place of 78.493 by students not choosing an internship. Permission of Coordinator and Chair

Max Credits: 6
Min Credits: 6

**78.495 Directed Study in Sound Recording Technology**

Course ID: 7407

Course Details: Individual work under the supervision of a member of the SRT faculty on a topic or area of production approved by the instructor and the Coordinator of SRT. Permission of Coordinator and Chair

Max Credits: 3
Min Credits: 3

**79.360 Aesthetics and Critical Studies of Graphic Design**

Course ID: 7427

Course Details: Examination of the aesthetic theories and practice of graphic design. Significant practitioners of the art will be highlighted.

Max Credits: 3
Min Credits: 3

**79.361 Aesthetics and Critical Studies of New Media**

Course ID: 7428

Course Details: Examination of the aesthetic theories and practice of new media. Significant practitioners of the art will be highlighted.

Max Credits: 3
Min Credits: 3

**79.380 Understanding Movies: Cinema as Social Commentary**

Course ID: 37494

Course Details: This film theory seminar has several main objectives: to study the production of meaning in films; to analyze how moving images are used in social representation; and to introduce students to the visual and critical language of cinema. In this course, we will view a series of films by international authors. These address some of the most pressing issues of today's global world such as identity, subjectivity, difference and otherness, race relations, representations of gender and sexuality, immigration, war, colonialism and post-colonialism, poverty, and social inequalities. The films that we
watch will be studied not as isolated cinematic texts but as illustrations and examples of theories of representation. Students will develop their critical analysis skills by being introduced to theoretical concepts such as "the gaze" in art and cinema as well as formal elements such as mise-en-scène, cinematography, editing, and sound.

Max Credits: 3
Min Credits: 3

79.494 Directed Study in Aesthetic Concepts

Course ID: 7430

Course Details: An individual supervised research project relating to questions of aesthetic interpretation and understandings. Fall and Spring.

Max Credits: 3
Min Credits: 3

79.496 Practicum Experience in Aesthetic Concepts

Course ID: 7432

Course Details: A program of on-campus and/or off-campus experiences for art majors only. Specific requirements will vary depending upon department policies and the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a community, social, cultural or artistic area and for applying techniques of problem solving and/or credits. Students will be graded "satisfactory" or "unsatisfactory". Fall and Spring.

Max Credits: 3
Min Credits: 3

81.111 Principles of Biology I

Course ID: 7466

Course Details: Introduces topics such as the chemical and physical basis of life, its evolution, diversity, distribution, and interrelationships of life forms. The central theme of genetic replication, translation, expression, and selection will be emphasized as a unifying principle which determines and integrates structure and function at the cellular, individual population, and community levels of organization. Designed for those students who intend to pursue career options in the biological sciences, biotechnology or related areas such as medicine, biomedical research, radiological sciences or environmental sciences. It is the first-semester course of a two-semester sequence.

Max Credits: 3
Min Credits: 3

81.112 Principles of Biology II

Course ID: 7467

Course Details: Serves as a continuation of the 81.111/81.112 sequence for those students who intend to pursue career options in the biological sciences or related professional areas such as medicine, biomedical research or environmental sciences. Molecular energy exchange in organisms (photosynthesis and respiratory metabolism), the common functional needs of support, locomotion, nutrition, internal communication and the maintenance of homeostasis are considered. Control and regulation of organisms at levels beyond the individual are considered through discussions of population and community ecology.

Max Credits: 3
Min Credits: 3

81.115 Introduction To Biology Seminar

Course ID: 7470

Course Details: Freshman Seminar in Biology (Honors section available) This course offers a small group seminar format for problem solving and discussion with faculty and staff. It is designed for individual participation in exploring concepts related to material considered in Principles of Biology I and II (81.111 and 81.112). Required of freshman students; optional, with permission of instructor, to others registered in lecture section.
Max Credits: 1
Min Credits: 1

81.116 Freshman Seminar in Biology

Course ID: 7471

Course Details: This course is designed to acclimate incoming students to their new University environment. Students will learn about the Biology program, its faculty and staff members, University resources, and other information useful for success.

Max Credits: 1
Min Credits: 1

81.117 Experimental Biology I

Course ID: 7472

Course Details:

Max Credits: 1
Min Credits: 1

81.118 Experimental Biology II

Course ID: 7473

Course Details:

Max Credits: 1
Min Credits: 1

81.122 Biology for Health Sciences

Course ID: 38070

Course Details: Develops a basic understanding of biological topics relevant to students in the health sciences. Course will introduce students to biochemistry, cell biology, cellular respiration, cell replication, genetics, inheritance and molecular biology. Introduction to prions, viruses, prokaryotic and eukaryotic biology will also be covered.

Max Credits: 3
Min Credits: 3

81.124 Biology for Health Sciences Lab

Course ID: 38071

Course Details: Develops a basic understanding of biological topics relevant to students in the health sciences. Course will introduce students to biochemistry, cell biology, cellular respiration, cell replication, genetics, inheritance and molecular biology. Introduction to prions, viruses, prokaryotic and eukaryotic biology will also be covered.

Max Credits: 1
Min Credits: 1

81.201 General Microbiology

Course ID: 7474

Course Details: A study of the general properties of bacteria and viruses (anatomy, physiology, genetics, metabolism, cultivation, and growth); discussions include major microbial infections in man (etiologic agent, antibiotics and chemotherapy) and an examination of the role of the microbes in the environment.

Max Credits: 3
Min Credits: 3
81.203 General Microbiology Laboratory

Course ID: 7475

Course Details: A series of laboratory exercises covering basic qualitative and quantitative techniques commonly employed in a microbiology laboratory.

Max Credits: 2
Min Credits: 2

81.210 Biology for Engineers

Course ID: 37711

Course Details: Develops a basic understanding of the science of biology for engineering students, including and introduction to biochemistry, cell biology, metabolism, genetics, genomics, molecular biology, cell growth, and nutrition. Both eukaryotic and prokaryotic biology will be covered.

Max Credits: 3
Min Credits: 3

81.212 Biology for Engineers Laboratory

Course ID: 37712

Course Details: This laboratory course will build on 81.210. It will provide an introduction to several basic biological techniques and approaches used in biological engineering laboratories.

Max Credits: 1
Min Credits: 1

81.220 Principles of Cell and Molecular Biology

Course ID: 37710

Course Details: This course will cover basic topics in cell and molecular biology, including structures of proteins, lipids, carbohydrates and nucleic acids, structure of DNA and its replication and repair, transcription, and cell-cell communication. The molecular biology of cells and the regulation of cellular processes will be emphasized.

Max Credits: 3
Min Credits: 3

81.233 Experimental Methods in Biology

Course ID: 37713

Course Details: This is a project-based course designed to introduce students to the methods of general biological laboratory research. Techniques will be introduced in the context of interrelated experiments during a semester-long project. Techniques will include, but are not limited to: making solutions, pipetting, using sterile technique, gel electrophoresis, DNA transformations, minipreps, and other molecular and microscopic methods.

Max Credits: 2
Min Credits: 2

81.235 Genetics

Course ID: 36858

Course Details: The theories of both classical and molecular genetics are explored with emphasis on the experimental evidence which has laid the foundation for contemporary understanding of genetics, included is the nature of the genetic material, gene action, genetic recombination, gene regulation, gene interaction, the production and inheritance of genetic phenotypes, chromosomal mechanics, and the behavior of genes in populations.

Max Credits: 3
81.237 Problems in Genetics

Course ID: 36859
Course Details: Techniques of genetic analysis using molecular, prokaryotic and eukaryotic systems. There is an emphasis on problem solving and statistical methods.
Max Credits: 1
Min Credits: 1

81.240 Evolution, Ecology and Conservation

Course ID: 37718
Course Details: Over 5 million species thrive in amazingly diverse habitats on Earth ranging from the extreme freezing cold of the poles to the lush warmth of the tropics. How did this fantastic diversity arise on our earth? How are these species intimately interconnected with one another, their communities and their ecosystem? How can we save this remarkable biodiversity from extinction? This course will address these key questions by examining the fundamental concepts of evolution, ecology and conservation biology. Students will be expected to attend a discussion section in which they will examine case studies and primary scientific literature.
Max Credits: 3
Min Credits: 3

81.242 Problems in Evolution, Ecology and Conservation

Course ID: 37714
Course Details: A discussion session designed to reinforce material presented in 81.240, Evolution, Ecology and Conservation. An emphasis will be placed on problem solving.
Max Credits: 1
Min Credits: 1

81.252 Physiology

Course ID: 7481
Course Details: Presents a comprehensive study of the fundamental mechanisms governing mammalian physiology. The role of cell physiology in determining systemic functions and coordinating biological control systems will be emphasized. Maintenance of homeostasis will be discussed in terms of biochemical, cytological, anatomical, and physical principles.
Max Credits: 3
Min Credits: 3

81.254 Physiology Laboratory

Course ID: 7482
Course Details:
Max Credits: 2
Min Credits: 2

81.300 Directed Research Experience II

Course ID: 7485
Course Details:
Max Credits: 2
Min Credits: 2
81.301 Microbiology
Course ID: 36856
Course Details: General properties of bacteria and viruses including anatomy, physiology, genetics, metabolism, cultivation, growth, control and their role in the ecosystems, and industry.
Max Credits: 3
Min Credits: 3

81.303 Microbiology Laboratory
Course ID: 36855
Course Details: A series of laboratory exercises covering basic qualitative and quantitative techniques commonly employed in a microbiology laboratory including sterile technique, microscopy, enrichment and isolation, and prevention.
Max Credits: 2
Min Credits: 2

81.306 Invertebrate Zoology
Course ID: 7487
Course Details: A survey of the phyla of invertebrate animals. Discussions include their physiology, development, morphology, behavior, ecology and adaptations. Corequisite: 81.308
Max Credits: 3
Min Credits: 3

81.308 Invertebrate Zoology Lab
Course ID: 7488
Course Details: A broad spectrum of living and preserved specimens are studied in the laboratory with regard to both structure and function. Corequisite 81.306
Max Credits: 1
Min Credits: 1

81.315 Principles of Ecology
Course ID: 7491
Course Details: A series of lectures concerned with the interrelationships of organisms with their abiotic environment with emphasis on the New England area. Selected current topics will supplement the text.
Max Credits: 3
Min Credits: 3

81.317 Principles of Ecology Laboratory
Course ID: 7492
Course Details: A series of laboratory exercises to supplement and illustrate lectures of 81.315. Field trips are an integral part of the course involving sampling and analysis of such ecosystem components as water, soil, invertebrate fauna and characteristic flora of various habitats. Directed readings, quizzes, practical exam and oral presentation of a research topic are integral parts of the course.
Max Credits: 2
Min Credits: 2

81.320 Botany
Course Details: Serves as an introduction to the study of the plant kingdom dealing with the structure, function, and diversity of plants with an emphasis on seed plants. The physiology, morphology, and taxonomy of plants is emphasized.

Max Credits: 3
Min Credits: 3

**81.322 Botany Laboratory**

Course Details: Emphasizes material covered in 81.320 using field and laboratory exercises.

Max Credits: 1
Min Credits: 1

**81.324 Economic Botany**

Course Details: Discussions on how humans use plants. Topics will include: Structure and characteristics of woods and their uses in construction of various items, agricultural uses of food plants and spices, poisonous plants, medicinal plants, plants used in religious ritual and plants used as hallucinogens, plants that have altered human history.

Max Credits: 3
Min Credits: 3

**81.335 Principles of Genetics**

Course Details: The theories of both classical and molecular genetics are explored with emphasis on the experimental evidence which has laid the foundation for contemporary understanding of genetics. Included is the nature of the genetic material, gene action, genetic recombination, gene regulation, gene interaction, the production and inheritance of genetic phenotypes, chromosomal mechanics, and the behavior of genes in populations.

Max Credits: 3
Min Credits: 3

**81.337 Experimental Genetics**

Course Details: Techniques of genetic analysis using molecular, prokaryotic and eukaryotic systems. There is an emphasis on problem solving and statistical methods.

Max Credits: 1
Min Credits: 1

**81.401 Supervised Teaching Biology I**

Course Details: Through observation, preparation of material and presentation of demonstrations in selected courses offered by the Department of Biological Sciences, the student becomes familiar with the materials and teaching/learning situations in biology.

Max Credits: 1
Min Credits: 1

**81.402 Supervised Teaching Biology II**

Course ID: 7509
Course Details: Through observation, preparation of material and presentation of demonstrations in selected courses offered by the Department of Biological Sciences, the student becomes familiar with the materials and teaching/learning situations in biology.

Max Credits: 1  
Min Credits: 1

81.404 Environmental Microbiology

Course ID: 7510

Course Details: Examination of microbial communities in natural and artificial environments and interactions between microorganisms and their abiotic environments. Consideration is given to the role of microorganisms in the flux of energy and matter through ecosystems at molecular, ecosystem, and global scales; microbial consortia and symbioses; and modern techniques in environmental microbiology.

Max Credits: 3  
Min Credits: 3

81.409 Photobiology

Course ID: 36853

Course Details: Biological process involving light in plants and animals. Topics include mechanisms of light absorption, energy transduction, light reactions in photosynthesis, functions of color in flowering plants, visual systems and structural and pigment coloration in animals, pigmentation in animals affecting camouflage and reproductive strategies. In addition, the genetics involved in responses to light such as photoperiods, circadian rhythms, and seasonal cycles will be covered.

Max Credits: 3  
Min Credits: 3

81.411 Senior Research Biology

Course ID: 7512

Course Details: An individual, directed one-year research program for senior biology majors selected on the basis of previous academic performance at the end of the junior year. A topic will be chosen after consultation with a faculty member. A report of the research in the form of a thesis is required.

Max Credits: 4  
Min Credits: 4

81.412 Senior Research: Biology

Course ID: 7513

Course Details: An individual, directed one-year research program for senior biology majors selected on the basis of previous academic performance at the end of the junior year. A topic will be chosen after consultation with a faculty member. A report of the research in the form of a thesis is required.

Max Credits: 4  
Min Credits: 4

81.413 Invertebrate Zoology II

Course ID: 35512

Course Details: An in depth exploration of the deutorostome phyla with a focus on anatomy, ecology and evolution of the lophophorates, Echinodermata, Chaetognatha, Hemichordata and Chordata. Includes readings from the primary literature.

Max Credits: 3  
Min Credits: 3

81.415 Invertebrate Zoology Lab II
Course Details: The laboratory study of live and preserved specimens of invertebrate animals with a focus on anatomy and functional morphology.

Max Credits: 1
Min Credits: 1

81.416 Climate Change: Science, Communication, and Solutions

Course Details: Climate change offers one of the greatest challenges yet faced by society and scientists. The scientific consensus is clear that climate change is occurring, its pace is accelerating, its impacts on human society will be largely negative, and it is largely caused by anthropogenic greenhouse gas emissions. Yet, despite strong scientific evidence for the enormous challenges that society may face, scientists’ attempts to disseminate that evidence beyond their peers have not yet been successful. Indeed in today’s media world of blogs, YouTube video clips, and sound-bites, confusion over the scientific reality of climate change frequently dominates the discourse in classrooms and communities. This course will provide students with the tools and knowledge that they need to develop their own well-informed view of climate change. Because climate change is both impacted by humans and will increasingly impact society, this course takes a cross-disciplinary approach, integrating science, policy solutions, and media literacy as they relate to climate change.

Max Credits: 4
Min Credits: 4

81.419 Biochemistry

Course Details: Studies the structure and properties of proteins, carbohydrates, and lipids which combined with a discussion of elementary enzymology allows for detailed descriptions of several important degradative and biosynthetic pathways, their integration and regulation. Throughout the course, emphasis is on methods and practical application of fundamental information to the solution of problems of current biomedical interest.

Max Credits: 3
Min Credits: 3

81.421 Biochemistry Techniques

Course Details: A series of discussions and "hands on" laboratory exercises emphasizing techniques and use of equipment most commonly employed in biochemical-biomedical research laboratories. Techniques to be mastered include: cell culture, cell fractionation, enzyme purification, ultracentrifugation, UV-visible spectrophotometry, spectrofluorometry, various types of chromatography (thin layer, gas, gel exclusion, ion exchange), electrophoresis, liquid scintillation spectrometry, and the safe handling and application of radioisotopes to problems in biochemistry. Wherever possible, the principles presented in 81.419 will be used as a basis for experimentation using the above techniques.

Max Credits: 2
Min Credits: 2

81.423 Biology of Global Change

Course Details: An examination of the role of life processes in controlling the cycling of elements on the surface of the Earth and atmosphere from the molecular to the global level. Students will learn how the different physical components of Earth interact, how these interactions are influenced by life, and how they affect Earth's habitability now and in the future.

Max Credits: 3
Min Credits: 3

81.426 Evolutionary Biology

Course ID: 36580
Course Details: Examines the patterns and processes of biological evolution that have led to the diversity of life. Topics covered include the history of evolutionary thought, the evidence for evolution, the generation and maintenance of population-level variation, natural selection, adaptation, sexual selection, speciation, phylogenetics, molecular evolution, the fossil record and extinctions. In addition to lecture and textbook material, students will read and discuss classic and contemporary primary literature from evolutionary biology.

Max Credits: 3
Min Credits: 3

81.428 Molecular Biotechnology: Recombinant Protein Production

Course ID: 37369

Course Details: Proteins are major targets of pharmaceuticals, and are themselves increasingly used as therapeuticals. However both basic research and the pharmaceutical industry depends on availability of purified proteins that are often difficult to isolate from native sources. In this lecture course, students will learn basic and advanced theoretical background in expression and purification of recombinant proteins. It will cover a variety of expression systems including prokaryotic and eukaryotic cells. The course will also address traditional and new methods in recombinant protein purification. Furthermore, students will be introduced to some downstream applications such as crystallization screens and biochemical/biophysical studies.

Max Credits: 3
Min Credits: 3

81.432 Genomics

Course ID: 37715

Course Details: This course surveys the field of genomics, examining current technologies and their biological applications. Lectures cover genome organization, genome sequencing and annotation, functional genomics, evolutionary genomics, transcriptomics, proteomics and the role of bioinformatics in organizing and interpreting genomic data.

Max Credits: 3
Min Credits: 3

81.434 Genomics Laboratory

Course ID: 37716

Course Details: A series of molecular laboratory and computer-based bioinformatics exercises providing practical experience in the collection and analysis of genomic-level data.

Max Credits: 1
Min Credits: 1

81.437 Biology and Evolution of Arthropoda

Course ID: 37441

Course Details: A detailed examination of phylum Arthropoda from developmental, ecological, genetic, morphological and paleontological perspectives. Specific topics include the relationships of arthropods to protoarthropod-like groups including tardigrades and onychophorans, the evolution of segmentation, and current perspectives on relationships within the phylum.

Max Credits: 3
Min Credits: 3

81.439 Biology and Evolution of Arthropoda Laboratory

Course ID: 37442

Course Details: An exploration of protoarthropod and arthropod diversity using live and preserved specimens of the major taxa including Tardigrada, Onychophora, Chelicerata, Crustacea, Myriapoda and Hexapoda. Students will learn to collect, dissect, identify, handle and care for live specimens.

Max Credits: 1
Min Credits: 1

**81.440 Advances in Plant Biology**

Course ID: 32943

Course Details: Examination of a range of topics in plant biology with an emphasis on processes that are unique to plants. The course will focus first on the role of plants in human affairs, and basic plant anatomy, physiology and genetics followed by three or more topics at an advanced level. Typical focus areas may include biosynthesis and regulation of fatty acids, metabolism of aromatic amino acids, studies of pathways leading to the synthesis of useful natural plant products and the genetic manipulation of plants to promote plant improvement.

Max Credits: 3
Min Credits: 3

**81.442 Cell Biology**

Course ID: 7521

Course Details: Deals with the study of the cell and its cytoplasm incorporating the structure of cell membranes and the organelles they define; specialized organelles dealing with energy capture and transduction, some aspects of histochemical and biochemical studies on cytoplasmic organelles at the electron microscopic level. An introduction into cytogenetics and nuclear cytology; a brief discussion of prokaryotic cells.

Max Credits: 3
Min Credits: 3

**81.451 Senior Seminar in Biology**

Course ID: 7523

Course Details: This course instructs students in developing effective writing and speaking skills required for preparation of scientific manuscripts and presentations, and communicating in the scientific world. Students will be required to prepare and present oral presentations and to submit written reports.

Max Credits: 2
Min Credits: 2

**81.452 Senior Seminar II**

Course ID: 7524

Course Details: Seminar discussion of selected topics of current research interest. An oral seminar presentation as well as a written report are required of all biology seniors.

Max Credits: 1
Min Credits: 1

**81.457 Advanced Invertebrate Zoology**

Course ID: 33457

Course Details: Comparative functional morphology, life histories, and phylogeny of a particular taxon (Crustacea, Molusca) of invertebrates.

Max Credits: 3
Min Credits: 3

**81.459 Advanced Invertebrate Zoology Laboratory**

Course ID: 33458

Course Details: Classification, identification, anatomy and physiology of selected invertebrates.

Max Credits: 1
81.460 Stem Cell Biology

Course ID: 33651

Course Details: The molecular and genetic characteristics of stem cells and their developmental potential will be explored. Lectures and readings will cover the development of embryonic, fetal and adult stem cells, and will examine their use in treating human disorders receiving widespread attention, including neurodegenerative diseases, heart disease, spinal cord injury and leukemia. The ethical, legal and social implications of stem cell research will also be discussed. Additional library investigation and a term paper or seminar will be required.

Max Credits: 3

81.467 Molecular Biology

Course ID: 1234

Course Details: A study of the principles and specialized techniques of cloning, purifying, and manipulating recombinant DNA molecules.

Max Credits: 3

81.472 Virology

Course ID: 7528

Course Details: A study of bacterial, animal, and plant viruses, including viral structure, modes of replication, biochemistry of the infected cell, genetic properties, and viral oncogenesis. Emphasis is on virus-cell interaction at the molecular level.

Max Credits: 3

81.476 Cell Culture

Course ID: 1233

Course Details: A series of lecture and laboratory exercises that will focus on the in vitro culture and analysis of multiple cell types commonly used in biomedical research laboratories. The lecture component will review methodologies used to establish immortalized cell lines, medium components for specific cell types, and techniques for genetically manipulating and analyzing cell lines. The laboratory exercises will emphasize the mastery of sterile techniques used to grow both established cell lines and primary cultures, and molecular tools used for introducing recombinant genes and for analyzing cell growth and differentiation.

Max Credits: 4

81.482 Cancer Biology

Course ID: 33459

Course Details: A study of the genes and proteins implicated in the cause of human cancer and discussion of the complex behaviors of cancer cells that differ from their normal counterparts in human tissue. Lectures and original research papers will be used.

Max Credits: 3

81.488 Structural Biology

Course ID: 37717

Course Details: Structural basis of the molecular biology of cells and the regulation of cellular processes will be discussed.
This course will cover the fundamental knowledge about protein, nucleic acid and membrane structure in relation to central systems in biology. Topics to be discussed include structural enzymology, macromolecular assemblies for replication, transcription, translation, membrane proteins, signal transduction, cell motility and transport, cell-cell interactions, the immune system, and virus structure.

Max Credits: 3
Min Credits: 3

81.489 Practical Protein Crystallography

Course ID: 38015

Course Details: This course provides grounding in the principles and practice of protein x-ray crystallography. The course will be unique in format and provide both didactic and laboratory instruction. It is comprised of a series of lecture and laboratory exercises, with an emphasis on practical techniques and hands-on experience of modern protein crystallography. The course will cover the fundamental knowledge about x-ray physics, instrumentation and geometrical diffraction, protein crystallization, macromolecular data collection and processing, phase estimation and improvement, model building and refinement, and model assessment. Student will also be given a recently published structural paper for writhing a report on the subject.

Max Credits: 4
Min Credits: 4

81.490 Human Neurobiology

Course ID: 31890

Course Details: A study of cellular and systems neurobiology with a focus on how these relate to human health and disease. Particular attention will be given to illustrating functional neuroanatomy and neurophysiology of the human CNS using investigations into the pathogenic mechanisms of a variety of human neurodegenerative diseases including epilepsy, Alzheimer's Disease, Huntington's Disease, ALS among others. Note: Graduate level enrollees will be responsible for additional reading and writing.

Max Credits: 3
Min Credits: 3

81.491 Senior Project: Biology

Course ID: 7531

Course Details: Individual, directed one semester research project taken in the fall and/or spring. Presentation of an acceptable project plan at the time of registration is required. A project report is required.

Max Credits: 4
Min Credits: 4

81.492 Senior Project: Biology

Course ID: 7532

Course Details: Individual, directed one semester research project taken in the fall and/or spring. Presentation of an acceptable project plan at the time of registration is required. A project report is required.

Max Credits: 4
Min Credits: 4

81.493 Immunology

Course ID: 1231

Course Details: A study of the nature of the immune response with sections on antibody structure, function and production; antigen-antibody reactions; immunogenetics; and immune regulation, protection and injury.

Max Credits: 3
Min Credits: 3
81.495 Immunology Laboratory

Course ID: 1230

Course Details: A series of basic laboratory exercises dealing with the preparation, isolation and characterization of antigens, antibodies and effector cells.

Max Credits: 2
Min Credits: 2

81.496 Practicum Experience

Course ID: 7533

Course Details: On-campus and/or off-campus experiences are developed by the student in consultation with a member of the student's major department. Specific requirements will vary depending upon department policies and the nature of the program undertaken by the student. The intent of the practicum experience is to provide an occasion for investigation of a scientific area and for applying techniques of problem solving and/or skills which are appropriate to the student's major discipline. The practicum experience may not be substituted for a required course in the major.

Max Credits: 3
Min Credits: 3

81.498 Directed Study: Biology

Course ID: 33123

Course Details:

Max Credits: 2
Min Credits: 2

82.3CE Cooperative Education Work Experience I

Course ID: 37663

Course Details: This zero credit course is specifically designated for undergraduate students in the College of Sciences who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program and have secured their first, full-time co-op employment. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0
Min Credits: 0

82.4CE Cooperative Education Work Experience II

Course ID: 37802

Course Details: This zero credit course is specifically designed for undergraduate students from participating majors in the College of Sciences, who are participating in the voluntary co-op experience is designed to provide students the opportunity to develop and enhance their technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by their Co-op Coordinator.

Max Credits: 0
Min Credits: 0

82.210 Professional Development Seminar

Course ID: 36959

Course Details: The Professional Development Seminar is designed to provide students with the necessary structure, resources, and support to successfully secure and engage in their first cooperative education experience. Through a variety
of teaching methodologies and assignments, students will participate in a sequence of learning activities including self-
assessment, industry research, and the development of co-op learning objectives. Students will prepare to engage in the job
search process through resume writing, strategic interviewing, professional networking and through learning professional
behavior and presentation skills. The goal of the course is to assist each student in developing a sound plan of action to
successfully participate in the cooperative education experience.

Max Credits: 1
Min Credits: 1

**82.310 Co-op Assessment 1**

Course ID: 36960

Course Details: The primary goal of this seminar is to assist students in the overall assessment of their overall cooperative
education experience. Through facilitated small group discussion, individual consultation and hands on practice, students will
have an opportunity to identify and articulate their technical and professional skills, and explore how these skills and their co-
op employment might be translated and leveraged into future work environments and their academic program at UML.

Max Credits: 1
Min Credits: 1

**82.410 Co-op Assessment 2**

Course ID: 36961

Course Details: This seminar is designed to support and assist students in the continued assessment of their cooperative
education experience. Through a deepening of their work in Co-op Assessment 1, students will review their overall
performance in the cooperative education program, while continuing to demonstrate their technical and professional skills
through written work and public presentations to multiple audiences. It is expected that students will clearly define their future
academic and career goals, enhance their professional networks, and develop a future plan to support their engineering
aspirations.

Max Credits: 1
Min Credits: 1

**83.100 Introduction to Biology**

Course ID: 7612

Course Details: Presents environmental and organismal structural interrelationships and relates these to the chemical
evolutionary basis of life. Not suitable for credit towards any degree in the Division of Sciences.

Max Credits: 3
Min Credits: 3

**83.101 Life Science I**

Course ID: 7613

Course Details: Presents environmental and organismal structural interrelationships and relates these to the chemical
evolutionary basis of life. Suitable as a Natural Science Elective for a degree in the Division of Sciences.

Max Credits: 3
Min Credits: 3

**83.102 Life Science II**

Course ID: 7614

Course Details: Emphasis is on systems structure and function. The cellular organization of plants and animals leads into
physiological processes of higher organisms with great emphasis on humans. Among topics considered are nutrition and
digestion, cellular metabolism, circulation, respiration, excretion, nervous and skeletal-muscular systems. Also considered
are the chemical interactions of these systems with immunity, hormonal and reproductive processes. Suitable as a Natural
Science Elective for a degree in the Division of Sciences.

Max Credits: 3
Min Credits: 3

**83.103 Life Science I Laboratory**

Course ID: 7615

Course Details: Concerned with experimentation and interpretation of some of the concepts of Life Science I. Suitable as a Natural Science Elective for a degree in the Division of Sciences.

Max Credits: 1

Min Credits: 1

**83.104 Life Science II Laboratory**

Course ID: 7616

Course Details: Involved with experimentation and interpretation of some of the concepts of Life Science II. Suitable as a Natural Science Elective for a degree in the Division of Sciences.

Max Credits: 1

Min Credits: 1

**83.105 Introduction to Biology Lab**

Course ID: 7617

Course Details: Introduction to Biology Laboratory is a co-requisite course for the Introduction to Biology online lecture course - 83.100. The two courses together fulfill a GenEd Science requirement. The lab course can be taken concurrently with the lecture course or subsequent to it. Weekly labs correspond directly with the chapter assignments provided by the 83.100 instructors.

Max Credits: 1

Min Credits: 1

**83.110 Microbes and Society: Good, Bad and Ugly**

Course ID: 35780

Course Details: Examines historical aspects of microbial interactions with human society, including the use of microbes in food production, agriculture, biotechnology, industry and environmental preservation; explores bioterrorism, the problem of antibiotic resistance and surveys some historical and contemporary microbial diseases.

Max Credits: 3

Min Credits: 3

**83.123 Nutrition and Disease**

Course ID: 7620

Course Details: Serves as an interdisciplinary survey course for students not majoring in biology, which deals with human nutrition as it relates to various chronic disease states. Methods of detection and treatment of the disorders are considered as well as general concepts of health promotion/disease prevention based on the Dietary Guidelines for Americans. Specific topics covered include the role of nutrition in: heart disease, diabetes, cancer, obesity, alcoholism, and eating disorders. Not suitable for credits toward any degree in the Division of Sciences.

Max Credits: 3

Min Credits: 3

**83.125 Plants and Human Society**

Course ID: 7621

Course Details: This course is designed primarily to fulfill the science elective requirement for the non-science major. Its purpose is to provide the undergraduate student who is not majoring in the biological sciences with an introduction to the study of plants and their importance in our everyday world. The importance of plants in agriculture, medicine and industry will
be emphasized. Not suitable for credit towards any degree in the Division of Sciences.

Max Credits: 3
Min Credits: 3

**83.127 Plants & Human Society Lab**

Course ID: 30382

Course Details: Not suitable for credit towards any degree in the Division of Sciences.

Max Credits: 3
Min Credits: 3

**83.214 Human Ecology**

Course ID: 7626

Course Details: Designed to reveal and discuss the increasing problems of overpopulation in regard to environmental deterioration, living space, limits of natural resources and the adverse effects of human alteration on destruction of the natural ecosystem. The implications of current literature and news items will be emphasized. Not suitable for credit towards any degree in the Division of Sciences.

Max Credits: 3
Min Credits: 3

**84.101 Applied Chemistry for Non-Scientists**

Course ID: 7633

Course Details: Provides an understanding of basic chemical principles – atomic structure, bonding and interparticle forces, physical and chemical properties of matter through hands-on examination of matter and the application of principles to understanding the chemistry of current issues (e.g., environmental chemistry, biochemistry, food and drug chemistry) and the analysis of problems dealing with these issues. This course is not available for credit for Science or Engineering majors.

Max Credits: 3
Min Credits: 3

**84.102 Forensic Science for the Non-Scientist**

Course ID: 35546

Course Details: This course presents the inherently fascinating topics of crime and criminal investigations as a pathway for teaching the fundamental chemical concepts most often covered in an introductory non-majors course. This course capitalizes on the surge of interest in the scientific investigation of crime (as sparked by CSI and other television shows) and will collate the theme of forensic science with the fundamentals of chemistry. The course material will be continually updated with each offering.

Max Credits: 3
Min Credits: 3

**84.105 Intro to the Discipline of Chemistry**

Course ID: 36857

Course Details: This course provides an introduction to chemistry as a career. Required of chemistry majors, it discusses historical aspects of the field and modern career paths, including academic and industrial chemistry. Students are presented with information regarding career opportunities in chemistry, including: analytical/environmental, forensics, inorganic, organic, materials, pharmaceutical/biochemistry, polymer, and theoretical/physical. They are also given an introduction to graduate school and teaching opportunities often pursued following the B.S. degree. In addition to lectures by the instructor, guests from industry and government laboratories are invited to discuss "what it means to be a chemist".

Max Credits: 1
Min Credits: 1
84.111 General Chemistry I

Course ID: 7634

Course Details: Provides a one-semester survey of inorganic chemistry: the structure and properties of matter, chemical reactions, stoichiometry, gas laws, solution chemistry, kinetics, equilibrium, and acid-base chemistry.

Max Credits: 3
Min Credits: 3

84.112 General Chemistry II

Course ID: 7635

Course Details: Surveys the basic principles of organic chemistry and biochemistry with emphasis on biochemical aspects of carbohydrates, lipids, proteins and nucleic acids. Various metabolic pathways are also emphasized.

Max Credits: 3
Min Credits: 3

84.113 General Chemistry Laboratory I

Course ID: 7636

Course Details: Lab experiments designed to illustrate the principles covered in 84.111.

Max Credits: 1
Min Credits: 1

84.114 General Chemistry Laboratory II

Course ID: 7637

Course Details: Uses laboratory experiments designed to illustrate the principles discussed in 84.112.

Max Credits: 1
Min Credits: 1

84.117 Selected Topics in Chemistry

Course ID: 30383

Course Details: A one semester general chemistry course for mechanical engineering students. The properties of matter, chemical bonding, stoichiometric relationships, energy and chemical thermodynamics, kinetics, chemical equilibrium, electrochemistry and nuclear chemistry are the major areas discussed. Relationships among chemistry, material science and engineering are central to the course. Problem solving is emphasized.

Max Credits: 3
Min Credits: 3

84.121 Chemistry I

Course ID: 7639

Course Details: Provides an introduction to the basic concepts of chemistry through classroom discussions and demonstrations. Topics include chemical calculations, atomic structures, the periodic table, basic bonding theory, solutions, liquids, and gases. Restricted to science, engineering, and engineering technology majors.

Max Credits: 3
Min Credits: 3

84.122 Chemistry II

Course ID: 7640
Course Details: Serves as a continuation of 84.121. Topics include thermodynamics; kinetics, acids and bases; an introduction to organic chemistry; chemical equilibrium; precipitation reactions; and electrochemistry. Restricted to science, engineering, and engineering technology majors.

Max Credits: 3
Min Credits: 3

84.123 Chemistry I Laboratory

Course ID: 7641

Course Details: Studies experimental chemical principles and chemical transformation that is coordinated with topics considered in 84.121. Some of the more important reactions of elements, oxides, acids, bases, and salts are examined. Other topics include chemical separation, purification, preparation of inorganic salts, quantitative determinations dealing with the formula of a compound, gas laws, and colligative properties. Careful techniques and precise measurements are stressed. Restricted to science, engineering, and engineering technology majors.

Max Credits: 1
Min Credits: 1

84.124 Chemistry II Laboratory

Course ID: 7642

Course Details: Serves as a continuation of the laboratory study begun in 84.123 that is coordinated with topics of 84.122. Topics include: thermochemistry, kinetics, spectroscopy, titration, pH, equilibrium reaction and constants. Some aqueous solution reactions and organic reactions are examined. Accurate measurements and precise instrumental and apparatus operation are expected. Restricted to science, engineering, and engineering technology majors.

Max Credits: 1
Min Credits: 1

84.135 Honors Chemistry I

Course ID: 7643

Course Details: A more in-depth view of the topics covered in Chemistry I, (84.121). Topics include chemical reactions and calculations, atomic history and structures, the behavior of gases and bonding theory. Open to students enrolled in the Honors Program, and may be taken instead of 84.121.

Max Credits: 3
Min Credits: 3

84.136 Honors Chemistry II

Course ID: 7644

Course Details: A continuation of 84.135. A more in-depth view of the topics covered in Chemistry II (84.122). Topics include solutions, kinetics, thermodynamics, acids and bases, chemical equilibrium, electrochemistry and solubility. Open to students enrolled in the Honors Program, and may be taken instead of 84.122.

Max Credits: 3
Min Credits: 3

84.204 Introduction to Organic and Polymer Chemistry

Course ID: 7650

Course Details: This course is a one-semester overview of organic chemistry for plastics engineering majors. Organic chemistry and its associated principles underscore a broad component of the plastics engineering curriculum. It is desirable therefore for such students to develop a basic appreciation of the fundamental reactions in organic chemistry, as well as an understanding of the interaction of organic compounds with their environment. Students will therefore be expected to secure a basic understanding of, e.g., chemical bonding, the chemistry of alkanes, alkenes, alkynes, aromatic compounds, substitution and elimination reactions, reactions of organic alcohols, ethers, epoxides, aldehydes and ketones, carboxylic acids, and amine compounds. When appropriate, examples will be provided that relate to those typical polymerization
reactions (e.g. free-radical or ionic) employed to manufacture commercial polymer materials. Coverage will include synthesis of organic chemicals and polymers from natural and sustainable materials.

Max Credits: 3
Min Credits: 3

**84.205 Principles Of Organic Chemistry Laboratory**

Course ID: 7651

Course Details: Introduction to the basic skills and techniques used in the synthesis, purification, and characterization of representative organic compounds. Open to Plastics Engineering students in the fall semester and Chemical Engineering students in the spring semester.

Max Credits: 1
Min Credits: 1

**84.221 Organic Chemistry IIA**

Course ID: 7655

Course Details: Studies the basic principles and reactions which characterize the chemical behavior of carbon compounds. Nomenclature, reactions, reaction mechanisms, and stereochemistry will be covered. Required for chemistry majors.

Max Credits: 3
Min Credits: 3

**84.222 Organic Chemistry IIB**

Course ID: 7656

Course Details: A continuation of 84.221 including an introduction to infrared and NMR spectroscopy and biochemistry. The application of organic reactions in multi-step synthesis is stressed.

Max Credits: 3
Min Credits: 3

**84.227 Organic Chemistry Laboratory I**

Course ID: 7661

Course Details: Laboratory work designed to emphasize the techniques of organic synthesis and the use of instrumentation for identification and characterization of organic compounds. Required for chemistry majors.

Max Credits: 2
Min Credits: 2

**84.228 Organic Chemistry Laboratory II**

Course ID: 7662

Course Details: A continuation of 84.227 including an introduction to semimicro organic techniques. Planning and successfully carrying out reactions published in the chemical literature are emphasized. Required for chemistry majors.

Max Credits: 2
Min Credits: 2

**84.229 Organic Chemistry Laboratory IIA**

Course ID: 7663

Course Details: Reviews techniques, skills, and heuristic approaches in the synthesis, purification, and identification of organic compounds. IR, GC, and NMR instrumental methods are included.

Max Credits: 1
84.230 Organic Chemistry II A Lab
Course ID: 7664
Course Details: A continuation of 84.229.
Max Credits: 1
Min Credits: 1

84.260 Information Retrieval
Course ID: 7665
Course Details: An introduction to the important chemical and chemical-related reference sources including journals, patents, technical publications, and compiled reference works, and instructions in their use. Assignments require the use of each source discussed. On-line searching using computerized chemical and chemical related databases is also introduced.
Max Credits: 2
Min Credits: 2

84.301 Special Topics: Chemistry
Course ID: 7667
Course Details:
Max Credits: 3
Min Credits: 3

84.303 Forensic Science I
Course ID: 35812
Max Credits: 3
Min Credits: 3

84.304 Forensic Science II
Course ID: 35813
Course Details: Drug Analysis I, Drug Analysis II, Chemistry of combustion and Arson, Chemistry of color and colorants, Analysis of ink and paints, Chemistry of polymers, Analysis of fibers and papers.
Max Credits: 3
Min Credits: 3

84.305 Forensic Science I Laboratory
Course ID: 35814
Course Details: Locard’s exchange principle, Reagent preparation, crime scene investigation, a case of deductive reasoning, crime scene sketching, Forensic glass analysis, Fingerprint, Introduction to Microscopy, Color perception.
Max Credits: 1
Min Credits: 1

84.306 Forensic Science II Laboratory
Course ID: 35815

Course Details: Forensic hair analysis, Handwriting comparison, Fluorescence detection of drug, Introduction to Immunoassay and enzyme catalysis, Fluorescence microscopy Analysis of gunshot residues, Analysis of metal, Analysis of flammable.

Max Credits: 1
Min Credits: 1

84.313 Analytical Chemistry I

Course ID: 7668

Course Details: Focuses on the evaluation of analytical data, aqueous and non-aqueous acid-base systems, oxidation reduction and complexation equilibria, solubility and precipitation, solvent extraction, ion-exchange and chromatographic methods.

Max Credits: 3
Min Credits: 3

84.314 Analytical Chemistry II

Course ID: 7669

Course Details: Introduces modern instrumental methods of chemical analysis. Topics to be discussed include ultraviolet, infrared nuclear magnetic resonance, emission and atomic absorption spectroscopy. Mass spectrometry, chromatography, thermal and electrochemical methods of analysis will also be covered.

Max Credits: 3
Min Credits: 3

84.315 Analytical Chemistry Laboratory I

Course ID: 7670

Course Details: Experiments emphasizing the topics presented in 84.313 are conducted.

Max Credits: 2
Min Credits: 2

84.316 Analytical Chemistry Laboratory II

Course ID: 7671

Course Details: Presents laboratory experiments designed to complement the coverage of topics in 84.314.

Max Credits: 2
Min Credits: 2

84.339 Physical Chemistry Principles

Course ID: 7676

Course Details: A one-semester course designed for plastics engineering majors. Physical chemical concepts of importance to plastics and polymeric materials are emphasized and include kinetics, spectroscopy, phase rule, and statistical thermodynamics.

Max Credits: 2
Min Credits: 2

84.344 Physical Chemistry I

Course ID: 7678

Course Details: Covers basic physical chemical topics: laws of thermodynamics, solutions, chemical and phase equilibria,
electrochemistry, kinetics, atomic, and molecular structure.

Max Credits: 3
Min Credits: 3

84.345 Physical Chemistry II

Course ID: 7679
Course Details: Serves as a continuation of 84.344.
Max Credits: 3
Min Credits: 3

84.346 Physical Chemistry Laboratory I

Course ID: 7680
Course Details: Laboratory work designed to exemplify principles covered in 84.344. Required for chemistry majors.
Max Credits: 2
Min Credits: 2

84.347 Physical Chemistry Laboratory II

Course ID: 7681
Course Details: Provides laboratory work designed to exemplify the principles of chemical kinetics, equilibrium, and spectroscopy.
Max Credits: 1
Min Credits: 1

84.350 Physical Bioinorganic Laboratory

Course ID: 7682
Course Details: Coordination compounds are utilized in a core of experiments to illustrate basic physiochemical techniques and analysis of experimental data in electrochemistry and kinetics. A project lab is carried out to apply and extend techniques learned.
Max Credits: 2
Min Credits: 2

84.407 Undergraduate Thesis

Course ID: 7689
Course Details: Research in biochemistry, electrochemistry or analytical, organic, inorganic, physical or polymer chemistry. Progress report required.
Max Credits: 3
Min Credits: 3

84.408 Undergraduate Thesis II

Course ID: 7690
Course Details: A continuation of 84.407. Both semesters must be taken and not more than six credits may be used in meeting degree requirements. A written thesis and seminar are required. The written thesis is to follow the conventional form of introduction, literature survey, data, results, and conclusions. One copy of the thesis must be filed in the Department office.
Max Credits: 3
Min Credits: 3
84.443 Advanced Inorganic Chemistry

Course ID: 30385

Course Details: The chemical behavior, structure and methods of preparation and nomenclature of the more common elements and their compounds.

Max Credits: 3
Min Credits: 3

84.445 Advanced Inorganic Lab

Course ID: 30386

Course Details: Laboratory to study the reactions of ions in aqueous solutions and to carry out inorganic syntheses and characterizations.

Max Credits: 2
Min Credits: 2

84.450 Introduction To Biochemistry

Course ID: 7692

Course Details: An introductory study of the fundamental principles of biochemistry including the chemistry of proteins, carbohydrates, nucleic acids and lipids, thermodynamics, kinetics and mechanisms of enzyme action, intermediary metabolism and selected topics in molecular biology.

Max Credits: 3
Min Credits: 3

85.102 Weather Forecasting Seminar

Course ID: 7764

Course Details: Introduction to forecasting techniques including use of upper air observations and numerical forecast guidance. This course is intended primarily for students majoring in the various options of environmental science. It does not satisfy specific science requirements for majors in the Division of Science.

Max Credits: 1
Min Credits: 1

85.120 The Nature of Science

Course ID: 7765

Course Details: In this course students are introduced to the role of critical thinking in the development of scientific theories. Several major areas of science are explored with a focus on the link between conceptual thought and the resulting physical laws. The importance to society of scientists and citizens making informed decisions on science/technology issues are examined. Methods to gather and assess data are discussed and a number of examples of the use of scientific principles to prove fact or fraud are studied. The students will learn how to question propositions put before them.

Max Credits: 3
Min Credits: 3

85.141 Weather and Climate

Course ID: 7766

Course Details: Serves as a general meteorology course for the non-science major. Topics include: atmospheric composition, solar radiation, temperature, moisture and condensation relationship between air pressure and wind, weather patterns, severe weather, optical phenomena in the atmosphere, and the behavior and possible change of climate. This course satisfies the Gen Ed science requirement, but not specific science requirements for majors in the Division of Science.
Max Credits: 3
Min Credits: 3

85.143 Weather and Climate Laboratory

Course ID: 7767

Course Details: The laboratory encourages students to apply knowledge from the lectures to a variety of atmospheric and climatic phenomena developed from data analysis, experimentation, and maps. Synthesis and critical thinking are encouraged in the solution of problems.

Max Credits: 1
Min Credits: 1

85.213 Atmospheric Science Laboratory

Course ID: 7770

Course Details: The plotting and analysis of meteorological data is introduced, with the goal of understanding the basis for various ways of looking at weather systems. After each technique is introduced, students will see the computer counterpart using the workstations in the weather lab. Both the strengths and weaknesses of automated displays are made clear to students, thus making them better able to interpret the computer images on a daily basis.

Max Credits: 1
Min Credits: 1

85.214 Meteorology Analysis Laboratory

Course ID: 7771

Course Details: The use of the skew-T diagram to understand the vertical structure in the atmosphere is the main focus of this course. Students will learn to plot and analysis atmospheric sounding data, and to recognize various structures in the analyzed data. Both hand and computer-aided analysis will be compared.

Max Credits: 1
Min Credits: 1

85.234 Scientific FORTRAN Programming

Course ID: 7772

Course Details: A basic course in computer programming using FORTRAN 90/95. Topics include programming arithmetic, decisions, repetition, input/output structures, arrays and array processing, and simple algorithms for searching and sorting.

Max Credits: 3
Min Credits: 3

85.291 Practicum in Meteorology

Course ID: 7773

Course Details:
Max Credits: 3
Min Credits: 1

85.301 Atmospheric Dynamics

Course ID: 7774

**85.304 Methods in Meteorology I**

Course ID: 7776

Course Details: The application of vector analysis to dynamic meteorology. Three-dimensional divergence and vorticity, circulation, and solenoids. Selected ordinary and partial differential equations of fluid mechanics and their solutions. Spectral decomposition of hemispheric wave motion.

Max Credits: 3
Min Credits: 3

**85.305 Methods in Meteorology II**

Course ID: 7777

Course Details: Fundamentals of numerical weather prediction. Data analysis methods in meteorology using the techniques of curve fitting, correlation, and power spectrum analysis. Solution of stability problems.

Max Credits: 3
Min Credits: 3

**85.308 Forecasting and Synoptic Techniques I**

Course ID: 7779

Course Details: Explores techniques of synoptic analysis including graphical subtraction, thickness analysis, isentropic analysis, streamlines and trajectories, divergence and vorticity. The use of a computer to perform these computations is explored through student projects.

Max Credits: 3
Min Credits: 3

**85.309 Forecasting and Synoptic Techniques II**

Course ID: 7780

Course Details: Explores three-dimensional structure and dynamics of mid-latitude storm systems; capabilities and limitations of the barotropic model; quasi-geostrophic model; and operational primitive equation models. Some mesoscale phenomena are covered as time permits including coastal cyclogenesis, thermal lows, and sea-breeze circulations.

Max Credits: 3
Min Credits: 3

**85.313 Physical Climatology**

Course ID: 7781

Course Details: Atmospheric processes determining the climate: solar and terrestrial radiation, elevation and thermal properties of surfaces, atmospheric circulations and eddy conduction between the atmosphere and land or sea surfaces, heat and water balance of earth's surface and the atmosphere; hydrologic cycle; and climatic simulation models.

Max Credits: 3
Min Credits: 3

**85.340 Tropical Meteorology**

Course ID: 7782

Course Details: An introduction to the tropical atmosphere including tropical climatology, structure and dynamics of easterly waves, tropical cyclones and monsoonal circulations.

Max Credits: 3
85.350 Satellite and Radar Meteorology

Course ID: 7783

Course Details: Explores theory and applications of radar, satellites, and lidar. Use of satellite imagery as a forecasting aide, theory and use of satellite profiling, and application of conventional and Doppler radar to severe weather and short term forecasting. Use of lidar and other profiling techniques to determine vertical temperature structure and turbulence.

Max Credits: 3
Min Credits: 3

85.403 Physical Meteorology

Course ID: 7785

Course Details: Explores solar and terrestrial radiation processes and the heat balance of the atmosphere; fundamentals of radiation theory; radiative transfer processes in the atmosphere; atmospheric condensation processes; and nucleation theory and the growth of water drops and ice crystals by condensation, sublimation and accretion.

Max Credits: 3
Min Credits: 3

85.410 Advanced Forecasting

Course ID: 7786

Course Details: Advanced analysis techniques and their use as forecasting tools are explored in both manual and computer formats. Techniques include moisture advection, moist isentropic trajectories, boundary layer destabilization, and other state-of-the-art techniques. Application of techniques to small and mesoscale phenomena.

Max Credits: 3
Min Credits: 3

85.415 Advanced Atmospheric Dynamics I

Course ID: 7788


Max Credits: 3
Min Credits: 3

85.416 Advanced Atmospheric Dynamics II

Course ID: 7789


Max Credits: 3
Min Credits: 3

85.420 Introduction to Operational Numerical Weather Prediction

Course ID: 36535

Course Details: In this class, the student will learn the structure and science behind modern numerical weather prediction models and how to use them to solve real-world issues facing modern meteorological consultants. The student will learn how to operate and apply a modern numerical weather prediction model to study such issues as offshore wind farm siting, solar
power prediction, and energy load forecasting. Students should be prepared to use Linux-based PC's (supplied) to perform and submit projects.

Max Credits: 3
Min Credits: 3

85.471 Air Pollution

Course ID: 7791
Course Details:
Max Credits: 3
Min Credits: 3

85.484 Space Weather

Course ID: 35075
Course Details: Space Weather is an emerging field of space science focusing on understanding the conditions and processes on the sun, in the interplanetary space, and in the Earth's magnetosphere, ionosphere and thermosphere that can influence the performance and reliability of space-borne and ground-based technological systems and can endanger human life or health. This course is an introduction level course. It applies knowledge learned in Physics I and II in particular in electromagnetics to a real situation: space. The course introduces the present knowledge of space phenomena and the physical understanding of the plasma environment from the sun to the earth's ionosphere and in the heliosphere. Regions in space to be discussed include solar surface, solar wind, bow shock, magnetosheath, magnetosphere, magnetotail, radiation belts, ring currents, and ionosphere. Among space plasma physics theories, single particle theory, kinetic theory, and magnetohydrodynamics, which describe charged particle motion in electromagnetic fields and its consequences, are introduced and applied to space environment.

Max Credits: 3
Min Credits: 3

85.491 Directed Study

Course ID: 7793
Course Details: Students, through regular and frequent consultation with the instructor, undertake independent study of a particular area of meteorology.

Max Credits: 3
Min Credits: 1

85.495 Honors Research in Atmospheric Science

Course ID: 7794
Course Details: An individual or team research project carried out by qualified students with the approval of and supervision by a faculty member.

Max Credits: 3
Min Credits: 3

85.496 Practicum Experience in Meteorology

Course ID: 7795
Course Details: A program of on-campus and/or off-campus experiences developed by the student in consultation with a faculty member and, when appropriate, a member of the staff of an off-campus firm. May be repeated up to a maximum of six credits. The practicum may not be substituted for a nonelective course in the major.

Max Credits: 3
Min Credits: 1

87.101 Environmental Science Seminar
Course ID: 7840
Course Details: A survey of the field of environmental science, curriculum options, and career opportunities. Presentations by members of the department and guest speakers. This course is intended primarily for students majoring in the various options of environmental science. It does not satisfy specific science requirements for majors in the Division of Science.
Max Credits: 1
Min Credits: 1

87.102 Environmental Problems Seminar

87.102 Environmental Problems Seminar

Course ID: 7841
Course Details: A survey of environmental problems and issues. Topics include air, water, and noise pollution; solid and liquid waste disposal; and the social, political, and economic implications of these issues. Readings, discussions, guest speakers, and field trips. This course is intended primarily for students majoring in the various options of environmental science. It does not satisfy specific science requirements for majors in the Division of Science.
Max Credits: 1
Min Credits: 1

87.115 Astronomy

87.115 Astronomy

Course ID: 7847
Course Details: Offers an introduction to the study of astronomy including historical development, instruments, solar system dynamics, planetary evolution, stellar systems and stellar evolution. Several field trips are included. This course satisfies the Gen Ed science requirement, but not specific science requirements for majors in the Division of Science.
Max Credits: 3
Min Credits: 3

87.117 Astronomy Lab

87.117 Astronomy Lab

Course ID: 7848
Course Details: Intended to develop a deeper understanding of astronomy through an exposure to the methods and materials used in astronomical analysis. Corequisite: 87.115 I,II(0,2)1
Max Credits: 1
Min Credits: 1

87.201 Earth and Environmental Systems I

87.201 Earth and Environmental Systems I

Course ID: 7850
Course Details: An integrated study of the interactions between the lithosphere, hydrosphere, atmosphere, and biosphere. Emphasis will be placed on the physical and biological principles which underlie and control these interactions, pollution, geologic hazards, climate change, and social and political aspects which govern our relationship with the natural environment.
Max Credits: 3
Min Credits: 3

87.202 Earth And Environmental Systems II

87.202 Earth And Environmental Systems II

Course ID: 7851
Course Details: A continuation of Principles of Earth & Environmental Systems.
Max Credits: 3
Min Credits: 3

87.203 Earth And Environmental Systems Laboratory

87.203 Earth And Environmental Systems Laboratory
Course ID: 7852
Course Details:
Max Credits: 1
Min Credits: 1

87.204 Earth And Environmental Systems Laboratory

Course ID: 7853
Course Details:
Max Credits: 1
Min Credits: 1

Course Details: This course introduces earth and environmental science students to applications of geographic information systems, emphasizing hands-on field experience in collecting spatial location data and in mapping environmental data using GIS software. Covers fundamentals of: geodesy; spherical and plane coordinate systems; spatial data concepts, including error, accuracy, and precision; location measurement technologies including GPS: vector and raster GIS data structures and file types, basic GIS operations, including georeferencing of raster files and editing of vector files; assembly of field data over a base map; analysis of spatial relationships using GIS tools; symbology and methods of map presentation.

Max Credits: 3
Min Credits: 3

87.301 GIS in Earth and Environmental Sciences

Course ID: 37132
Course Details: This course introduces earth and environmental science students to applications of geographic information systems, emphasizing hands-on field experience in collecting spatial location data and in mapping environmental data using GIS software. Covers fundamentals of: geodesy; spherical and plane coordinate systems; spatial data concepts, including error, accuracy, and precision; location measurement technologies including GPS: vector and raster GIS data structures and file types, basic GIS operations, including georeferencing of raster files and editing of vector files; assembly of field data over a base map; analysis of spatial relationships using GIS tools; symbology and methods of map presentation.

Max Credits: 3
Min Credits: 3

87.496 Practicum

Course ID: 7866
Course Details: A program of on-campus and/or off-campus experiences developed by the student in consultation with a faculty member from the Department and, when appropriate, a member of the staff of an off-campus firm. May be repeated to a maximum of six credits. The practicum may not be substituted for a required course in the major.

Max Credits: 3
Min Credits: 1

89.101 General Geology

Course ID: 7881
Course Details: Presents a study of the earth with emphasis on earth materials, earth structure (crustal and internal), earth history, and the development of life. Designed for the general student.

Max Credits: 3
Min Credits: 3

89.103 General Geology Laboratory

Course ID: 7883
Course Details: Topics covered include rock and mineral identification; interpretation of topographic and geologic maps; earthquakes and rock deformation; ground water, streams, wind, and glaciers and the sculpting of the Earth's surface; and natural hazards and their impacts to humans.

Max Credits: 1
Min Credits: 1

89.151 Earth and Life
Course ID: 7891
Course Details: This course will trace the changes in both the Earth and a variety of organisms through an investigation of fossils, field sites, map interpretation, and basic earth science principles. The effects of physical change and geobiochemical processes on evolution will be stressed as will the effects of life on Earth. Students will gain an appreciation of the very special nature of the earth and its symbiont life forms when seen against the background of other planets.
Max Credits: 3
Min Credits: 3

89.153 Earth and Life Laboratory
Course ID: 7892
Course Details: This laboratory will concentrate on the identification of fossils, discrimination of fossils from sedimentary structures, and interpretation of ancient environments from lithology, fossils, and maps. A field trip is required.
Max Credits: 1
Min Credits: 1

89.215 Forensic Geology
Course ID: 30952
Course Details: This course deals with the application of geological and related principles to the solution of various types of crimes. The course will explore the use of evidence (rocks and minerals, soils, geochemistry, etc.) to identify the source and hence the potential perpetrator of the crime.
Max Credits: 3
Min Credits: 3

89.301 Mineralogy and Crystallography
Course ID: 7903
Course Details: This course will introduce the concepts of crystallography necessary to prepare the student to use the analytical equipment of Optical Mineralogy and X-ray Crystallography. It also contains topics on the physical properties and chemistry of minerals aimed at improving the student's ability to identify mineral samples. A significant portion of the course will be devoted to an introduction to optical methods using oil immersion and thin section techniques.
Max Credits: 3
Min Credits: 3

89.303 Mineralogy And Crystallography Laboratory
Course ID: 7904
Course Details: Techniques of crystallographic description. Megascopic and microscopic techniques of mineral identification.
Max Credits: 1
Min Credits: 1

89.304 Igneous & Metamorphic Petrology
Course ID: 7905
Course Details: The origin and evolution of igneous and metamorphic rocks. Emphasis will be on physical and chemical processes, magma transport and crystallization, phase equilibria, development of metamorphic facies, open and closed system behavior, and the development of metamorphic fabric.
Max Credits: 3
Min Credits: 3

89.306 Igneous and Metamorphic Petrology Laboratory
Course ID: 7906
Course Details: Identification and classification of igneous and metamorphic rocks. Emphasis is on thin section identification and use of rock textures and compositions as guides to petrogenesis.
Max Credits: 1
Min Credits: 1

89.314 Hydrogeology
Course ID: 7907
Course Details: This course investigates the science of water in a geologic setting with special emphasis on the distribution, movement, and chemistry of the water. The course will include the following topics: techniques for measuring elements in the hydrologic equation, accuracy of hydrologic measurement, statistical studies of floods, and study of groundwater for both steady-state and transient conditions.
Max Credits: 3
Min Credits: 3

89.315 Environmental Geochemistry
Course ID: 7908
Course Details: Application of geochemical principles to environmental problems including air pollution and atmospheric processes, climate change, water chemistry and water-rock interactions, and the transport and dispersal of organic and inorganic pollutants.
Max Credits: 4
Min Credits: 4

89.316 Geomorphology
Course ID: 7909
Course Details: A study of the physical and chemical processes at work on the earth's surface which result in the formation and development of surface features. Emphasis is placed on the mechanics of erosion (water, wind, ice, and waves) and the morphology and spatial distribution of the resultant landforms.
Max Credits: 3
Min Credits: 3

89.318 Geomorphology Laboratory
Course ID: 7910
Course Details: Investigates landforms and surficial processes through an interpretation of maps and field work. Environmental applications of surficial processes are stressed.
Max Credits: 1
Min Credits: 1

89.322 Structural Geology
Course ID: 7911
Course Details: An analysis of crustal deformation through detailed study of geologic structures with emphasis upon the response of geologic materials to stress and strain. Field techniques, tectonic principles, and geometrical analysis are employed.
Max Credits: 3
Min Credits: 3

89.324 Structural Geology Laboratory
Course ID: 7912
Course Details: A survey of the graphical techniques used to convert field measurement into the information needed in the construction of geologic maps, cross-sections, and crustal stress-strain histories.

Max Credits: 1
Min Credits: 1

**89.352 Sedimentation And Stratigraphy**

Course ID: 7915
Course Details: Principles and processes of sedimentation: erosion, mechanics of transport, diagenesis and lithification, models for sedimentary environments. Development of the stratigraphic record, relative and absolute time, and seismic stratigraphy.

Max Credits: 3
Min Credits: 3

**89.354 Sedimentation And Stratigraphy Laboratory**

Course ID: 7916
Course Details: Determination of mass properties of sediments with emphasis on mechanical and statistical analysis, identification and description of sedimentary rocks, facies models and stratigraphic cross-sections.

Max Credits: 1
Min Credits: 1

**89.456 Applied Geophysics**

Course ID: 7920
Course Details: Application of geophysics to problems in geology and environmental science. Principles and techniques of gravity, magnetic, electrical, and seismic methods. Field projects and surveys.

Max Credits: 3
Min Credits: 3

**89.495 Honors Research Geology**

Course ID: 7922
Course Details: An independent scientific research project carried out by a qualified senior under the supervision of a faculty member.

Max Credits: 3
Min Credits: 1

**91.100 Media Computing**

Course ID: 8054
Course Details: Introduction to computer programming using multimedia applications. Programming data structures are covered by manipulating pictures, sounds and video. Linear Data structures such as arrays and matrices are manipulated in a computer programming language Java and C.

Max Credits: 3
Min Credits: 3

**91.101 Computing I**

Course ID: 8055
Course Details: Introduction to computing environments: introduction to an integrated development environment; C, C++, or a similar language. Linear data structures; arrays, records, and linked lists. Abstract data types, stacks, and queues. Simple sorting via exchange, selection, and insertion, Basic file I/O. Programming style documentation and testing. Ethical and social issues. Effective Fall 2013, Co-req 91.103 Computing 1 Lab.

Max Credits: 3
Min Credits: 3

91.102 Computing II

Course ID: 8056


Max Credits: 3
Min Credits: 3

91.112 Undeclared Science Seminar

Course ID: 36238

Course Details: Discussions will be conducted on a wide range of topics in the sciences to familiarize the student with the programs, procedures, research, and educational opportunities at the University.

Max Credits: 1
Min Credits: 1

91.113 Exploring the Internet

Course ID: 8058

Course Details: This course focuses on the primary tools used to navigate the Internet from a Windows desktop: e-mail and the web browsers. In addition, this course covers many of the other applications of the Internet: ftp, listserve, newsgroups, chat, search engines, and portals. Students will complete hands-on exercises, including construction of their personal web page. Not for computer science majors.

Max Credits: 3
Min Credits: 3

91.117 Artbotics

Course ID: 33571

Course Details: Artbotics focuses on exploring the intersection among art, computer science, and robotics. The course is project-driven, and includes public exhibitions and service learning. Students will learn founding principles in both the fields of art and computer science, and put them into practice by creating interactive, tangible exhibits that are displayed in public settings. In the service learning component, students will mentor local high school students in the same topics. The course will also include guest lectures from practitioners in the fields.

Max Credits: 4
Min Credits: 4

91.201 Computing III

Course ID: 8064


Max Credits: 4
Min Credits: 4
**91.203 Assembly Language Programming**

Course ID: 8066

Course Details: Presents the organization and operation of a conventional computer, including principal instruction types, data representation, addressing modes, program control, I/O, assembly language programming, including instruction mnemonics, symbolic addresses, assembler directives, system calls, and macros, the usage of text editors, symbolic debuggers, and loaders, and the use of pseudocode in guiding structured assembly language programming.

Max Credits: 4
Min Credits: 4

**91.204 Computing IV**

Course ID: 8067


Max Credits: 3
Min Credits: 3

**91.211 Computer Science for SRT Applications**

Course ID: 8069

Course Details: This course is an introduction to C programming, with applications in sound recording technology. Students will write and execute several programs that perform operations pertinent to SRT, including manipulating MIDI codes, performing simple signal processing functions, processing sampled data, and synthesizing sound algorithmically. Not for computer science majors.

Max Credits: 3
Min Credits: 3

**91.212 Special Topics: Sound Thinking**

Course ID: 35253

Course Details: Special Topics: Sound Thinking is an interdisciplinary elective for sophomore-level undergraduates that explores issues of sound production, musical form, or music in multimedia, depending on faculty and student interest. It is co-taught by Music and Computer Science Faculty.

Max Credits: 3
Min Credits: 3

**91.301 Organization of Programming Languages**

Course ID: 8076

Course Details: Analytical approach to the study of programming languages. Description of the salient features of the imperative, functional, logical, and object-oriented programming paradigms in a suitable metalanguage such as Scheme. Topics include iteration, recursion, higher-order functions, types, inheritance, unification, message passing, orders of evaluation, and scope rules. Elementary syntactic and semantic descriptions. Implementation of simple interpreters.

Max Credits: 3
Min Credits: 3

**91.304 Foundations of Computer Science**

Course ID: 8077


Max Credits: 3
Min Credits: 3

**91.305 Computer Architecture**

Course ID: 8078

Course Details: Examines the basic functional components of a computer system including the CPU, memory systems, and I/O systems. Each of these three areas will be developed in detail with a focus on the system design and component integration. Topics will include CPU control and ALU operation, computer timing, data address and I/O bus activity, addressing model, programmed and DMA I/O, and instruction sets and micro code.

Max Credits: 3

Min Credits: 3

**91.308 Operating Systems**

Course ID: 1228

Course Details: Presents an introduction to major operating systems and their components. Topics include processes, concurrency and synchronization, deadlock, processor allocation, memory management, I/O devices and file management, and distributed processing. Techniques in operating system design, implementation, and evaluation will be examined.

Max Credits: 3

Min Credits: 3

**91.309 Database I**

Course ID: 8080

Course Details: This course surveys topics in database management systems. Topics include access methods, data models (relational, semantic, object-oriented and object-relational), query languages, database design, query optimization, concurrency control, recovery, security, integrity, client-server architecture, and distributed database systems. A database application project will be assigned.

Max Credits: 3

Min Credits: 3

**91.310 Database II**

Course ID: 8081

Course Details: Advanced topics in database systems, including distributed database systems, query optimization, concurrency control, knowledge bases, deductive databases, extendibility, and object-oriented database systems. Additional topics may include benchmarking, scientific databases, and parallelism. Software engineering principles will be applied to the development of components of a database management system.

Max Credits: 3

Min Credits: 3

**91.350 Special Topics**

Course ID: 8085

Course Details:

Max Credits: 3

Min Credits: 1

**91.401 Software Project I**

Course ID: 8093

Course Details: Specification, design, and implementation of a one- or two-semester software project proposed to a directing faculty member. Projects may be proposed as a one- or two-semester effort based on faculty approval. A two-
semester effort requires subsequent registration for 91.402. Prerequisite: Students must submit a proposal to the directing faculty member, obtain his/her signed approval, and forward a copy of the signed proposal to department chairperson.

Max Credits: 3
Min Credits: 3

91.404 Analysis of Algorithms

Course ID: 8095

Course Details: Development of more sophisticated ideas in data type and structure, with an introduction to the connection between data structures and the algorithms they support. Data abstraction. Controlled access structures. Trees, lists, graphs, arrays; algorithms design strategies; backtracking, greedy storage, divide and conquer, branch and bound. Elementary techniques for analysis; recursion equations, estimations methods, elementary combinatorial arguments. Examination of problem areas such as searching, sorting, shortest path, matrix and polynomial operations, and the indicated representations and algorithms. The student will use the techniques learned in this course and in previous courses to solve a number of logically complex programming problems.

Max Credits: 3
Min Credits: 3

91.405 Parallel Processing

Course ID: 8096

Course Details: A study of parallel architectures and parallel algorithms, including classification of architectures, characterization of performance, design of parallel algorithms, evaluation of parallel software, and languages for parallel processing. Students will write and execute programs for several different parallel machines.

Max Credits: 3
Min Credits: 3

91.406 Compiler Construction I

Course ID: 8097

Course Details: Includes both theory and practice. A study of grammars; specification and classes; the translation pipeline: lexical analysis, parsing, semantic analysis, code generation and optimization; and syntax-directed translation. Use of automatic generation tools in the actual production of a complete compiler for some language.

Max Credits: 3
Min Credits: 3

91.411 Software Engineering I

Course ID: 8099

Course Details: Software Engineering is an essential discipline for any computer science major. In this class you will learn skills that will help you design and build software projects for advanced computer science classes. This course provides an introduction to systematic techniques for development of software, i.e., "the Engineering of Software". Topics to be discussed include software life-cycle, group coordination, requirements specification, software design, software testing and software maintenance. Emphasis is given to the development of one complex software system and the system documentation necessary for such a complete software product. The students will mock the software cycle via a medium-to-large semester-long project.

Max Credits: 3
Min Credits: 3

91.412 Software Engineering II

Course ID: 8100

Course Details: Software development methodologies for large-scale systems. Project organization, life cycle concept, data modeling, structured analysis and design, information hiding, and the use of computer-aided software engineering (CASE) tools. Team projects are required; these emphasize the design, documentation, and maintenance of complex software systems. Not open to students who have taken 91.523 Software Engineering I.
Max Credits: 3
Min Credits: 3

**91.413 Data Communications I**

Course ID: 8101

Course Details: This course provides an introduction to fundamental concepts in the design and implementation of computer communication networks, their protocols, and applications. Topics include: TCP/IP and OSI layered network architectures and associated protocols, application layer, network programming API (sockets), transport, congestion, flow control, routing, addressing, autonomous systems, multicast and link layer. Examples will be drawn primarily from the Internet.

Max Credits: 3
Min Credits: 3

**91.414 Data Communications II**

Course ID: 8102

Course Details: A continuation of 91.413. Topics include Multimedia Networks, network Management, Network Security, Wireless and Mobile Networks. Students will track discussion in IETF committees and work in a dedicated network laboratory.

Max Credits: 3
Min Credits: 3

**91.420 Artificial Intelligence**

Course ID: 8104

Course Details: Discusses LISP, tree and graph searching algorithms: breadth first, depth first, and uniform cost. Also covers heuristic search methods, admissibility, and games: mini-max, alphaBeta. Students will learn theorem proving and question answering.

Max Credits: 3
Min Credits: 3

**91.421 Data Mining**

Course ID: 8105

Course Details: This introductory data mining course will give an overview of the models and algorithms used in data mining, including association rules, classification, clustering, etc. The course will teach the theory of these algorithms and students will learn how and why the algorithms work through computer labs.

Max Credits: 3
Min Credits: 3

**91.427 Computer Graphics I**

Course ID: 8107

Course Details: Introduction to graphics systems and concepts. History of graphics. Introduction to hardware, software, and mathematical tools. Graphics languages and APIs (GKS, PHIGS, Direct 3D, OpenGL). Graphics data structures and algorithms for 2D and 3D modeling and viewing. Input, archiving, and display architectures. Introduction to hidden line and hidden surface removal.

Max Credits: 3
Min Credits: 3

**91.428 Computer Graphics II**

Course ID: 8108
Course Details: An advanced course in computer graphics for students familiar with basic issues in computer graphics. Details on hidden line and surface removal. 2D and 3D curve and surface generation. Rendering, illumination, and color models. Realism through precision (ray tracing) and imprecision (fractals). Windowing and user interface management systems. Modern hardware architectures. Animation and simulation systems.

Max Credits: 3
Min Credits: 3

91.450 Robotics I

Course ID: 8111

Course Details: An introduction to robotics, including laboratory. In the lab, students build and program robots. Topics to be covered include sensors, locomotion, deliberative architectures, reactive architectures, and hybrid architectures.

Max Credits: 3
Min Credits: 3

91.451 Robotics II

Course ID: 8112

Course Details: Advanced topics in robotics, including laboratory. Topics to be covered include map making, path planning, computer vision and learning. Research-level robots are used in the laboratories.

Max Credits: 3
Min Credits: 3

91.457 Computer Security

Course ID: 8117

Course Details: Basic concepts of cryptography, data security, information theory, complexity, number theory, and finite field theory; encryption algorithms including the Data Encryption Standard (DES) and public key systems; incorporating cryptographic controls into computers; key management; access controls; information flow controls; and inference controls.

Max Credits: 3
Min Credits: 3

91.460 Selected Topics

Course ID: 8120

Course Details: Depends on faculty interest, student demand, and developments in the field.

Max Credits: 3
Min Credits: 3

91.461 Graphical User Interface Programming I

Course ID: 8121

Course Details: This is a first course in the design and implementation of graphical user interfaces (GUIs) for windowing environments. The course involves numerous programming projects that are evaluated on design and layout of the user interface, coding style, and comprehensiveness of documentation. The course may be taken on its own, but is intended to be followed by 91.462 to complete a two-course CS project sequence.

Max Credits: 3
Min Credits: 3

91.462 Graphical User Interface Programming II

Course ID: 8122

Course Details: A second course in the design and implementation of graphical user interfaces for windowing environments.
91.490 Directed Studies in Computer Science

Course ID: 8131

Course Details: Individual study for a student desiring more advanced or more specialized work. This course may not be taken more than twice and may not be substituted for scheduled offerings. Prerequisite: Students must submit a proposal to the directing faculty member, obtain his/her signed approval, and forward a copy of the signed proposal to the department chairperson.

Max Credits: 4
Min Credits: 1

92.107 Elementary Math for Teaching: Numbers and Operations

Course ID: 37557

Course Details: The Number and Operations course for elementary and middle school teachers examines the three main categories in the Number and Operations strand of Principles and Standards of School Mathematics (NCTM) — Understanding numbers, representations, relationships, and number systems; the meanings of operations and relationships among those operations; and reasonable estimation and fluent computation. Not for Science / Engineering majors.

Max Credits: 3
Min Credits: 3

92.111 Quantitative Reasoning

Course ID: 8242

Course Details: An introduction to the mathematics concepts and skills important in modern society, even for non-technical pursuits. The course will emphasize conceptual understanding as well as a facility in performing elementary computations. Topics to be examined will include types of reasoning, problem-solving methods, techniques of estimation, algebraic essentials, and the nature of probability and statistics. No credit in Science or Engineering.

Max Credits: 3
Min Credits: 3

92.111SI SI for Quantitative Reasoning & Introduction to Statistics

Course ID: 8240

Course Details: This course provides supplemental instruction in mathematics to students whose Elementary Algebra Accuplacer exam scores indicate the need for such instruction. The credits in this course can not be used to satisfy the credits required for graduation, but may be used to satisfy the credits required for full time student status.

Max Credits: 2
Min Credits: 2

92.121 Management Precalculus

Course ID: 8245

Course Details: Review of algebra: operations on the real numbers, factoring, radical notation, and rational exponents. Linear and quadratic equations, rational expressions. Graphs of functions, straight lines, parabolas, exponential and log functions, systems of equations, and linear mathematical models. Prerequisites: No credit for math/science/engineering majors.

Max Credits: 3
Min Credits: 3

92.121SI Management Pre-Calculus Supplemental Instruction
Course ID: 36826

Course Details: Taken simultaneously with 92.121, this 1-credit course offers students retaking 92.121 supplemental instructions to foster a greater opportunity for successful completion of Management Precalculus. The course credit cannot be used to satisfy the credits required for graduation, but may be used to satisfy credits required for full time student status.

Max Credits: 1
Min Credits: 1

**92.122 Management Calculus**

Course ID: 8246

Course Details: Differential calculus: limits, continuity, derivatives, differentials, higher-order derivatives, implicit differentiation, maxima and minima of functions, and applications of derivatives to business and economics. Integrals and Applications to business. No credit in Science or Engineering

Max Credits: 3
Min Credits: 3

**92.123 Precalculus Mathematics II**

Course ID: 8247

Course Details: Reviews angles and their measure, the trigonometric functions, solving triangles, law of sines, law of cosines, circular functions and their graphs, vectors and trigonometric identities. Not for Science / Engineering majors.

Max Credits: 3
Min Credits: 3

**92.125 Calculus A**

Course ID: 8249

Course Details: Serves as a first course in calculus and provides a brief review of analytic geometry and trigonometric functions. The course progresses to the study of inverse functions, limits, continuity, derivatives, rules for differentiation of algebraic and transcendental functions, chain rule, implicit differentiation, linear approximation, differentials, and maximum and minimum values.

Max Credits: 3
Min Credits: 3

**92.126 Calculus B**

Course ID: 8250

Course Details: Serves as a continuation of 92.125. The course covers L?Hopital?s Rule, optimization problems, Newton?s method, sigma notation, integration, area between curves, volume, arc length, surface area, integration by parts, trigonometric substitution, partial fraction decomposition, and improper integrals.

Max Credits: 3
Min Credits: 3

**92.127 Preparation for Calculus**

Course ID: 8251

Course Details: A review of precalculus (algebra and trigonometry) together with development of problem solving skills. No credit for math/science/engineering majors.

Max Credits: 4
Min Credits: 4

**92.128 Calculus IA**
Course ID: 8252
Course Details: Provides a review of pre-calculus algebra and trigonometry integrated with the first half of Calculus I: limits, continuity, derivatives, basic derivative formulas, chain rule, implicit differentiation. For math/science/engineering majors, only two credits of this course may be applied toward a degree.
Max Credits: 4
Min Credits: 4

92.128SI Calculus IA Supplemental Instruction
Course ID: 38061
Course Details: Taken simultaneously with 92.128, this 1-credit course offers students retaking 92.128 supplemental instructions to foster a greater opportunity for successful completion of Calculus IA. The course credit cannot be used to satisfy the credits required for graduation, but may be used to satisfy credits required for full time student status.
Max Credits: 1
Min Credits: 1

92.129 Calculus IB
Course ID: 35267
Course Details: Provides a review of pre-calculus algebra and trigonometry integrated with the second half of Calculus I: L'Hospital's Rule, optimization problems, curve sketching, Newton's Method, antiderivatives. For math/science/engineering majors, only two credits of this course may be applied toward a degree. For pre-requisites, completion of this course is equivalent to 92.131 Calculus I.
Max Credits: 4
Min Credits: 4

92.131 Calculus I
Course ID: 8254
Course Details: Serves as a first course in calculus. Functions, limits, continuity, derivatives, rules for differentiation of algebraic and transcendental function; chain rule, implicit differentiation, related rate problems, max/min problems, and curve sketching. Integrals and areas.
Max Credits: 4
Min Credits: 4

92.132 Calculus II
Course ID: 8255
Course Details: Serves as a continuation of Calculus I. Volume, arc length, surface area, pressure and force. Differentiation and integration of trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic functions. Improper integration, infinite series, Taylor and MacLauren series.
Max Credits: 4
Min Credits: 4

92.138 Calculus for the Life Sciences I
Course ID: 38099
Course Details: This is a single variable calculus course with applications to the life sciences. Review of basic algebra, functions and graphs. The Derivative: Basic definition, formulas and methods. Applications of differentiation, including curve sketching and maximum-minimum problems. Study of exponential and logarithmic functions motivated by growth, decay and logistic modes. Introduction to integration, techniques, applications and the fundamental theorem. Approximation methods.
Max Credits: 4
Min Credits: 4
92.141 Honors Calculus I
Course ID: 8260
Course Details: This course covers the same topics as 92.131 Calculus I, but in an enriched environment.
Max Credits: 4
Min Credits: 4

92.142 Honors Calculus II
Course ID: 8261
Course Details: This course covers the same topics as 92.132 Calculus II, but in an enriched environment.
Max Credits: 4
Min Credits: 4

92.151 Explorations in Mathematics
Course ID: 8263
Course Details: An introduction to the nature of mathematics, providing insights into what mathematics is, what it accomplishes, and how it is pursued as a human enterprise. The course will stress concepts and relevance to modern experience, with topics to be selected at the discretion of each instructor from a wide variety of interesting and illustrative fields of mathematics. No credit in Science or Engineering.
Max Credits: 3
Min Credits: 3

92.210 Functions and Modeling
Course ID: 37657
Course Details: Engage in lab-based activities designed to strengthen their problem-solving skills and expand knowledge of the topics in secondary mathematics, focusing especially on topics from precalculus and the transition to calculus. Explore a variety of contexts that can be modeled using families of functions. Topics include conic sections, parametric equations and polar equations. Multiple representations, transformations, data analysis techniques and interconnections among geometry, probability and algebra. Quantitative approaches and building relationships between discrete and continuous reasoning will be recurrent themes.
Max Credits: 3
Min Credits: 3

92.221 Linear Algebra I
Course ID: 8281
Course Details: Elementary set theory and solution sets of systems of linear equations. An introduction to proofs and the axiomatic methods through a study of the vector space axioms. Linear analytic geometry. Linear dependence and independence, subspaces, basis. Inner products. Matrix algebra. Applications of the above will also be discussed.
Max Credits: 3
Min Credits: 3

92.222 Linear Algebra II
Course ID: 8282
Course Details: Linear transformations. Linear operators, change of basis, inner product and the diagonalization problem. Quadratic forms. Convex sets and geometric programming, input/output models for an economy, Markov chains, other applications of linear algebra.
Max Credits: 3
**92.225 Calculus C**

Course ID: 8285

Course Details: Serves as a continuation of 92.126. This course covers integration by parts, integration of trigonometric integrals, trigonometric substitution, partial fraction, numeric integration, improper integrals, L'Hopital's Rule, indeterminate forms, sequences, infinite series, integral tests, comparison tests, alternating series tests, power series, Taylor series, polar coordinates, graphs and areas in polar coordinates, and parametric equations.

Max Credits: 3
Min Credits: 3

**92.226 Calculus D**

Course ID: 8286

Course Details: Serves as a continuation of 92.225. This course covers curvature, cylindrical surfaces, dot and cross products, curves and planes in three space, cylindrical and spherical coordinates, functions of two variables, chain rule, directional derivatives and gradient, tangent planes, and double and triple integrals in rectangular, polar, cylindrical and spherical coordinate systems.

Max Credits: 3
Min Credits: 3

**92.227 Elementary Math for Teaching: Geometry and Measurement**

Course ID: 37459

Course Details: This is a mathematics content course which covers the geometry/measurement strands of the Massachusetts Curriculum Frameworks in Mathematics at a collegiate level. The goal is not only to prepare students for the elementary mathematics MTEL, but to lay the groundwork for graduate work in elementary mathematics education. The course centers around “Big Ideas” such as Equivalence, Proportionality, Transformations; and Shapes & Solids. Not for Science / Engineering majors.

Max Credits: 3
Min Credits: 3

**92.231 Calculus III**

Course ID: 8287

Course Details: Serves as a continuation of Calculus II Polar Coordinates, parametric equations, vectors and analytic geometry in space. Functions of several variables, partial derivatives, and chain rule. Tangent planes and normal lines. Maxima and minima, Lagrange multipliers, and multiple integrals.

Max Credits: 4
Min Credits: 4

**92.234 Differential Equations**

Course ID: 8289

Course Details: Classification and solution of ordinary differential equations of the first order and higher orders. The Laplace transform. Applications.

Max Credits: 3
Min Credits: 3

**92.236 Engineering Differential Equations**

Course ID: 8290

Course Details: Introduction to differential equations with an emphasis on engineering applications. Topics include first-order
equations, higher-order linear equations with constant coefficients, and systems of first-order equations. Applications of each topic are introduced and qualitative, analytical, and numerical solution techniques are studied. Laplace transform methods are discussed. The software package MATLAB may be used throughout the course.

Max Credits: 3
Min Credits: 3

92.241 Honors Calculus III

Course ID: 8291

Course Details: Covers the same topics as 92.231 Calculus II, but in an enriched environment.

Max Credits: 4
Min Credits: 4

92.244 Honors Differential Equations

Course ID: 8293

Course Details: Introduction to differential equations. Topics include first-order equations, second-order and higher-order linear equations, systems of first-order linear equations with constant coefficients, and Laplace transforms.

Max Credits: 3
Min Credits: 3

92.283 Introduction to Statistics

Course ID: 8302

Course Details: An introduction to descriptive statistics, graphing and data analysis, probability laws, discrete and continuous probability distributions, correlation and regression, inferential statistics. No credit for Math, Science, or Engineering majors.

Max Credits: 3
Min Credits: 3

92.283SI SI for Quantitative Reasoning & Introduction to Statistics

Course ID: 8240

Course Details: This course provides supplemental instruction in mathematics to students whose Elementary Algebra Accuplacer exam scores indicate the need for such instruction. The credits in this course can not be used to satisfy the credits required for graduation, but may be used to satisfy the credits required for full time student status.

Max Credits: 2
Min Credits: 2

92.301 Introduction to Applied Mathematics I

Course ID: 8303

Course Details: Discusses vector analysis, Green's Theorem, Divergence Theorem, Stokes' Theorem, Fourier series, integrals, and partial differential equations of physics and engineering.

Max Credits: 3
Min Credits: 3

92.305 Introduction to Real Analysis I

Course ID: 8307

Max Credits: 3
Min Credits: 3

92.321 Discrete Structures I

Course ID: 8321

Course Details: Presents propositional logic, combinatorics, methods of proof, mathematical systems, algebra of sets, matrix algebra, relations and functions, recursion and generating functions, applications to computer science, and graph theory.

Max Credits: 3
Min Credits: 3

92.322 Discrete Structures II

Course ID: 8322

Course Details: Examines graph theory, trees, algebraic systems, Boolean algebra, groups, monoids, automata, machines, rings and fields, applications to coding theory, logic design, and sorting.

Max Credits: 3
Min Credits: 3

92.330 Symbolic Logic

Course ID: 8323

Course Details: This course is an introduction to symbolic logic. Symbolic logic provides a solid foundation in formal reasoning for students preparing for further study in mathematics, linguistics, cognitive science, computer science or philosophy. Topics include propositional logic, first-order logic and systems of deduction, Tarski’s notion of model, and the completeness and incompleteness theorems of Godel. Prerequisite: 92.321.

Max Credits: 3
Min Credits: 3

92.360 Mathematic Structure for Computer Engineers

Course ID: 8327


Max Credits: 3
Min Credits: 3

92.362 Numerical Analysis I

Course ID: 8328

Course Details: Focuses on the theory and application of numerical techniques including error analysis. Also discusses solution of linear, nonlinear and differential equations, interpolation, numerical integration, and curve fitting. Computer solutions are emphasized.

Max Credits: 3
Min Credits: 3

92.363 Intro to Data Analysis

Course ID: 8329

Course Details: Computer analysis of data derived from research conducted in physical, social, and life sciences. Data preparation. Data modification, file manipulation, and descriptive statistics using SPSS. Programming ability is not required. No credit in Science or Engineering.
Max Credits: 3
Min Credits: 3

92.375 Senior Seminar I

Course ID: 30392

Course Details: Student works with an advisor to develop a proposal for a senior project that will be carried out as part of 92.475 Senior Seminar II. Generally taken during the spring of the junior year. Prerequisite: permission of instructor.

Max Credits: 1
Min Credits: 1

92.385 Applied Statistics

Course ID: 8340

Course Details: Introduction to experimental design, data analysis and formal statistical procedures from an applied point of view.

Max Credits: 3
Min Credits: 3

92.386 Probability and Statistics I

Course ID: 8341

Course Details: Provides a one-semester course in probability and statistics with applications in the engineering sciences. Probability of events, discrete and continuous random variables cumulative distribution, moment generatory functions, chi-square distribution, density functions, distributions. Introduction to estimation, hypothesis testing, regression and correlation.

Max Credits: 3
Min Credits: 3

92.403 Mathematical Analysis

Course ID: 8344

Course Details: The real numbers, completeness, sequences of real numbers, functions, continuity, uniform continuity, differentiability, the Riemann integral, series or real numbers, sequences and series of functions, uniform convergence, power series.

Max Credits: 3
Min Credits: 3

92.407 Probability and Mathematical Statistics I

Course ID: 8346

Course Details: Addresses the topics of probability, random variables, discrete and continuous densities, expectation and variance, special distributions (binomial, Poisson, normal, etc.), moment generating functions, joint and conditional distributions, transformations of variables, sampling, and the central limit theorem.

Max Credits: 3
Min Credits: 3

92.411 Complex Variables I

Course ID: 1227

Course Details: Discusses complex numbers, functions of a complex variable, mappings, derivatives, analytic functions, elementary functions. Laurent series, residues and poles, contour integration.

Max Credits: 3
92.413 Number Theory

Course Details: Studies congruencies and the Chinese Remainder Theorem, Primitive roots, quadratic reciprocity, approximation properties of continued fractions, Pell's equation. Recent application of number theory such as primality testing, cryptology, and random number generation will also be covered.

Max Credits: 3
Min Credits: 3

92.420 Mathematical Problem Solving

Course Details: Focuses on: mathematical resources, ability to use heuristics, the student's beliefs about the use of mathematics to solve problems, and the student's self-confidence as a problem solver. Effective strategies for incorporating problem solving in the curriculum will also be discussed.

Max Credits: 3
Min Credits: 3

92.421 Abstract Algebra I

Course Details: Elementary group theory, groups, cosets, normal subgroups, quotient groups, isomorphisms, homomorphisms, applications.

Max Credits: 3
Min Credits: 3

92.426 Topology

Course Details: Metric spaces, topological spaces, connectedness, compactness, the fundamental group, classifications of surfaces, Brouwer's fixed point theorem.

Max Credits: 3
Min Credits: 3

92.427 Geometry

Course Details: This course is designed for current and prospective geometry teachers. In addition to the development of Euclidean geometry, students will become familiar with geometry applications in Geometer's Sketchpad software, and to a lesser degree with other geometry software applications including Geogebra, Cabri, Maple and/or Mathematica. There will be an introduction to spherical and hyperbolic geometry and triangle measurements will be computed for each. Calculus based derivations of area and volume for surfaces and solids will be generated and related to Euclidean geometry topics.

Max Credits: 3
Min Credits: 3

92.435 History of Mathematics

Course Details: Examines ancient numeral systems, Babylonian and Egyptian mathematics, Pythagorean mathematics, duplication, trisection, and quadrature, Euclid's elements and Greek mathematics after Euclid, Hindu and Arabian mathematics, European mathematics from 500 to 1600, origins of modern mathematics, analytic geometry, the history of calculus. Also covers the transition to the twentieth century and contemporary perspectives.

Max Credits: 3
Min Credits: 3
Max Credits: 3
Min Credits: 3

92.445 Partial Differential Equations
Course ID: 8325
Course Details:
Max Credits: 3
Min Credits: 3

92.448 Mathematics of Signal Processing
Course ID: 8365
Max Credits: 3
Min Credits: 3

92.450 Mathematical Modeling
Course ID: 8366
Course Details: Applications of mathematics to real life problems. Topics include dimensional analysis, population dynamics, wave and heat propagation, traffic flow.
Max Credits: 3
Min Credits: 3

92.466 Stat Program Using SAS
Course ID: 31925
Course Details:
Max Credits: 3
Min Credits: 3

92.475 Senior Seminar II
Course ID: 8385
Course Details: Undergraduate seminar on advanced mathematical topics. Students are required to develop an understanding of an advanced subject beyond the scope of an existing course or synthesize two or more different areas from their curriculum. Students are required to participate in the seminar, present their results to the Department and write a substantial thesis in their topic area. Essential course elements include library research, original research, and both verbal and written exposition. The first semester is a graduation requirement for majors in mathematics.
Max Credits: 3
Min Credits: 3

92.476 Senior Seminar III
Course ID: 8386
Course Details: An optional second semester seminar to allow for continuation of study initiated in Senior Seminar I.
Max Credits: 3
Min Credits: 3
92.486 Probability and Math Statistics II

Course ID: 8394


Max Credits: 3
Min Credits: 3

92.490 Selected Topics

Course ID: 8396

Course Details: Individual study for the student desiring more advanced or more specialized work. Course may not be substituted for scheduled offerings. Prerequisite: Permission of Department Chair.

Max Credits: 3
Min Credits: 1

92.491 Directed Study in Algebra

Course ID: 8397

Course Details: Individual study for the student desiring more advanced or more specialized work in algebra. May be repeated for a total of six semester credits. Course may not be substituted for scheduled offerings.

Max Credits: 3
Min Credits: 3

92.494 Directed Study in Statistics

Course ID: 8400

Course Details: Individual study for the student desiring more advanced or more specialized work in Statistics. May be repeated for a total of six semester credits. Course may not be substituted for scheduled offerings. Prerequisite: Permission of Department Chair.

Max Credits: 3
Min Credits: 3

94.301 Organization of Programming Languages

Course ID: 30805

Course Details: Analytical approach to the study of programming languages. Description of the salient features of the imperative, functional, logical, and object-oriented programming paradigms in a suitable metalanguage such as Scheme. Topics include iteration, recursion, higher-order functions, types, inheritance, unification, message passing, orders of evaluation, and scope rules. Elementary syntactic and semantic descriptions. Implementation of simple interpreters. Note: This course is for CS graduate students needing to fulfill prerequisite requirements. It is not available to CS undergraduates without specific permission from the Undergraduate Coordinator.

Max Credits: 3
Min Credits: 3

94.304 Foundations of Computer Science

Course ID: 34537

Course Details: A survey of the mathematical foundations of Computer Science. Finite automata and regular languages. Stack Acceptors and Context-Free Languages. Turing Machines, recursive and recursively enumerable sets. Decidability. Complexity. This course involves no computer programming. This course is for CS graduate students needing it to fulfill prerequisite requirements. It is not available to CS undergraduates without specific permission from the Undergraduate Coordinator.
94.305 Computer Architecture

Course ID: 30806

Course Details: Examines the basic functional components of a computer system including the CPU, memory systems, and I/O systems. Each of these three areas will be developed in detail with a focus on the system design and component integration. Topics will include CPU control and ALU operation, computer timing, data address and I/O bus activity, addressing model, programmed and DMA I/O, and instruction sets and micro code. This course is for CS graduate students needing it to fulfill prerequisite requirements. It is not available to CS undergraduates without specific permission from the Undergraduate Coordinator.

Max Credits: 3
Min Credits: 3

94.308 Introduction to Operating Systems

Course ID: 30807

Course Details: Presents an introduction to major operating systems and their components. Topics include processes, concurrency and synchronization, deadlock, processor allocation, memory management, I/O devices and file management, and distributed processing. Techniques in operating system design, implementation, and evaluation will be examined. This course is for CS graduate students needing it to fulfill prerequisite requirements. It is not available to CS undergraduates without specific permission from the Undergraduate Coordinator.

Max Credits: 3
Min Credits: 3

94.404 Analysis of Algorithms

Course ID: 30808

Course Details: Development of more sophisticated ideas in data type and structure, with an introduction to the connection between data structures and the algorithms they support. Data abstraction. Controlled access structures. Trees, lists, graphs, arrays; algorithms design strategies; backtracking, greedy storage, divide and conquer, branch and bound. Elementary techniques for analysis; recursion equations, estimations methods, elementary combinatorial arguments. Examination of problem areas such as searching, sorting, shortest path, matrix and polynomial operations, and the indicated representations and algorithms. The student will use the techniques learned in this course and in previous courses to solve a number of logically complex programming problems. This course is for CS graduate students needing it to fulfill prerequisite requirements. It is not available to CS undergraduates without specific permission from the Undergraduate Coordinator.

Max Credits: 3
Min Credits: 3

95.101 Introductory Physics

Course ID: 8523

Course Details: A survey course for students majoring in sound recording technology. Topics covered include: one and two dimensional motion, Newton's Laws of dynamics, statics, circular motion, work and energy, linear and angular momentum, electrostatics, electric and potential fields, magnetic fields, vibrations, waves, sound, Faraday's Law and AC circuits.

Max Credits: 3
Min Credits: 3

95.103 General Physics I

Course ID: 8524

Course Details: Serves as the first semester of a one-year course which surveys the field of physics at a non-calculus level. Topics include force and motion, vectors, gravity, energy and momentum, heat and thermodynamics, and oscillations, waves and sound. Although the course emphasizes conceptual understanding, a functional knowledge of algebra and geometry is
95.104 General Physics II

Course ID: 8525

Course Details: Provides a continuation of 95.103. Topics include electricity and magnetism, geometrical and physical optics, atoms, and nuclei.

Max Credits: 3
Min Credits: 3

95.111 Undeclared Science Seminar

Course ID: 8526

Course Details: Discussions will be conducted on a wide range of topics in the sciences to familiarize the student with the programs, procedures, research and educational opportunities at the University.

Max Credits: 1
Min Credits: 1

95.112 Freshman Physics Seminar

Course ID: 8527

Course Details: An introduction to the scientific methods of physics and the exploration of research opportunities for undergraduates.

Max Credits: 1
Min Credits: 1

95.121 Exploring the Universe

Course ID: 8528

Course Details: Addresses topics that include: Planet Earth, its structure, plate tectonics, greenhouse effect, ozone layer, craters and dinosaurs; our satellite Moon; other planets; our star Sun and its energy source; other stars, the HR diagram and stellar evolution, white dwarfs, neutron stars, supernovae, black holes; our galaxy, the Milky Way, its structure; other galaxies; the universe, its structures and expansion; evolution of galaxies, quasars, cosmology, the Big Bang and Unification of the forces of nature. Satisfies Gen Ed science requirements for non-science majors. Does not satisfy science requirements for Science majors but may be used as a free elective by Science majors.

Max Credits: 3
Min Credits: 3

95.141 Physics I

Course ID: 8529

Course Details: First semester of a two-semester sequence for science and engineering majors. Mechanics including vectors, kinematics in one and two dimensions, Newton's laws of dynamics, work and energy, energy conservation, linear momentum conservation, rotational kinematics and dynamics, Newton's Universal Law of Gravitation, oscillatory motion and mechanical waves.

Max Credits: 3
Min Credits: 3

95.144 Physics II

Course ID: 8531
Course Details: Continuation of 95.141. Optics including interference, and diffraction. Electricity and magnetism including Coulomb’s Law, electric field, Gauss’ Law, electric potential, Ohm’s law, DC circuits with resistors, magnetic field, Ampere’s Law, Faraday’s Law, inductance, Maxwell’s equations, and electromagnetic waves. Modern physics including deBroglie waves, uncertainty principle, photoelectric effect, hydrogen atom and the stability of the Bohr orbits, and atomic spectrum of hydrogen.

Max Credits: 3
Min Credits: 3

95.161 Honors Physics I

Course ID: 8535

Course Details: Introductory mechanics at a more challenging level and the first semester of a sequence for physics majors. Mechanics of particles in one dimension, kinematics, forces, dynamics; particles in two and three dimensions, vectors, curvilinear and oscillatory motion; conservation principles, work, energy, linear momentum, collisions; rotational mechanics, angular momentum, torque and static equilibrium; gravitation and planetary orbits; wave motion, transverse and longitudinal, standing waves.

Max Credits: 4
Min Credits: 4

95.164 Honors Physics II

Course ID: 8537

Course Details: Geometrical optics, reflection, refraction, flat and curved mirrors, thin lenses; physical optics, interference and diffraction; electrostatics, charge, electric forces, fields and flux, electric potential, capacitance and field energy; electric charge in motion, currents, DC and RC circuits; magnetic fields, forces on moving charges, magnetic field of an electric current, electromagnetic induction, inductance, changing currents, AC circuits; electromagnetic radiation; the limits of classical electromagnetic theory.

Max Credits: 4
Min Credits: 4

95.204 Introduction to Radiological Sciences

Course ID: 8542

Course Details: This course is designed to introduce students to the working practices encountered in health physics. This is accomplished through field trips to local facilities that use radioactive materials, laboratory exercises, and class discussions. This class exposes the student to basic health physics procedures, vocabulary, and equipment.

Max Credits: 3
Min Credits: 3

95.210 Introductory Modern Physics

Course ID: 8544

Course Details: Special theory of relativity, experimental basis of quantum theory, structure of the atom, wave properties of matter, quantum theory, hydrogen atom, atomic nucleus, nuclear interactions and applications, and semiconductors.

Max Credits: 3
Min Credits: 3

95.245 Physical Properties of Matter

Course ID: 8546

Course Details: Fluid statics, dynamics of fluids, properties of solids, advanced topics in waves and vibrations, temperature and heat flow, kinetic theory of gases, thermodynamics, and the limits of classical physics.

Max Credits: 3
Min Credits: 3
95.269 Honors Physics III

Course ID: 8547

Course Details: Statics and dynamics of fluids, pressure, viscosity, Archimedes and Bernoulli principles, mechanical properties of solids, stress and strain, shear, electric and magnetic properties of materials, para- dia- and ferromagnetism, electro-mechanical and magneto-mechanical effects, hysteresis, advanced topics in waves and vibrations, damping, resonance in mechanical and AC oscillators, thermodynamics, Maxwell's velocity distribution, blackbody radiation, and the limits of classical physics, introduction to special relativity.

Max Credits: 4
Min Credits: 4

95.300 Introduction to Radiological Sciences

Course ID: 36770

Course Details: This course is designed to introduce students to the working practices encountered in the health physics and medical physics profession. This is accomplished through field trips to local facilities that use radioactive materials, use and calibrations of radiological instrumentation, laboratory exercises, and class discussions. This class exposes the student to basic health and medical physics procedures, vocabulary, and equipment.

Max Credits: 3
Min Credits: 3

95.304 Vibration and Sound

Course ID: 37507

Course Details: The course serves to integrate the various sub-topics of physics that undergraduate majors have experienced by exploring the physical processes of vibrations of lumped and continuous electrical mechanical and acoustic systems: the damped harmonic oscillator in electrical and mechanical form, the flexible string in tension and the coaxial cable with differing end conditions, vibrations of bars, membranes and plates, plane waves of sound, standing waves, radiation and scattering. Throughout reference is made to analogous process in the quantum mechanical domain. Closely coordinated with the recitations is the co-requisite laboratory course, which provides concrete experience with the phenomena discussed in the recitations.

Max Credits: 3
Min Credits: 3

95.308 Physics with Computers I

Course ID: 8549

Course Details: 

Max Credits: 3
Min Credits: 3

95.316 Science and Technology in an Impoverished World

Course ID: 37509

Course Details: Intended for junior-level science and engineering majors, this is a one-semester 3-credit course focused of the impact of science and technology in poverty stricken regions of the world. Students will be challenged to consider the implementation of past and present technologies for solving resource shortages, evaluate and strengths and limitations of these solutions while developing alternatives to address future barriers to positive change. Encouraged to work toward these issues, students will: 1) Pursue and evaluate topics in science and technology through the skills of inquiry, research, critical thinking and problem solving. 2) Demonstrate the knowledge for quantitative and qualitative analysis of problems in science and technology. #1 Analyze and interpret issues in interdisciplinary areas of science and engineering developing a level of comfort with solving unfamiliar problems using acquired knowledge and skills.

Max Credits: 3
Min Credits: 3
95.338 Optics and Waves

Course Details: Wave nature of light, mathematics of wave motion, electromagnetic theory of light propagation, reflection and refraction, Fresnel coefficients, polarization, interference, Young’s experiment, fringe visibility and coherence, various interferometers, Newton’s ring and applications, Fraunhofer diffraction by single and multiple apertures and diffraction gratings.

Max Credits: 3
Min Credits: 3

95.353 Electromagnetism I

Course Details: The theory of electromagnetic fields using vector analysis: electrostatic fields and potentials in vacuum, conductors, and dielectric media; magnetic effects of steady currents in nonmagnetic media; magnetic induction and time varying currents and fields. (offered as 95.553 for graduate credit)

Max Credits: 3
Min Credits: 3

95.354 Electromagnetism II

Course Details: Magnetic materials, electric multipoles, solutions to Laplace’s equation, boundary conditions, image charge problems, Maxwell’s equations; propagation of electromagnetic waves in vacuum, conductors and dielectrics; reflection and refraction of electromagnetic waves; radiation from dipoles and antennas. (offered as 95.554 for graduate credit).

Max Credits: 3
Min Credits: 3

95.381 Mathematical Physics I

Course Details: Intended for students having completed 2 full years of physics and math, this course is designed to develop competency in the applied mathematical skills required of junior and senior level physics majors. Covering topics involving infinite series, power series, complex numbers, and linear algebra along with vector and Fourier analysis, students will be trained with the rigor required to solve a wide range of applications in the physical sciences.

Max Credits: 3
Min Credits: 3

95.382 Mathematical Physics II

Course Details: Expanding on the skills mastered in 95.381 Mathematical Physics I, this course is designed to continue developing competency in the applied mathematics required of junior and senior level physics majors. Intended for students having completed at least 2 years of physics and math, topics covered will involve ordinary, differential equations, calculus of variations, tensor analysis, special functions, series solutions of differential equations, partial differential equations, and complex variables as well as probability and statistics. Students will be trained with the rigor required to solve a wide range of applications in the physical sciences.

Max Credits: 3
Min Credits: 3

95.383 Astronomy and Astrophysics I

Course Details: This course is designed for an interdisciplinary general undergraduate (upperclassmen) audience.
Fundamentals of astronomy and astromechanics, introductory survey of astrophysics and the solar system (i.e. planetary astronomy).
Max Credits: 3
Min Credits: 3

95.401 Radiation Safety and Control I
Course ID: 8562
Course Details: Introduction to radiation protection, including radiation sources, radiation dose and dose measurement, radiation exposure, radiation protection techniques, monitoring methods and instruments, contamination control and waste storage, facility design, hazards analysis, and applied health physics techniques for the safe handling and control of radioactive material including laboratory. (offered as 98.501 for graduate credit)
Max Credits: 4
Min Credits: 4

95.402 Radiation Safety and Control II
Course ID: 8563
Course Details: A laboratory course giving students experience with equipment and practices of current use in the radiation protection field, and extension of 98.401 giving some of the practical aspects of radiation safety and control. (offered as 98.502 for graduate credit)
Max Credits: 4
Min Credits: 4

95.411 Physics Perspectives
Course ID: 8565
Course Details: Discussions on the role of the professional physicist in society.
Max Credits: 1
Min Credits: 1

95.413 Mechanics
Course ID: 1221
Max Credits: 3
Min Credits: 3

95.421 Statistical Thermodynamics
Course ID: 1220
Course Details: An integrated study of the thermodynamics and statistical mechanics, review of the experimental foundations and historical development of classical thermodynamics; probability and statistical methods of studying macroscopic systems; atomic basis of the laws of thermodynamics and microscopic definitions of thermodynamics quantities using the method of ensembles; entropy and related quantities; TdS equations, Maxwell relations, equation of state, and applications: canonical and grand canonical ensembles; phase transitions; quantum statistics; application to radiation, magnetism, specific heats. (offered as 95.521 for graduate credit)
Max Credits: 3
Min Credits: 3

95.424 Environmental Health Physics
Course ID: 37592
Course Details: Natural and man-made sources of environmental radioactivity and radiation; environmental transport in air, water, and soil; exposure pathways; environmental standards and regulations; environmental monitoring and surveys (MARSSIM); contaminated site characterization, and site remediation; environmental radiological impact of industry, accidents, and natural and man-made disasters.
Max Credits: 3
Min Credits: 3

95.435 Introductory Quantum Mechanics I
Course ID: 1219
Course Details: De Broglie waves, the Schroedinger equation, wave functions, wave packets, Heisenberg uncertainty principle, expectation values, particle in a box, the simple harmonic oscillator, free particles, step barrier, barrier penetration, square well potential, time independent perturbation theory. (offered as 95.535 for graduate credit)
Max Credits: 3
Min Credits: 3

95.436 Introductory Quantum Mechanics II
Course ID: 8567
Course Details: The three dimensional Schroedinger equation, the deuteron nucleus, angular momentum, spin, the hydrogen atom, spin-orbit interaction, Zeeman effect, Pauli exclusion principle, atomic structure, multi-electron atoms, the Fermi gas, X-rays. (offered as 95.536 for graduate credit)
Max Credits: 3
Min Credits: 3

95.439 Electro-Optics
Course ID: 1218
Course Details: Optical properties of materials, including dispersion, absorption, reflection and refraction at the boundary of two media. Crystal optics and induced birefringence and optical activity. Polarization states and Jones matrices. Applications to electro-optic devices. Experiments and projects involving the study of optical sources and detectors, spectroscopy, polarization, birefringence, pockels’ effect, optical fibers, and optical communication. (offered as 95.539 for graduate credit)
Max Credits: 3
Min Credits: 3

95.440 Image Processing
Course ID: 8568
Course Details: Basic physics of television and other imaging systems: representation and manipulation of images in digital form; Fourier analysis and filtering of images: detection of image features such as edges and regions; pattern recognition; three-dimensional visual perception in man and machine; examples of image processing tasks from such areas as medicine, industrial inspection and robotics; laboratory exercises with an image processing system utilizing and Octec 2000 image analyzer and a Data General Nova 4/C Computer. Ability to program a computer is required. (offered as 95.540 for graduate credit)
Max Credits: 4
Min Credits: 4

95.441 Radiochemistry
Course ID: 8569
Course Details: This course stresses analytical techniques applicable to identification and quantification of radionuclides in various sample types. Considerable time will be spent on review of general chemistry and inorganic analytical chemistry. The theories and applications of various separation techniques including precipitation, solvent extraction, ion exchange
chromatography, and electrodeposition will be discussed with emphasis on separation of radioactive species. Additional material to be covered includes instrumental techniques for analysis of radioactive species, radiotracer and isotope dilution techniques, neutron activation analysis, and sample preparation.

Max Credits: 3
Min Credits: 3

95.447 Laser Physics and Applications

Course ID: 1217

Course Details: Spontaneous and stimulated emission line broadening processing, rate equations, laser oscillation condition, spectral output of lasers. Gaussian beam propagation and resonator design parameters. Key features of ultraviolet through far infrared laser systems. Application to spectroscopy, radar, welding. (offered as 95.547 for graduate credit)

Max Credits: 3
Min Credits: 3

95.453 Health Physics Capstone

Course ID: 35837

Course Details: This course will provide the B.S. candidate in Physics (Radiological Health Physics option) with an undergraduate capstone experience through basic independent research, including critical thinking, problem solving, report writing, and presentation skills.

Max Credits: 3
Min Credits: 3

95.454 Physics Capstone

Course ID: 30755

Course Details: This course will provide the graduating physics major with a capstone experience through an exposure to the rudiments of independent research; incorporating critical thinking, problem-solving, report-writing, and presentation skills learnt in the course of the undergraduate curriculum. Prerequisite: Senior Status.

Max Credits: 3
Min Credits: 3

95.461 Nuclear Physics I

Course ID: 1214

Course Details: Nuclear properties including size, mass, binding energy, electromagnetic moments, parity and statistics; nuclear shell model, collective structure, deformed shell model, radioactive decay law and the Bateman equations, radioactive dating, counting statistics, energy resolution, coincidence measurements and time resolution, lifetime measurements; nuclear barrier penetration; angular momentum, Coulomb barrier, alpha decay and systematics, fission. (offered as 95.561 for graduate credit).

Max Credits: 3
Min Credits: 3

95.462 Radiation Biology

Course ID: 8573

Course Details: Effects of ionizing radiation on cellular, molecular and organ systems levels of biological organization; Study of x-rays, gamma rays, accelerator beams, and neutrons in interaction with living systems; Cohesive treatment of radiation biophysics with applications in health physics and radiation oncology. (offered as 98.562 for graduate credit)

Max Credits: 3
Min Credits: 3
95.472 Solid State Physics

Course ID: 1213

Course Details: Crystal structures, x-ray diffraction, crystal binding, lattice vibrations, free electron and band models of metals. (offered as 95.572 for graduate credit).

Max Credits: 3

Min Credits: 3

95.477 Solid State Electronic and Optoelectronic Devices

Course ID: 1212

Course Details: This course is an introduction to solid state electronic and optoelectronic devices for undergraduate science students (i.e., biology, chemistry, mechanical engineering, electrical engineering, physics, etc.) graduate students just entering a scientific endeavor which utilizes solid state devices, and practical engineers and scientists whose understanding of modern electronics and optoelectronics needs updating. The course is organized to bring students with a background in sophomore physics to a level of understanding which will allow them to read much of the current literature on new devices and applications. The course will cover fundamental crystal properties, atoms and electrons, energy bands and charge carriers, excess carriers, junctions and p-n junction diodes (includes photodiodes and light-emitting diodes). Three or four practical demonstrations will also be performed with the analysis of the generated data assigned as homework. (offered as 95.577 for graduate credit)

Max Credits: 3

Min Credits: 3

95.478 Integrated Optics: Wave Guides and Lasers

Course ID: 1211

Course Details: This course is a continuation of 95.477 and serves as an introduction to solid state electronic and optoelectronic devices. The course will cover bipolar junction transistors, field effect transistors, integrated circuits, lasers, switching devices, and negative conductance microwave devices. Three or four practical demonstrations will also be performed with the analysis of the generated data assigned as homework. (offered as 95.548 for graduate credit)

Max Credits: 3

Min Credits: 3

95.481 Mathematical Methods of Radiological Sciences

Course ID: 8574

Course Details: An applied course emphasizing the mathematical skills used in radiological sciences/health physics fields, including special techniques used in radiation physics, radiation dosimetry, and radiation shielding. Computer applications will be emphasized. (offered as 98.581 for graduate credit)

Max Credits: 3

Min Credits: 3

95.482 Numerical Methods of Radiological Sciences

Course ID: 8575

Course Details: Advanced mathematical treatment of topics covered in 98.481 with extensive application of computer techniques to problem solutions applicable to Radiological Sciences and Protection. (offered as 98.582 for graduate credit)

Max Credits: 3

Min Credits: 3

96.101 Introductory Experimental Physics

Course ID: 8666

Course Details: Experimental physics with topics correlated with the corequisite lecture course.
**96.103 General Physics I Lab**

Course ID: 8667

Course Details: Presents the first semester of a one-year course which surveys the field of experimental physics with topics correlated to the corequisite lecture course.

Max Credits: 1  
Min Credits: 1

**96.104 General Physics II Lab**

Course ID: 8668

Course Details: Serves as a continuation of 96.103 with topics correlated with the corequisite lecture course.

Max Credits: 1  
Min Credits: 1

**96.105 Sounds of Music**

Course ID: 35598

Course Details: Examines the physical process that makes musical sounds from acoustic instruments. Hands-on laboratory experiences explore how the vibrations of strings, air columns, membranes, plate and bars are transformed into musical sounds, how these propagate and are transformed by the listening space, and how these are received by ears and perceived by the brain. In addition harmonic series, the mean-tempered scale, the use of decibels, sonic interference and diffraction are explained.

Max Credits: 3  
Min Credits: 3

**96.141 Physics I Lab**

Course ID: 8671

Course Details: Serves as an introductory course on methods and techniques of experimentation in physics with experiments in mechanics selected to support the concepts of the corequisite lecture course.

Max Credits: 1  
Min Credits: 1

**96.144 Physics II Lab**

Course ID: 8673

Course Details: Serves as a continuation of 96.141 with experiments in optics, electricity and magnetism, and modern physics to support the concepts of the corequisite lecture course.

Max Credits: 1  
Min Credits: 1

**96.161 Honors Physics I Laboratory**

Course ID: 8678

Course Details: An introductory laboratory course at the honors level on the methods and techniques of experimental physics. Lectures on measurement uncertainties and error analysis are included and experiments are selected principally in mechanics.

Max Credits: 2
96.164 Honors Physics Lab II

Min Credits: 2

Max Credits: 2

Course Details: A continuation of 96.161 with experiments selected principally in optics, electricity and magnetism.

Course ID: 8679

96.201 Health Physics Internship I

Min Credits: 3

Max Credits: 3

Course Details: Applied work experience as a health physics technician at a government laboratory or a radiation facility of some industry, hospital, or education and research institution.

Course ID: 8681

96.245 Physics III Lab

Min Credits: 1

Max Credits: 1

Course Details: Experiments are selected principally in properties of solids, vibrations, waves, heat, and thermodynamics.

Course ID: 8683

96.261 The Physics of Materials and Devices

Min Credits: 3

Max Credits: 3

Course Details: Investigating the phenomenology of materials involve sensing devices in which electrical signals must be evaluated. Observing physical phenomena with an electrical sensing device enables one to calibrate the dynamics of the electrical signal associated with the changes in the physical phenomenology observed with that device. Applications in these laboratory-based measurement techniques include the Wheatstone bridge, current/voltage device characterization, the operational amplifier as an active filter, stress & strain, Newton's law of cooling, Stefan-Boltzman's law and the ideal gas law.

Course ID: 32070

96.262 Principles in Laboratory Automation

Min Credits: 3

Max Credits: 3

Course Details: This is an introduction to the principles of automating today's research laboratory. A foundation of the Labview-based software and hardware tools required to conduct computer-controlled experiments will be presented, demonstrated and then used to acquire, display and analyze data on some typical physical phenomena. Students will be fully involved in designing the control and acquisition software as well as setting up the experimental hardware. Applications of the automated acquisition environment include AC characterization of RC and LRC circuits, the use of thermistors and thermocouples along with acquiring the temperature dependent resistivity of high Tc super conductors.

Course ID: 8687

96.301 Health Physics Internship II

Min Credits: 1

Max Credits: 3

Course Details:

Course ID: 8691
96.302 Health Physics Internship II
Course ID: 8692
Course Details:
Max Credits: 3
Min Credits: 3

96.304 Vibration and Sound Lab
Course ID: 37506
Course Details: A series of four directed four-hour experiments and one student directed experiment all of which are coordinated with Vibration and Sound 95.304. Emphasis is on non-intrusive measurement techniques; choosing, applying appropriate transducers and structuring data processing and display in measurements of transfer functions, impedances and modal structures for the system studied analytically in the companion course.
Max Credits: 1
Min Credits: 1

96.393 Advanced Experimental Physics Laboratory I
Course ID: 8699
Course Details:
Max Credits: 2
Min Credits: 2

96.394 Advanced Physics Lab II
Course ID: 8700
Course Details: A continuation of 96.393 with experiments selected mainly from condensed matter and nuclear physics. Opportunities for independent work by permission of the instructor.
Max Credits: 2
Min Credits: 2

96.401 Radiation Safety And Control I
Course ID: 8701
Course Details:
Max Credits: 0
Min Credits: 0

96.406 Nuclear Instrumentation
Course ID: 36046
Course Details: This course provides the operating principles and applications of nuclear radiation detection systems, including detector theory, electronic signal processing, and measurement and data reduction techniques. The systems covered include gas-filled detectors (ion chambers, proportional counters, and Geiger-Mueller counters), inorganic and organic scintillators, and high-purity germanium detectors, for the detection of alpha, beta, gamma, and neutron radiation. This course also covers hypothesis testing, detection limits, and detector dead time (offered as 98.506 for graduate credit).
Max Credits: 4
Min Credits: 4

96.409 Nuclear Instrumentation
Course ID: 37351

Course Details: This course provides the operating principles and applications of nuclear radiation detection systems, including detector theory, electronic signal processing, and measurement and data reduction techniques. The systems covered include gas-filled detectors (ion chambers, proportional counters, and Geiger-Mueller counters), inorganic and organic scintillators, and high-purity germanium detectors, for the detection of alpha, beta, gamma, and neutron radiation. This course also covers hypothesis testing, detection limits, and detector dead time. This course is adapted for Nuclear Engineering and Medical Physics majors. (offered as 98.509 for graduate credit).

Max Credits: 3
Min Credits: 3

96.411 Senior Research In Radiological Sciences

Course ID: 8703

Course Details: A research problem related to the field of radiation protection is investigated by the student under the direction of faculty and staff of the Nuclear Center. The student will present a seminar on this research project. Areas of research may include radiation shielding, radiation detection and measurement, radiation survey and monitoring, radiation biology, radiation chemistry, radiobiology, radiochemistry, radioecology, natural radioactivity, fallout, analyses and measurement of radioactivity and radiation levels associated with the operation of reactors and accelerators, and radioactive aerosols.

Max Credits: 3
Min Credits: 3

96.445 Characterization of Materials

Course ID: 35486

Course Details: A one-semester course designed to teach the student several of the important techniques for characterizing the structural, optical, and electronic properties of materials. Experiments will include x-ray diffractometry, hardness measurements, ellipsometry, visible and near infrared spectroscopy, far infrared spectroscopy, and raman spectroscopy.

Max Credits: 2
Min Credits: 2

96.453 Optics Project

Course ID: 8710

Course Details:

Max Credits: 3
Min Credits: 3

96.467 Automation Techniques

Course ID: 30830

Course Details: Students explore the techniques and sensor technologies of automating measurement acquisition and analysis in a research laboratory. The Labview-based software and hardware tools required to conduct computer-controlled experiments will be presented, demonstrated, and then used to acquire, display, and analyze data for a number of sensors. Students will be expected to master the design of control and acquisition software as well as setting up the experimental hardware. Applications of the automated acquisition environment include AC characterization of operational amplifiers and active filters as well as the RC time characteristics of photoductors and thermocouples. Advanced projects individualized to the student's field of interest are required.

Max Credits: 3
Min Credits: 3

96.495 Special Research Problems I

Course ID: 8713

Course Details: Special problems in physics assigned to the individual student with emphasis on modern research methods.
and preparation of results for publication.

Max Credits: 3
Min Credits: 3

**96.496 Special Research Problems II**

Course ID: 8714

Course Details: A continuation of 96.495 for a second semester.

Max Credits: 3
Min Credits: 3

**96.497 Senior Thesis in Physics**

Course ID: 8715

Course Details:

Max Credits: 3
Min Credits: 3

**99.101 Radiation and Life**

Course ID: 8906

Course Details: This course will provide students with an understanding of the nature, sources, uses, and biological effects of natural and man-made radiations. Radiations discussed include non-ionizing radiations such as ultraviolet and microwave as well as the ionizing radiations produced by radon in homes and radio nuclides released from nuclear power plants. Students will have a better understanding of the risks and benefits of radiation in the modern world. Satisfies Gen Ed science requirements for non-science majors. Does not satisfy science requirements for Science majors but may be used as a free elective by Science majors.

Max Credits: 3
Min Credits: 3

**99.102 Radiation and Life Laboratory**

Course ID: 8907

Course Details: This laboratory course which is suitable for non-science majors will provide the student with an opportunity for some hands-on experience with modern equipment used to identify and quantify levels of radioactivity in the environment. Students will measure radiation from a variety of sources and will determine concentrations of radionuclides in several environmental samples including making measurements of the radon levels in the air of their own homes. Students will also study the effects of ionizing radiation on the germination and growth rate of exposed seeds. Satisfies Gen Ed science requirements for non-science majors. Does not satisfy science requirements for Science majors but may be used as a free elective by Science majors.

Max Credits: 1
Min Credits: 1

**99.131 Technical Physics I**

Course ID: 8909

Course Details: Presents material in both the class and laboratory format. Topics include: vectors; one- and two-dimensional motion; Newton's laws of motion; translational and rotational equilibrium; work and energy; linear momentum; and circular motion and gravitation. Two additional Friday night classes are required.

Max Credits: 3
Min Credits: 3

**99.132 Technical Physics II**
Course Details: Covers material in both the class and laboratory format. Rotational dynamics; mechanical vibrations and waves; sound; solids and fluids; thermal physics; heat and law of thermodynamics will be discussed. One session per week. Two additional Friday night classes are required.

Max Credits: 3
Min Credits: 3

99.133 Technical Physics III

Course Details: Presents material in both the class and laboratory format. Reflection, refraction, mirrors, lenses, wave optics, optical instruments, Coulomb's law, magnetic force, quantum physics, atomic physics and nuclear physics will each be addressed. One session per week. Two additional Friday night classes are required.

Max Credits: 3
Min Credits: 3

GNDR.240 Introduction to Gender Studies

Course Details: This course is an interdisciplinary introduction to the field of Gender Studies that examines both commonalities and differences among diverse groups of women. A variety of topics are presented such as past and present stratification in work and family, sexual identities, medial representations of women, and violence against women. Social movements for women's equality and feminist theories and methods are also introduced.

Max Credits: 3
Min Credits: 3

GNDR.401 Gender Studies Practicum

Course Details: This course provides a link between the UMASS Lowell campus and the community, offering students a unique learning experience. This Community Service-Learning course provides opportunities for students to learn through thoughtful engagement in community service, applying knowledge of gender issues gained in the classroom to the world outside the classroom. Students and their faculty supervisors together will determine the kind of service work students will engage in during the semester, choosing from a wide range of available placements. They will be using their hard-won knowledge from their years in the classroom and applying it to help meet urgent needs in the he community. Students will have the opportunity to make lasting connections and effect positive change in our community. Ideally, this course will promote good citizenship through reflection on gender issues and testing of personal values, leading students toward a heightened sense of social responsibility and a lifelong commitment to their local, national, and global communities.

Max Credits: 3
Min Credits: 1

HON.110 First Year Seminar in Honors: Text in the City

Course Details: The First Year Seminar in Honors (FYSH) uses Lowell as its text. Rich in history and culture, and the students' home for the next four years, the City of Lowell offers a perfect topic to promote connections while learning how to view the city through the lens of the Humanities. Students will develop library research skills, including facility with primary and secondary sources, and an appreciation for the narratives that lie in buildings, objects, and what people leave behind. Activities include field trips, readings, writing, and an artistic interpretation. As important, students will have the opportunity to form strong connections to each other, to the faculty, and to the community. Note: New course, but combination of current 59.102 and 59.103 in one semester.

Max Credits: 3
Min Credits: 3

HON.310 Honors Workshop
Course ID: 35508

Course Details: This course is designed to promote the application of interdisciplinary perspectives to problems, issues, concepts, and creations, as well as an appreciation of the research methods that characterize a broad range of disciplines. It is a writing intensive class with active participation requirements to enhance students' oral and written expository communication skills in preparation for the Senior Honors Thesis. Students complete the NIH module on research ethics and discuss the role of the University Office for Compliance/IRB. Note: Formerly 59.258.

Max Credits: 3
Min Credits: 3

**HON.320 Seminar: Special Topics in Honors**

Course ID: 36909

Course Details: Seminar: Special Topics in Honors offers students the opportunity to engage in depth with a subject that is of special interest in an Honors-level seminar. The course will address an inquiry-based topic that spans or falls outside the boundaries of any individual major on campus, but integrates methodology, content, and/or approaches from two or more.

Max Credits: 3
Min Credits: 3

**HON.490 Honors Thesis Research**

Course ID: 35510

Course Details: This zero credit course is designed to facilitate tracking of Honors students' thesis progress. During the first semester of a two semester (6 credit) project, students will register for the appropriate 301 section in their department as well as HON.490, for which the Honors Program components are required. These components include a timely and complete thesis proposal as well as an end-of-the-semester progress report, both of which are to be signed by the faculty advisor and committee member and submitted for approval to the Honors Director.

Max Credits: 0
Min Credits: 0

**HON.491 Honors Thesis Research**

Course ID: 35511

Course Details: This zero credit course is designed to facilitate tracking of Honors students' thesis progress. During the final semester of their thesis research, students will register for the appropriate 301 section in their department as well as HON 491, for which the Honors Program components of the research are required. In a single semester (3 credit) project, these components include a timely and complete thesis proposal as well as an end-of-the-semester progress report, both of which are to be signed by the faculty advisor and committee member and submitted for approval to the Honors Director. In addition, both single semester projects and the second of two semester projects require public presentation of the work and submission of a written thesis and any relevant supporting materials (i.e., in the creative arts).

Max Credits: 0
Min Credits: 0

**PCS.125 Introduction to Peace and Conflict Studies**

Course ID: 36942

Course Details: This course will focus on the causes of conflict, conflict resolution methods, and ways to sustain peace. The course will explain and define each of those areas. A mid-term will be administered to examine the students' grasp of the concepts and key terminology. The second part of the class will emphasize student participation and the application of concepts learned earlier in class. The final is a take home exam that will require the application of theory and praxis in the field of Peace and Conflict Studies.

Max Credits: 3
Min Credits: 3

**PCS.205 Restorative Justice**

Course ID: 37755
Course Details: This course will introduce students to the fundamental principles and practices of restorative justice as a method of building positive peace. Students will develop a working knowledge of the general theories of restorative justice, as well as practical hands-on experience with peacemaking circles. Traditional assumptions about justice and the adversarial legal process will be explored and challenged. The relationship between restorative justice, restorative practices, and other conflict resolution methods such as mediation will be discussed. Practical challenges in implementing restorative justice on the ground will also be examined.

Max Credits: 3
Min Credits: 3

PCS.420 Gender, Work and Peace

Course ID: 37452

Course Details: "Gender, Work and Peace" will explore the relationship between human rights, gender and nonviolence in the 21st century. We will examine how current and future reality can be shaped by related policies, specifically those on the micro and macro level concerned with gender. Today we live in a period of global transition comparable to the period that followed the Industrial Revolution. It presents us with enormous challenges and opportunities regarding factors we will address in class: economic globalization, government restructuring, work-family balancing, environmental safety at work, gender inequalities and the connection between human rights and dignity at work.

Max Credits: 3
Min Credits: 3

PCS.453 Integrative Seminar in Peace and Conflict Studies

Course ID: 37444

Course Details: The purpose of the integrative seminar is to assist students in developing a robust and mature understanding of the three PCS core questions as they relate to PCS coursework. With a strong evidence focus, students identify patterns, principles, questions, and dilemmas relevant to the core questions emerge from multiple courses they have taken within the PCS program. Students develop a reflective journal, a series of essays, a portfolio of their accumulated work, and a culminating portfolio presentation.

Max Credits: 3
Min Credits: 3

PCS.458 Peace and Conflict Field Experience

Course ID: 37366

Course Details: A program of practical experience in the field of Peace and Conflict. Students can work in a variety of areas related to Peace and Conflict Studies. Students meet regularly as a class on campus with the designated instructor to discuss their experiences and to learn more about the settings in which they practice and the challenges that they confront.

Max Credits: 3
Min Credits: 3

THEA.230 Foundations of Theatrical Design

Course ID: 37382

Course Details: Basic principles and techniques in scenic, lighting and costume design for theatre. Replaces 42.260 and 59.386; credits may not be earned for both 42.260 and THEA 230 or for 59.386 and THEA 230.

Max Credits: 3
Min Credits: 3

UTL.202 Interactions and Equity

Course ID: 37652

Course Details: This course examines the organization of instructional settings that maximize learning for all. Students will examine gender issues, cultural issues, bilingual education and learning disabilities as they impact learner success. A major portion of the course is a field experience in which students interview high school teachers, observe a high school
classroom, then teach three lessons. The purpose of these experiences is to ensure that students recognize the diversity of students and their specific learning needs. This course is required for STEM TEACHING MINOR.

Max Credits: 3
Min Credits: 3

**UTL.204 Perspectives on Mathematics and Science**

Course ID: 37649

Course Details: This course examines the history and philosophy of mathematics and science. Students will explore a selection of topics and episodes in the history of science and mathematics recognizing that many gains in knowledge have emerged through struggle, and in spite of resistance from cultural, religious and social structures. Students will learn that ideas in science and mathematics are dynamic and that disagreement can often lead to major breakthroughs. Students must think critically about how K-12 STEM education texts portray the history and philosophy of science and mathematics. This course is required for the STEM TEACHING MINOR.

Max Credits: 3
Min Credits: 3

**01.384 Language, Literacy and Culture**

Course ID: 2312

Course Details: The course examines the role that socio-cultural and socio-political contexts play in children's literacy development, with particular focus on English Language Learners (ELLs). The course is designed to help students understand the complex and dynamic worlds of diverse learners represented in twenty-first century classrooms. Students will learn new and effective approaches to teaching and learning that provides struggling learners, especially English Language Learners a fair and equitable chance to succeed in the learning contexts.

Max Credits: 3
Min Credits: 3

**14.409 Environment Engineering Geology**

Course ID: 2988

Course Details:

Max Credits: 3
Min Credits: 3

**16.485 Computer Aided Engineering I Lab**

Course ID: 3250

Course Details:

Max Credits: 3
Min Credits: 3

**19.301 Clinical Research Methods**

Course ID: 38159

Course Details: In this course, health science students learn to apply critical evaluation skills to quantitative data analysis and interpretation of research findings. The course reviews statistics and research methods, making students aware of the importance of the distribution of a range of types of quantitative data encountered in the health sciences. Sources of uncertainty (bias, confounding, and effect modification) and planning and analytical methods to minimize and summarize uncertainty will be summarized.

Max Credits: 3
Min Credits: 3

**22.382 Heat Transfer**
Course ID: 38230

Course Details: A calculus-based engineering course providing treatment of the fundamental modes of heat transfer. Topics include: steady-state and transient heat conduction in solids; forced and natural convection; the concept of thermal boundary layer; scale analysis and dimensionless number such as Reynolds, Prandtl, and Grashof numbers; Reynolds analogy; empirical engineering convection relations; thermal radiation involving heat exchange between black and non-black body surfaces.

Max Credits: 3
Min Credits: 3

**22.442 Design of Thermofluid Systems**

Course ID: 38231

Course Details: This is a comprehensive design course accompanied by periodic supplementary lectures, and builds on the concepts learned in Thermodynamics, Fluid Mechanics, Heat Transfer, and Analysis of Thermo/Fluid Processes. The course consists entirely of design projects on such topics as heat exchangers, pumps and blowers, piping systems, air conditioning and refrigeration systems, power plant cycles, and solar and wind energy systems. In addition to the appropriate technical aspects of the design, the projects will also consider such aspects as ergonomics, cost, environmental impact.

Max Credits: 3
Min Credits: 3

**22.446 Computational Thermal Fluids**

Course ID: 33584

Course Details: Derivation of the partial differential equations of thermal fluids (heat conduction, Navier-Stokes, continuity, and thermal convection/diffusion equation). Introduction to the finite-difference, finite-volume, and finite-element techniques as applied to numerical solution of these equations. Use of a commercial CFD package to analyze common fluid flow and heat transfer configurations. Course also offered at the graduate level as 22.546.

Max Credits: 3
Min Credits: 3

**28.001 Independent Study (MSL IS I)**

Course ID: 4412

Course Details: Advanced topics in leadership and management utilizing the military decision making process not covered in the regular curriculum. Content may vary from year to year. Due to the unique nature of this course, entrance into this course requires a permission number granted by the instructor.

Max Credits: 3
Min Credits: 3

**28.002 Independent Study II (MSL IS II)**

Course ID: 34682

Course Details: Advanced topics in leadership in a tactical environment with a focus on adventure training. Content may vary from year to year. Due to the unique nature of this course, entrance into this course requires a permission number granted by the instructor.

Max Credits: 3
Min Credits: 3

**28.140 Leadership and Personal Development (MSL 101)**

Course ID: 4413

Course Details: Leadership and personal development introduces students to the personal challenges and competencies that are critical for effective leadership. They will learn how the personal development of life skills such as goal setting, time management, physical fitness, and stress management relate to leadership, officership, and the Army profession. The focus
is on developing basic knowledge and comprehension of Army leadership dimensions, attributes and core leader competencies while gaining a big picture understanding of the ROTC program, its purpose in the Army, and its advantages for the student.

Max Credits: 3  
Min Credits: 3

**28.170 Introduction to Tactical Leadership (MSL 102)**

Course ID: 4416

Course Details: Introduction to tactical leadership overviews leadership fundamentals such as setting direction, problem-solving, listening, presenting briefs, providing feedback, and using effective writing skills. Students will explore dimensions of leadership attributes and core leader competencies in the context of practical, hands-on, and interactive exercises.

Max Credits: 3  
Min Credits: 3

**28.230 Foundations of Leadership (MSL 201)**

Course ID: 4419

Course Details: Foundations of Leadership explores the dimensions of creative and innovative tactical leadership strategies and styles by examining team dynamics and two historical leadership theories that form the basis of the Army leadership framework. Aspects of personal motivation and team building are practiced planning, executing and assessing team exercises.

Max Credits: 3  
Min Credits: 3

**28.240 Foundations of Tactical Leadership (MSL 202)**

Course ID: 4420

Course Details: Foundations of Tactical Leadership examines the challenges of leading tactical teams in the complex contemporary operating environment (COE). This course highlights dimensions of terrain analysis, patrolling, and operation orders. Further study of the theoretical basis of the Army Leadership Requirements Model explores the dynamics of adaptive leadership in the context of military operations. MSL 202 provides a smooth transition into MSL 301. Cadets develop greater self-awareness as they assess their own leadership styles and practice communication and team-building skills. COE case studies give insight into the importance and practice of teamwork and tactics in real-world scenarios.

Max Credits: 3  
Min Credits: 3

**28.330 Adaptive Team Leadership (MSL 301)**

Course ID: 4422

Course Details: During this course students will study, practice, and apply the Fundamentals of Army Leadership, Officership, Army values and Ethics, personal development, and small unit tactics at the team and squad level. At the conclusion of this course, students will be capable of planning, coordinating, navigating, motivating and leading a team or squad in the execution of a tactical mission during a classroom PE, a Leadership Lab, or during a Situational Training Exercise (STX) in a field environment. Students will receive systematic and specific feedback on their leader attributes, values and core leader competencies using the ROTC Leader Development Program (LSP) model. Due to the unique nature of this course, entrance into this course requires a permission number granted by the Instructor.

Max Credits: 3  
Min Credits: 3

**28.340 Applied Team Leadership (MSL 302)**

Course ID: 4423

Course Details: During this course students will study, practice, and apply the fundamentals of Army leadership, Officership, Army values and ethics, personal development, and small unit tactics at the team and squad level. At the conclusion of this course, students will be capable of planning, coordinating, navigating, motivating and leading a team or squad in the
execution of a tactical mission during a classroom PE, a Leadership Lab, or during a Situational Training Exercise (STX) in a field environment. Students will receive systematic and specific feedback on their leader attributes values and core leader competencies using the ROTC Leader Development Program (LDP) model. Due to the unique nature of this course, entrance into this course requires a permission number granted by the Instructor.

Max Credits: 3  
Min Credits: 3

28.440 Adaptive Leadership (MSL 401)

Course ID: 4427

Course Details: Adaptive Leadership is designed for students to apply their leadership techniques. Throughout the semester, students are assigned the duties and responsibilities of an Army staff officer and must apply the fundamentals of principles of training and the military decision making process to plan, execute and assess ROTC training. Students will be given numerous opportunities to train, mentor and evaluate underclass students enrolled in the ROTC Basic Course. Students will study how Army values and leader ethics are applied in the Contemporary Operating environment and how these values and ethics are relevant to everyday life. Students will study the Army officer's role in the counseling of subordinates, administrative actions and the management of an Army Officer's career. Due to the unique nature of this course, entrance into this course requires a permission number granted by the Instructor.

Max Credits: 3  
Min Credits: 3

28.450 Leadership in a Complex World (MSL 402)

Course ID: 4428

Course Details: Leadership in a Complex World explores the dynamics of leading in the complex situations of current military operations in the contemporary operating environment (COE). Students will examine differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism. This course places significant emphasis on preparing students for their careers in the military. It uses various case studies and scenarios to prepare students to face the complex ethical and practical demands of leading as a commissioned officer in the United States Army. Due to the unique nature of this course, entrance into this course requires a permission number granted by the Instructor.

Max Credits: 3  
Min Credits: 3

29.001 AF ROTC Leadership Lab

Course ID: 4429

Course Details: 

Max Credits: 0  
Min Credits: 0

29.101 Foundations of the United States Air Force-Part I

Course ID: 4430

Course Details: Topics relating to the Air Force and defense. Structure and missions of Air Force organizations, officership and professionalism, and an introduction to communication skills.

Max Credits: 1  
Min Credits: 1

29.102 Foundations of the United States Air Force - Part II

Course ID: 4431

Course Details: Completion of the material described in 29.101.

Max Credits: 1
29.201 Devel of United States Air Force Power

Course ID: 4432

Course Details: Factors contributing to the development of air power from its earliest beginnings through two World Wars, the evolution of air power concepts and doctrine, and an assessment of communication skills (speaking and writing).

Max Credits: 1
Min Credits: 1

29.202 Evolution of United States Air Force Power

Course ID: 4433

Course Details: Completion of the material described in 29.201.

Max Credits: 1
Min Credits: 1

29.301 Air Force Leadership Studies

Course ID: 4434

Course Details: Emphasizing the individual as a leader/manager in a Fortune 500/Air Force setting. The individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the professional skills needed by Air Force officers and middle managers. The basic managerial processes involving decision making, utilization of analytic aids in planning, organizing, and controlling in a changing environment are emphasized as necessary professional concepts. Organizational and personal values, management of forces in change, organizational power, politics, and managerial strategy and tactics are discussed within the context of the military organization. Actual Air Force and corporate case studies are used to enhance the learning and communication processes.

Max Credits: 3
Min Credits: 3

29.302 Air Force Leadership Studies II

Course ID: 4435

Course Details: Continuation of the material described in 29.301.

Max Credits: 3
Min Credits: 3

29.402 National Security

Course ID: 4437

Course Details: Continuation of the material described in 29.401.

Max Credits: 3
Min Credits: 3

30.219 Emergency Medical Technician

Course ID: 4450

Course Details:

Max Credits: 3
Min Credits: 3
30.331 Exercise Physiology Laboratory

Course ID: 4463

Course Details:

Max Credits: 1
Min Credits: 1

30.406 Exercise Physiology II

Course ID: 1249

Course Details: This course provides a continuation of Exercise Physiology I and deals with the short and long effects of exercise on the skeletal and neuromuscular systems. This portion of the sequence also provides an integration of the physiological systems when considering the effect of exercise. All exercise physiology undergraduate courses (number 38) are restricted to EP majors only.

Max Credits: 4
Min Credits: 4

31.302 Applied Technology in Health Promotion

Course ID: 4480

Course Details: This course discusses the uses of information and media technology in health promotion such as mobile devices, GIS (global information systems) for health mapping, social media, and other emerging technologies. Students will explore the ethical considerations pertinent to the use of such technologies in health promotion. The course discusses the concepts of health literacy and the implications of electronic information related to health literacy. Juniors only.

Max Credits: 3
Min Credits: 3

40.270 Women in American History

Course ID: 5238

Course Details: This course surveys the history of women in the British North American colonies and United States with a special focus on social and economic change. It examines women as a distinct group but also attends to divisions among them, particularly those based on class, ethnicity/race, and regional diversity. Course themes include concepts of womanhood, the development and transgression of gender roles, unpaid work and wage labor, social reform and women's rights activism, as well as changing ideas and practices with respect to the female body.

Max Credits: 3
Min Credits: 3

41.102 The Development of the American Legal System

Course ID: 37752

Course Details: This class will explore the American legal system, beginning with English common law and colonial rule through the American Revolution and establishment of our Constitution and federal system of government. We will examine how American law evolved through the “Golden Age” (1812 to 1860) and the rise of industrialization and corporations. We will look at how American law developed to favor the expansions of commerce and how the law evolved to support and the prohibit slavery. We will look at the treatment of wives and paupers throughout our history. We will study the rise of legal liberalism, economic reform, and the New Deal (1900-1945). The end of the Second World War heralded changes in society that saw the growth of government, the civil rights movement, racial and gender equity, changes in criminal law and a changing legal culture. There are no prerequisites for this course. This is a web-enhanced, online course.

Max Credits: 3
Min Credits: 3

41.287 Legal Writing

Course ID: 4969
Course Details: Designed to train the student for effective legal writing as applied to client letters, memoranda of law, pleadings, briefs and other legal documents.

Max Credits: 3
Min Credits: 3

41.373 Consumer Law

Course ID: 31896

Course Details: Acquaints the student with current federal and state consumer protection statutes. Deals with individual consumer problems by discussing deceptive advertising and the legal effect of warranties. Delves into the law pertaining to consumer credit including unfair debt collection tactics. Investigates insurance law as it affects consumers and surveys the law protecting incompetent consumers. Examines the legal remedies available to consumers including the consumer class action.

Max Credits: 3
Min Credits: 3

41.378 Comparative European Community Law

Course ID: 31897

Course Details: This course deals with the relationship between European Community law and the law of the United States; the operation and impact of community law in the United States; and the role of the European courts in interpreting community law. International treaties, laws, and regulations affecting the free movement of people, goods and services are traced.

Max Credits: 3
Min Credits: 3

42.312 Literature of Colonial America

Course ID: 5102

Course Details: This course will explore the literatures (including some selections in translation) written during America's colonial era. The periods of exploration, first encounters, settlement, the rise of Anglo-America, the emergence of a national sensibility, and the years of transition in the new republic will be considered. The course will also treat a small selection of nineteenth century texts that present visions and re-visions of the colonial past.

Max Credits: 3
Min Credits: 3

42.344 Women in Theatre

Course ID: 38095

Course Details: A study of the significant contributions of woman to the literature and art of the theatre in various periods and cultures. Topics may include: plays written by women, the progress of women in theater, the evolution of female roles, and the portrayal of feminism on the stage.

Max Credits: 3
Min Credits: 3

42.359 Contemporary World Drama

Course ID: 31899

Course Details: A study of important recent works by playwrights from around the globe.

Max Credits: 3
Min Credits: 3

42.377 Theories of Rhetoric and Composition
Course ID: 36429

Course Details: This course will examine the history and theories of composition and rhetoric, studying the field from its inception to more recent developments and challenges. We will also explore our own writing processes and literary practices. The course is furthermore grounded on the idea that literary practices are shaped by our culture. The course introduces practical approaches to as well as theoretical frameworks beneficial for those interested in composition studies.

Max Credits: 3
Min Credits: 3

42.408 Analysis of Modern English

Course ID: 5098

Course Details: A study of English syntax examining traditional, structural, and transformational grammars. Attention to issues of dialect, usage, phonology, and morphology.

Max Credits: 3
Min Credits: 3

43.249 The Vietnam War

Course ID: 38202

Course Details: Covers the U.S. was in Vietnam from its origins in the French colonial era to its impact on contemporary culture and foreign policy.

Max Credits: 3
Min Credits: 3

43.262 The Twenties and the Thirties

Course ID: 5236

Course Details: An examination of the emergence of the corporate and governmental institutions of modern America set in two turbulent decades of cultural and political ferment that involved both booming prosperity and the economic collapse of the Great Depression.

Max Credits: 3
Min Credits: 3

43.327 England: The Middle Ages

Course ID: 1245

Course Details: The history of the English people and nation from the Roman conquest to the end of the fourteenth century with special emphasis on the development of political and social institutions.

Max Credits: 3
Min Credits: 3

43.401 History Writing and Community

Course ID: 34894

Course Details: Restricted to upper-level students and available only with permission of the instructor, this course offers a select number of students the opportunity to work for non-profit and governmental organizations within Lowell. Such organizations might include the National Park Service; Community Teamwork Inc.; Girls Club of Lowell; St. Athanasius Church; American Textile History Museum, and so forth. The course is primarily intended for History majors. Students will utilize their skills in research, writing, and analysis to assist an organization with its documented needs (e.g., conduct research on history of the organization; write a pamphlet or short article; organize oral history interviews; analyze the urban context in which the organization has developed). Students receive academic credit, along with invaluable work-related experience.

Max Credits: 3
Min Credits: 3

43.491 Directed Study

Course ID: 5339

Course Details: Directed study offers the student the opportunity to engage in an independent study or research project under the supervision of a department member. Working closely with the instructor, students define and investigate a research topic in an area of special interest and present the results of their investigation in a significant paper. Juniors and seniors only.

Max Credits: 4
Min Credits: 1

44.5CO-OP Curricula Practical Training

Course ID: 37989

Course Details: Curricula Practical Training

Max Credits: 1
Min Credits: 0

44.214 Security Management

Course ID: 37791

Course Details: Addresses the basic interdisciplinary principles of security management including planning, budgeting, organizing, staffing, directing, and controlling. This course will also cover marketing security services to management, risk management, civil and criminal liability, and labor relations. Each aspect of the course is designed to prepare security managers to face the new challenges as broader and more cost-effective protection is required with fewer resources. The course will also bring about greater awareness and understanding of the various options available in security and loss control. It will identify a number of risk areas and outline various deterrent and preventative methods.

Max Credits: 3
Min Credits: 3

44.340 Criminal Networks

Course ID: 37470

Course Details: This course examines various forms of decentralized criminal networks and activities, both domestic and international, with particular focus on trafficking in drugs, weapons, counterfeit goods and humans. Students will study money laundering and the intersections of terrorist and criminal networks, as well as the challenges faced by law enforcement in responding to these activities.

Max Credits: 3
Min Credits: 3

44.341 International Perspectives on Crime and Crime Control

Course ID: 5382

Course Details: This course provides an introduction to international perspectives on crime and crime control policy in Western countries. International developments and cross-national research on crime and victimization, criminal justice, and crime prevention policy, and current issues will be examined.

Max Credits: 3
Min Credits: 3

44.490 Criminal Justice Honors Seminar

Course ID: 5419

Course Details: Specific practice in the definition, design, and execution of a research project, and an analysis of the impact
of contemporary criminal justice research on policy development.

Max Credits: 3
Min Credits: 3

45.308 Philosophy of Race and Gender

Course ID: 31900

Course Details: This course will focus on issues of identity and difference. We will discuss the ways in which group identities are formed and break down. We will discuss how differences are constituted and reconstituted. These issues are central to theories of race and gender, racism and sexism. Some of the questions which we will raise are these: What motivates forming group identities? How are they formed? How is identity used within oppressive social structures? How can it be used to transform society? Why do some differences make a difference and others don’t? Can we choose our group identities?

Max Credits: 3
Min Credits: 3

45.321 Theories of Ethics

Course ID: 5529

Course Details:
Max Credits: 3
Min Credits: 3

45.344 The Idea of Nature

Course ID: 31901

Course Details: The changing contents and the changing epistemological, social, aesthetic, economic, and religious implications of the concept of nature.

Max Credits: 3
Min Credits: 3

45.345 Rhetoric: History and Theory

Course ID: 5550

Course Details:
Max Credits: 3
Min Credits: 3

45.350 World Philosophies

Course ID: 5552

Course Details: This course will fuse the historical and the thematic approaches in order to undertake a comparative examination of the relations of the great philosophical traditions (Chinese, Indian, Western, Islamic, and Japanese) to the perennial issues of philosophy. The main focus will be the continuing vitality and heuristic fertility of these traditions and their ability to define how human

Max Credits: 3
Min Credits: 3

45.353 Contemporary European Philosophy

Course ID: 33500

Course Details: Explores European thought in the Twentieth and Twenty-first Centuries, including significant developments such as phenomenology, structuralism, hermeneutics, deconstruction, feminism, poststructuralism and post-modernism.
45.378 Philosophy of Peace and Nonviolence

Course ID: 38161

Course Details: This course examines philosophical theories of peace, pacifism, and nonviolence. We will study ancient and modern accounts, secular and religious traditions, as well as feminist perspectives in the philosophy of peace and nonviolence. We will explore philosophical applications of nonviolence toward nonhuman animals and the natural environment, along with specific cases of nonviolent resistance in contemporary global conflicts.

Max Credits: 3
Min Credits: 3

46.301 Research Methods in Political Science

Course ID: 5605

Course Details: This is a course in designing Quantitative Research and applying statistics for Political Science.

Max Credits: 3
Min Credits: 3

46.309 Political Psychology

Course ID: 5610

Course Details: An in-depth examination of the acquisition and role of political attitudes, values, belief systems, and other psychological mechanisms in shaping political behavior and conflict.

Max Credits: 3
Min Credits: 3

46.319 Survey Research

Course ID: 38119

Course Details: The techniques, methods and uses of Survey Research in contemporary Politics and Policy.

Max Credits: 3
Min Credits: 3

46.339 Judicial Review Seminar

Course ID: 5672

Course Details: An advanced examination of the contemporary controversy over judicial activism and constitutional interpretation.

Max Credits: 3
Min Credits: 3

46.379 Reading in Political Theory

Course ID: 37354

Course Details: Advanced exploration of the ways landmark political texts continue to influence present-day Political discourse; selections from Plato, Aristotle, Machiavelli, Locke, Smith, Wollstonecraft, Marx, Mill, Thoreau, DeBois and Behavior will be read.

Max Credits: 3
Min Credits: 3
48.270 Self and Society
Course ID: 5835
Course Details: An examination of the relationship between individuals and the social world around them. The course examines the underlying structures that pattern human interaction. Topics include the social construction of the self, the construction of social reality, and the sociology of emotions, among others.
Max Credits: 3
Min Credits: 3

48.325 Global Conflicts
Course ID: 5851
Course Details:
Max Credits: 3
Min Credits: 3

48.475 Seminar on Conflict Resolution
Course ID: 5886
Course Details:
Max Credits: 3
Min Credits: 3

49.306 Urban Economics
Course ID: 5908
Course Details:
Max Credits: 3
Min Credits: 3

49.415 Introduction to Environmental Economics
Course ID: 5913
Course Details: This is a renumbering of an existing course, 49.315. The renumbering to the 400 level is to allow Masters students in programs with environmental content to take this course for credit with their advisor's approval. This course introduces students to the economic and policy aspects of environmental quality and natural resource issues. Simple and complex models are used to blend economic theory with environmental facts. Students will learn to derive policy insights from theoretical constructs. The primary objective is to show how the basic principles in economics can play a valuable role in analyzing and evaluating critical environmental issues and help in determining policy guidelines. Standard benefit cost or efficiency criteria will be applied to a wide variety of environmental issues.
Max Credits: 3
Min Credits: 3

53.116WAIVER Arabic 2 and Culture Waiver
Course ID: 36170
Course Details: This course meets the requirements for Spanish 2 and Culture (53.116). An exception form must be completed and approved by the Cultural Studies Chairperson.
Max Credits: 0
Min Credits: 0

53.118 Hebrew 2 and Culture
Course ID: 32047

Course Details: A continuation of 53.117 Hebrew 1 and Culture, which is a pre-requisite. Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 117, 118 and 215, 217 levels must be elected in the prescribed sequence.

Max Credits: 3
Min Credits: 3

53.206 Chinese 4 and Culture

Course ID: 6050

Course Details: This course is a continuation of 53.205 Chinese 3 and Culture, which is a pre-requisite. Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 105, 106 and 205, 206 levels must be elected in the prescribed sequence.

Max Credits: 3
Min Credits: 3

53.493 Directed Study in Cambodian Culture

Course ID: 36697

Course Details: Students through regular and frequent consultation with their instructor develop a course of directed study in Cambodian (Kmer) culture, and define a problem for individual research. The student's findings are presented in a paper of significant proportions.

Max Credits: 6
Min Credits: 1

53.494 Directed Study in Arabic

Course ID: 36907

Course Details: Individual research projects on Arabic or Islamic culture. Students, through regular and frequent consultation with instructor, pursue a special topic of research.

Max Credits: 3
Min Credits: 3

54.204 Intensive Spanish 3 and 4

Course ID: 37492

Course Details: A continuation of 54.104, Intensive Spanish 1 and 2, this is a six credit blended (hybrid) course-taught partly in the classroom and partly online-intensive one-semester accelerated version of the third and fourth Spanish courses. Being a blended course, the online time will be dedicated to grammar review, and to the completion of various assignments and assessments. Class time will focus on communicative activities that combine grammatical concepts, relevant vocabulary, and cultural themes. An intensive course that aims to develop an intermediate mid proficiency in Spanish and familiarity with Hispanic culture through practice in the use of the grammatical structures and acquisition of vocabulary stressing language skills. The purpose of instruction is to utilize previous language background to lay a solid foundation for further Spanish language study (advanced level). Satisfactory completion of this course fulfills the prerequisite for Spanish 300-400 level courses.

Max Credits: 6
Min Credits: 6

54.333 Advanced Spanish Grammar

Course ID: 6083

Course Details: A systematic study of complex grammatical structures in Spanish.

Max Credits: 3
54.334 Advanced Spanish composition

Course ID: 6084

Course Details: The purpose of this course is to help students make their writing more accurate, organized and to develop students abilities in composition tasks. Specifically, students will learn how to approach the act of writing successfully by focusing on the interaction between writer, reader, purpose, and message. Students will also learn to manage important writing resources such as grammar, vocabulary, rhetorical techniques for organizing information, and strategies for writing through problems, reading critically, revising, and rewriting. Required for Spanish Majors.

Max Credits: 3
Min Credits: 3

54.456 Spanish Translation Seminar

Course ID: 6104

Course Details: A study of the theory and practice of translation aimed at developing translation skills. Material used is taken from literary works as well as newspapers and magazines. This course is intended for students with a good command of the language. Open to Spanish majors and others by permission of instructor.

Max Credits: 3
Min Credits: 3

58.350 Post Modernism

Course ID: 6243

Course Details: Following the Second World War, artists transformed the avant-garde tradition of their European predecessors to establish a dialogue with the mass media and consumer culture that has resulted in a wide array of artistic movements. Issues ranging from multiculturalism and gender to modernism and postmodernism will be addressed through the movements of abstract expressionism, pop, minimalism, neo-expressionism and appropriate in the diverse media of video, performance and photography, as well as painting and sculpture.

Max Credits: 3
Min Credits: 3

59.110 Basic Music Theory for Nonmajors

Course ID: 6259

Course Details:
Max Credits: 3
Min Credits: 3

59.201 Technology & Human Values I

Course ID: 32198

Course Details:
Max Credits: 3
Min Credits: 3

59.210 Into to Sourtheast Asian Cultures

Course ID: 37478

Course Details: This course focuses on the development of Southeast Asian art and culture from ancient times to the present. As a diverse region that is home to Muslims, Catholics and other Christians, Buddhists, Hindus and animists, examining arts and culture in Southeast Asia provides fascinating insight into the region's societies. This course examines performance, architecture and material culture from a variety of Southeast Asia, its contacts with neighboring regions, and
the breadth of societies in the region and their motivation for creating art. Students will be introduced to theater, dance
puppetry, martial arts and music of Southeast Asia. We will examine artistic forms influenced by ancient Hindus, Chinese,
Arabs, Europeans during the colonial era, and other influences on the arts in Southeast Asia. Students will also explore how
various art forms have political, social and religious functions in such regions as Thailand Indonesia (Bali and Java), Vietnam
and Cambodia.
Max Credits: 3
Min Credits: 3

59.336 Early Modern Philosophy

Course ID: 5643

Course Details: Examines Early Modern European Philosophy and its religious and scientific context, including movements
such as the Mechanical Philosophy, Rationalism, Empiricism, and Transcendental Philosophy. Topics include knowledge
and scientific understanding, the human mind and personal identity, and the debate between faith and reason.
Max Credits: 3
Min Credits: 3

59.352 Existence & Anxiety

Course ID: 31936

Course Details: Explores basic questions of human existence in 19th and 20th Century philosophy and literature. Topics
include anxiety and alienation; freedom and responsibility; authenticity and bad faith; individuality and mass society;
rationality and the absurd; values and nihilism; and God and meaninglessness.
Max Credits: 3
Min Credits: 3

59.497 Directed Studies: Environment and Society

Course ID: 35783

Course Details: An individual supervised research project relative to issues of the environment and society. Thematic or
methodological issues must result in a significant research paper.
Max Credits: 3
Min Credits: 3

66.017 Introduction to Business

Course ID: 38128

Course Details:
Max Credits: 3
Min Credits: 3

67.307 Systems Analysis & Design

Course ID: 6765

Course Details:
Max Credits: 3
Min Credits: 3

70.108 Introduction to App Design and Mobile Computing

Course ID: 38201

Course Details: This course is an introduction to design principles of applications ("apps") that run on mobile devices (smart
phones and tablet computers). The course will focus on the elements of graphic communication, software interaction design,
and computational thinking. Students will gain theoretical knowledge and design skills in these domains by building a series of apps that run on the Android platform using MIT App Inventor software. The course will also include discussion of societal impacts of computing.

Max Credits: 3
Min Credits: 3

70.225 History Photography Studio

Course ID: 6828
Course Details:
Max Credits: 3
Min Credits: 3

70.356 Drawing III

Course ID: 6856
Course Details:
Max Credits: 3
Min Credits: 3

70.382 Intermediate Video

Course ID: 36430
Course Details: This course will continue the exploration of video as an expressive medium. Students will explore video installation, interactivity, video compositing and streaming media to produce creative works.
Max Credits: 3
Min Credits: 3

70.485 Advanced Tutorial: Art History

Course ID: 6888
Course Details:
Max Credits: 3
Min Credits: 3

71.106 Freshman Chorus

Course ID: 35561
Course Details: A vocal ensemble consisting of all first-year music students, the Choir aims to build a community among those students by having them all share a common experience. Whether they have an extensive musical background or are novice musicians with little or no formal training, the First-Year Choir is intended to help students overcome the natural apprehensions that are associated with the first year of college. Additionally, the Choir will encourage ALL students to be comfortable singing in front of their peers and instructors, thereby making their experience in Aural Skills less daunting.
Max Credits: 0
Min Credits: 0

71.207 Aural Skills 3 - Supplement

Course ID: 35709
Course Details: Supplemental course to aural Skills 3, focusing on the development of sight singing, listening and musical dictation skills as they relate to music theory and analysis. Activities include singing (using movable “do”/tonic “do” solmization), listening and dictation (melodic, harmonic and rhythmic) of diatonic and chromatic music. Specifically, students will get extra practice in: a) performing (while conducting), identifying and notating more complex rhythms in simple and
compound meter; b) singing, identifying, and notating diatonic and chromatic major-and minor-key melodies, in treble bass, alto and tenor clef, including arpeggiations of all diatonic triads and sevenths, and secondary dominants; c) identifying and notating chord progressions in major and minor keys consisting of all diatonic triads and dominant sevenths, non-dominant seventh chords, and secondary dominants.

Max Credits: 0
Min Credits: 0

71.208 Musicianship & Analysis 3

Course ID: 37728

Course Details: An intensive, critical and integrated study of musical concepts. Through applied experiences composing, improvising, writing, performing, listening, and analyzing, students will explore and develop competencies in hearing, understanding and applying concepts of pitch modes; syncopation; mixed meters; extended harmony; modulation; and large structural forms.

Max Credits: 4
Min Credits: 4

71.209 Musicianship & Analysis 4

Course ID: 37729

Course Details: An intensive, critical and integrated study of musical concepts. Through applied experiences composing, improvising, writing, performing, listening, and analyzing, students will explore and develop competencies in hearing, understanding and applying concepts of chromaticism; microtonal intonation polyrhythm; harmonic inversions; extended modulations; altered chords and extensions; polytonality; and atonality.

Max Credits: 4
Min Credits: 4

71.308 Instrumental Solfege

Course ID: 6910

Course Details:
Max Credits: 2
Min Credits: 2

71.336 Vocal Arranging

Course ID: 6916

Course Details:
Max Credits: 3
Min Credits: 3

71.403 Contemporary Technology

Course ID: 6919

Course Details:
Max Credits: 3
Min Credits: 3

71.407 Electronic Music

Course ID: 6921

Course Details:
Max Credits: 3
Min Credits: 3

**72.213 Applied Brass And Percussion 2**
Course ID: 6977
Course Details:
Max Credits: 2
Min Credits: 2

**72.499 Senior Recital**
Course ID: 7045
Course Details: Public performance to be presented, registered concurrently with Applied Music 8 or Performance Applied Music 7.
Max Credits: 1
Min Credits: 1

**74.366 The Symphony**
Course ID: 7220
Course Details:
Max Credits: 3
Min Credits: 3

**74.403 Contemporary Techniques**
Course ID: 7224
Course Details:
Max Credits: 3
Min Credits: 3

**75.351 Jazz Improvisation I**
Course ID: 7277
Course Details:
Max Credits: 3
Min Credits: 3

**75.362 Jazz Improvisation 2**
Course ID: 7280
Course Details: A continuation of 75.361. Will emphasize the study and performance of more advanced levels of improvisation.
Max Credits: 3
Min Credits: 3

**75.374 Practical Intonation**
Course ID: 7282
Course Details:
Max Credits: 2
Min Credits: 2

75.475 Performance Seminar I

Course ID: 7291

76.361 Jazz Improvisation I

Course ID: 7344

76.366 Jazz Improvisation

Course ID: 7345

77.465 Music Of The Romantic

Course ID: 7382

78.401 Music of The Beatles

Course ID: 35289

Course Details: This course will explore how technology shaped, enhanced and defined the music of The Beatles. In doing so their music will also be studied for its musical materials, stylistic content, the sound qualities of recordings, cultural impacts, and extra-musical aspects, as well as the music and cultural ideas that influenced the music of The Beatles. Selected solo recordings and compositions of the artists will also be examined to trace the growth of ideas and materials with their roots in The Beatles' music.

Max Credits: 3
Min Credits: 3

81.205 Endocrinopathies

Course ID: 7476
81.244 Biodiversity & Conservation Australia's Tropics

Course ID: 38121

Course Details: The most diverse ecosystems in the world are Australia’s Great Barrier Reef and Daintree Tropical rainforest. To explore the basic principles of biodiversity and conservation biology we will use the case studies of the coral reefs and tropical rainforest of Cairns, Australia. The course will start off at UML, studying three aspects of biodiversity: its origin, the threats, and its conservation. Next we will go Australia where students will experience the wonders of these ecosystems, and learn first hand about the scientific research on the flora and fauna, and learn about the efforts to conserve these treasures. Students will participate in restoration projects of the tropical rainforest and coral reefs, and hear lectures on conservation from scientific researchers to the Aborigines.

Max Credits: 6
Min Credits: 6

81.406 Environment Microbiology Laboratory

Course ID: 7511

Course Details:

Max Credits: 1
Min Credits: 1

81.429 Recombinant Protein Production Techniques

Course ID: 38228

Course Details: This course introduces students to the principles and practice of recombinant protein expression and purification. Proteins are major targets of pharmaceuticals, and are themselves increasingly used as therapeutics. However both basic research and pharmaceutical industry depends on availability of purified proteins that are often difficult to isolate from native sources. This course will provide both didactic and laboratory instruction. It is comprised of a series of lecture and laboratory exercises, with an emphasis on practical techniques and hands-on experience of recombinant protein purification. The course will cover a variety of expression systems, including prokaryotic and eukaryotic cells, and address traditional and new methods in protein purification.

Max Credits: 4
Min Credits: 4

81.469 Molecular Biology

Course ID: 7525

Course Details: Laboratory experiments and independent projects designed to illustrate current techniques and instrumentation used in genetic engineering. Included are restriction mapping, cloning, plasmid purification, blot hybridization, PCR, and DNA sequencing. Students are introduced to computer software utilized for DNA sequence analysis and manipulation.

Max Credits: 4
Min Credits: 4

81.497 Directed Study: Biological Science

Course ID: 7534

Course Details:

Max Credits: 1
Min Credits: 1

81.499 Directed Study: Biology

Course ID: 7535

Course Details:
Max Credits: 3
Min Credits: 3

**82.354 Wildlife Management**

Course ID: 7608

Course Details: Not suitable for credit towards any degree in the Division of Sciences.
Max Credits: 3
Min Credits: 3

**83.327 Histology**

Course ID: 7631

Course Details: Not suitable for credit towards any degree in the Division of Sciences.
Max Credits: 3
Min Credits: 3

**85.430 Atmospheric Diffusion**

Course ID: 7790

Course Details:
Max Credits: 3
Min Credits: 3

**88.103 General Geology Laboratory**

Course ID: 7874

Course Details:
Max Credits: 3
Min Credits: 3

**89.5CO-OP Curricular Practical Training**

Course ID: 38047

Course Details: Curricular Practical Training
Max Credits: 1
Min Credits: 0

**89.198 Rocks**

Course ID: 7893

Course Details:
Max Credits: 3
Min Credits: 3

**89.307 Earth Materials I**

Course ID: 38083

Course Details: An introduction to the basic principles that control the arrangement of atoms in crystalline solids (minerals) and their physical and chemical properties. Topics include crystal chemistry, crystal symmetry, macroscopic mineral
identification, and the use of polarizing light microscopy and X-ray diffraction to identify and characterize minerals.

Max Credits: 3
Min Credits: 3

89.308 Earth Materials II

Course ID: 38072

Course Details: Origin and properties of igneous, metamorphic, and sedimentary rocks. The rock cycle is used as a unifying concept. The role of rock properties in environmental, economic, and engineering applications is considered.

Max Credits: 3
Min Credits: 3

89.309 Earth Materials I Laboratory

Course ID: 38084

Course Details: Laboratory to accompany Earth Materials I lecture. Topics include crystal structures, crystal symmetry, hand-specimen identification of minerals, X-ray diffraction, and polarizing light microscopy.

Max Credits: 1
Min Credits: 1

89.310 Earth Materials II Lab

Course ID: 38073

Course Details: Macroscopic and microscopic characterization and classification of rocks. Investigation of physical processes and spatial representation of rock and sediment distribution.

Max Credits: 1
Min Credits: 1

89.319 Earth Surface Processes

Course ID: 38074

Course Details: A study of the physical and chemical processes that create landforms on the Earth's surface. Emphasis is placed on physical and chemical weathering, fluvial erosion, glacial processes, soil formation, mass movements, slope stability and tectonic geomorphology.

Max Credits: 3
Min Credits: 3

89.321 Earth Surface Processes Laboratory

Course ID: 38075

Course Details: Hands-on investigation of landforms and surficial processes through interpretation and synthesis of maps, aerial photography and field data.

Max Credits: 1
Min Credits: 1

89.331 Earth History

Course ID: 38076

Course Details: An introduction to the history of the Earth and its life over the last 4.6 billion years. Applications include geologic principles, earth material, depositional environments, stratigraphy, the geological timescale, plate tectonics, and evolutionary theory.

Max Credits: 3
89.333 Earth History Laboratory

Course ID: 38077

Course Details: This laboratory compliments Earth History lecture material. Exercises include stratigraphic methods, geologic maps and fossil identification.

Max Credits: 1

Min Credits: 1

89.341 Environmental and Engineering Geology

Course ID: 37928

Course Details: Fundamentals of geology applied to environmental and engineering problems. Topics include minerals and rocks, soil properties, rock mechanics, active tectonics and earthquake hazards, slope stability and landslides, groundwater, rivers and flood hazards, coastal processes, and site assessment. Student project.

Max Credits: 3

Min Credits: 3

89.491 Directed Study: Geoscience

Course ID: 7921

Course Details: The student, through regular and frequent consultation with the instructor, undertakes independent study of a particular area of the geosciences.

Max Credits: 3

Min Credits: 1

91.108 Intro to App Des & Mobile Comp

Course ID: 38246

Course Details: This course is an introduction to design principles of applications ("apps") that run on mobile devices (smart phones and tablet computers). The course will focus on the elements of graphic communication, software interaction design, and computational thinking. Students will gain theoretical knowledge and design skills in these domains by building a series of apps that run on the Android platform using MIT App Inventor software. The course will also include discussion of societal impacts of computing.

Max Credits: 3

Min Credits: 3

91.422 Machine Learning

Course ID: 8106

Course Details: This introductory course gives an overview of machine learning techniques used in data mining and pattern recognition applications. Topics include: foundations of machine learning, including statistical and structural methods; feature discovery and selection; parametric and non-parametric classification; supervised and unsupervised learning; use of contextual evidence; clustering, recognition with strings; small sample-size problems and applications to large datasets.

Max Credits: 3

Min Credits: 3

92.122SI Management Calculus Supplemental Instruction

Course ID: 36827

Course Details: Taken simultaneously with 92.122, this 1-credit course offers students, who are either retaking 92.122 or have completed 92.121 with a D or D+ grade, supplemental instructions to foster a greater opportunity for successful completion of Management Calculus. The course credit cannot be used to satisfy the credits required for graduation, but may
be used to satisfy credits required for full time student status.

Max Credits: 1
Min Credits: 1

**92.129SI Calculus IB Supplemental Instruction**

Course ID: 38196

Course Details:
Max Credits: 1
Min Credits: 1

**92.139 Calculus for the Life Sciences II**

Course ID: 38100

Max Credits: 4
Min Credits: 4

**92.217 Diff Essentials For Chemical Engineers**

Course ID: 8278

Course Details:
Max Credits: 4
Min Credits: 4

**95.373 Advanced Theory of Solids**

Course ID: 8559

Course Details:
Max Credits: 3
Min Credits: 3

**95.385 MCNP for Radiological Sciences**

Course ID: 36151

Course Details: This course provides the theory and application of the Monte Carlo N-Patricle (MCNP) radiation transport computer code to radiological sciences and protection, with emphasis on radiation dosimetry and shielding, and criticality problems (offered as 98.585 for graduate credit)
Max Credits: 3
Min Credits: 3

**95.465 Physics of Radiation Oncology**

Course ID: 36152

Course Details: This course provides the theory and application of the physical concepts that pertain to radiation oncology, with emphasis on radiation treatment planning for linear accelerators and brachytherapy sources, photon and electron dose assessment, and recent experimental treatment modalities. (offered as 98.565 for graduate credit)
Max Credits: 3
96.402 Radiation Safety and Control II

Course ID: 8802

Course Details: This course provides a continuation of the theoretical and practical aspects of radiation protection provided in Radiation Safety and Control I (98.501). Topics include the statistical analyses and data reduction techniques that are used to analyze radiation measurements pertaining to the field of radiation protection. Laboratory sessions on alpha and gamma radiation measurements and air sampling will reinforce class lectures. Students also will experience applied radiation protection and dose assessment through a contamination control exercise that involves the use of protective clothing and respiratory protection.

Max Credits: 4
Min Credits: 3

98.401 Radiological Safety and Control I

Course ID: 1209

Course Details: This course provides a theoretical basis for radiological sciences and protection, with a rigorous review of the fundamentals of radiation physics including nuclear reactions, radioactivity and the kinetics of radioactive decay, natural and man-made radiation sources, the characteristics of ionizing radiation, radioactivity analysis, radiation dose quantities and measurement, external and internal radiation dosimetry, and radiation protection techniques.

Max Credits: 4
Min Credits: 3

98.462 Special Topics in Radiological Sciences

Course ID: 8799

Course Details:

Max Credits: 3
Min Credits: 3

98.481 Mathematical Methods of Radiological Sciences

Course ID: 1207

Course Details: This course provides an overview of applied mathematical concepts that are useful in radiological sciences and protection, including special techniques for radiation physics, radiation dosimetry, and radiation shielding, with emphasis on computer applications.

Max Credits: 3
Min Credits: 3

GNDR.200 Special Topics in Gender Studies (200-level)

Course ID: 36387

Course Details: "Special Topics in Gender Studies" (200-level) offers students the opportunity to study a topic of special interest in the field of Gender Studies from an interdisciplinary perspective. The content and approach will vary depending upon the research and teaching interests of the faculty member teaching the course.

Max Credits: 3
Min Credits: 3

GNDR.300 Special Topics in Gender Studies (300-level)

Course ID: 36388

Course Details: "Special Topics in Gender Studies" (300-level) offers students the opportunity to engage in depth with a special topic in the field of Gender Studies from an interdisciplinary perspective. The content and approach will vary
depending upon the research and teaching interests of the faculty member teaching the course.

Max Credits: 3
Min Credits: 3

**GNDR.301 Gay and Lesbian Studies**

Course ID: 36389

Course Details: This seminar provides an introduction to the interdisciplinary field of lesbian, gay, bisexual, and transgender (LGBT) studies, incorporating perspectives from the sciences, social sciences and humanities. The general goal of the course is for students to explore the dynamic, interactive forces - biological, psychological, social, cultural, and political - that shape the experience of sexuality. Topics will include: methodological, epistemological and pedagogical issues in the study of sexuality; the biological foundations of gender and sexuality; the social construction of sex and gender; literary, artistic, and mass media representations of LGBT people; development of gender and sexual identities; relationships and families; LGBT communities and political movements; HIV/AIDS; intersecting identities (gender, race, class, disability, etc.), and queer theory.

Max Credits: 3
Min Credits: 3

**GNDR.410 Directed Studies (400-level)**

Course ID: 36243

Course Details: This course, taken for 1 or 3 credits, may serve as a capstone experience for advanced gender studies students, helping them to explore a gender-related topic of interest while working closely with a faculty member. Projects that students complete for the Directed Studies will vary in length, scope, and topic, depending on how many credits are taken and which faculty member the student agrees to work with the student. What all projects will have in common is (1) a topic clearly relevant to gender studies, (2) an emphasis on achieving deep learning through advanced study, and (3) the integration of two or more distinct disciplines, integrating these disciplinary insights in order to solve a complex problem or analyze a complicated issue. This course allows for a student and professor to work closely together on a project of mutual interest. It is expected that the faculty member will be supporting and guiding the student’s work, and thus regular meetings will be necessary. In some cases the faculty member may not feel competent to oversee all aspects of a project in which an unfamiliar discipline is employed. In such cases, a second (and even third) faculty member may be asked to participate in the Directed Study as a consultant and final reader.

Max Credits: 3
Min Credits: 1

**GNDR.490 Seminar in Gender Studies**

Course ID: 36398

Course Details: This course serves as a capstone experience for advanced students, helping them to make connections between the gender studies classes they have taken and their main course of study or some other area of interest. This seminar provides a framework for students to integrate what they have learned, thus moving their experience in the program from a multi-perspectival examination of gender to a more cohesive and integrated approach encapsulated in a final project. This project will draw upon the methods, knowledge theory, end products, etc. of at least two distinct disciplines, integrating these disciplinary insights in order to solve a complex problem or analyze a complicated issue related to gender. Students will benefit from working with peers in small groups and as a whole class, learning how other students synthesize what they have learned about gender issues and how their lived experience influences their perspectives on such things as the intersection of gender with socio-economic position, race and ethnicity, sexual orientation, religion, and other factors. The professor who leads this seminar will be both a resource and a cataly; students will learn about gender and advanced research, and they will be prompted to reach their academic potential.

Max Credits: 3
Min Credits: 3

**IB.400 Introduction to Biomedical Engineering**

Course ID: 37930

Course Details: Provides exposure to cutting-edge biomedical technologies in a number of different areas with a balance between biomedical engineering and biotechnology areas.

Max Credits: 3
PCS.170 Community and Organizational Conflict

Course ID: 36944

Course Details: Using a systems approach, students will move from interpersonal conflict to addressing conflict in groups. Students will explore the uniqueness of conflict in various kinds of groups and will examine models for assessment, analysis, process design, intervention, and evaluation in such situations of conflict. Using case studies and real life situations of group conflict and systemic injustice from families, organizations and communities, students will learn practical strategies for group facilitation, dialogue, problem solving, decision-making, and system change.

Max Credits: 3
Min Credits: 3

PCS.455 Mediation: Theory and Practice

Course ID: 38199

Course Details: Mediation is a form of dispute resolution in which a neutral person helps two or more parties discuss their conflict, explore wants and needs, generate options, and reach an agreement. Mediation has become more prevalent over the past few decades in the courts, community-setting, and schools because it empowers the disputing parties to reach a resolution that works for them. This course introduces mediation in the context of other forms of alternative dispute resolution, teaches the principles and theory behind mediation, and trains students in the fundamentals of the mediation process. Interactive exercises and mediation role-plays will be used to provide experiential practice. Upon completion of the course, students will be connected to opportunities to practice mediation in the local courts or with community organizations.

Max Credits: 3
Min Credits: 3

PCS.473 Seminar in Peace and Conflict Studies

Course ID: 37460

Course Details: Offered from time to time to highlight specialized areas of faculty interest and to acquaint the student with new developments from a broad range of theory and research and how these developments might affect the field of Peace and Conflict Studies.

Max Credits: 3
Min Credits: 3

PCS.491 Directed Study

Course ID: 37218

Course Details: Through frequent consultation with the instructor, the student carries out the investigation of a particularly specialized area of interest. This course may be repeated for up to a total of 9 credits.

Max Credits: 3
Min Credits: 3

PCS.496 Practicum in Peace and Conflict Studies

Course ID: 37217

Course Details: Specific requirements vary, but the Practicum experience enables Junior and Senior level students to work and study in a variety of areas related to Peace and Conflict Studies. Students meet regularly as a class on campus with the designated instructor to discuss their experiences and to learn more about the settings in which they practice and the challenges that they confront. Practicum may be repeated for a maximum of nine credits.

Max Credits: 3
Min Credits: 1

THEA.221 Stagecraft
Course ID: 37381

Course Details: Survey of the materials, skills, and techniques of technical theatre (including scenic construction, scene painting, lighting, and sound production) through reading, lecture, and hands-on experience. Replaces 42.252; credits may not be earned for both 42/59.252 and THEA 221.

Max Credits: 3
Min Credits: 3

THEA.301 Working with the Playscript

Course ID: 37387

Course Details: A hands-on introduction to a range of plays, studied as scripts intended for production. Conducted as a seminar/workshop with attention to both the critical interpretation and staging of various dramatic forms. Replaces 42.384 and 59.384; credits may not be earned for both 42/59.384 and THEA 301.

Max Credits: 3
Min Credits: 3

THEA.492 Technical Theatre Practicum

Course ID: 38097

Course Details: One-credit practicum in technical theatre (scenic construction, lighting, sound, costuming), consisting of work on a campus production under the supervision of Theatre Arts faculty.

Max Credits: 1
Min Credits: 1

THEA.494 Directed Study in Theatre

Course ID: 37390

Course Details: Supervised independent project in theatre. Instructor's permission required. Replaces 42.494 and 59.494; may be repeated for credit with permission.

Max Credits: 3
Min Credits: 3

UTL.203 Reading and Writing in Stem Fields

Course ID: 37654

Course Details: This course is designed to meet the Commonwealth of Massachusetts' requirement for secondary content teaching. New teachers must help students become strategic readers of texts and research in STEM disciplines and to communicate their ideas effectively in writing. Students in the course will investigate the complex process of comprehension and design reading strategies for middle and high school students. They will explore the means to assist middle and high school students to be more effective writers both of laboratory type reports and expository passages. The use of technology as a tool to communicate instructional materials and expectation with students and parents will be explored. Throughout the course, students will recognize that academic language must be taught in a way that enables English language learners to master STEM content.

Max Credits: 2
Min Credits: 2

UTL.301 Project-Based Instruction

Course ID: 37650

Course Details: This is a key component of the Minor as it engages students in designing, implementing and employing a project-based curriculum. Students will observe project-based learning in high schools, before creating and leading their own field-based unit. The unit must incorporate major components of project-based learning, namely collaboration, formulating questions, making predictions, designing investigations, collecting and analyzing data, making products and sharing ideas. This course is required for the STEM TEACHING MINOR.
Max Credits: 3  
Min Credits: 3

**UTL.302 Research Methods**

Course ID: 37651

Course Details: The goal of this course is to provide students with an understanding of and the ability to use tools that scientists use to solve problems. Students will also learn how scientists communicate their findings and engage in peer-review. Students design and carry out four independent inquiries, which they write up and present in the manner that is common in the scientific community. Students will work in multidisciplinary teams. The course is divided between class and lab sessions, but is primarily lab-based. The topics of the class sessions are: Curiosity and Scientific Inquiry, Experimental Design and Analysis, Statistics, Modeling, Presenting Scientific Information. Students conduct their inquiries, incorporate statistics to interpret their results and present their scientific work orally. This course is required for the STEM TEACHING MINOR.

Max Credits: 3  
Min Credits: 3

**UTL.401 Practicum**

Course ID: 37653

Course Details: This is the culminating experience in the STEM Teaching Minor and must be taken in conjunction with the one-credit Practicum Seminar*. Students are required to spend 12 weeks (minimum) teaching a STEM subject in a middle or high school. Candidates are required to have (i) declared the STEM teaching minor, (ii) passed both MTEL examinations and (iii) maintained an overall GPA of 2.5.

Max Credits: 6  
Min Credits: 6

**UTL.402 Practicum Seminar**

Course ID: 37655

Course Details: The Practicum Seminar provides a supportive environment where students share their experiences and work on solutions to problems they may be experiencing. Master teachers teach the weekly seminar, share their teaching experiences and facilitate discussions to help students develop their own successful teaching identities. The seminar is an effective forum for students to get the guidance they consistently want on classroom management. Additionally, students must fulfill the requirements determined by the Commonwealth of Massachusetts. The licensure documentation will be discussed, developed and submitted as a requirement of the 1 credit seminar.

Max Credits: 1  
Min Credits: 1

**WLS.401 Seminar: Advanced Topics in Work, Labor and Society**

Course ID: 37050

Course Details: Advanced Topics in Work, Labor and Society offers students the opportunity to engage in depth with a special topic in the field from an interdisciplinary perspective. Then content and approach will vary depending upon the research and teaching interests of the faculty member teaching the course, but all will provide opportunities for an in-depth exploration of a topic beyond what is available in current course offerings.

Max Credits: 3  
Min Credits: 3

**WLS.402 Directed Studies in Work, Labor and Society**

Course ID: 37052

Course Details: This course, taken for 1 or 3 credits, may serve as a capstone experience for advanced students in the Work, Labor and Society minor, helping them to explore a work-related topic of interest while working closely with a faculty member. Projects that students complete for the Directed Studies will vary in length, scope, and topic, depending on how many credits are taken and which faculty member agrees to work with the student. What all projects will have in common is (1) a topic clearly relevant to work, labor and society (2) an emphasis on achieving deep learning through advanced study,
and (3) the integration of two or more distinct disciplines, integrating these disciplinary insights in order to solve a complex problem or analyze a complicated issue.

Max Credits: 3
Min Credits: 1

**46.410 Seminar Instructional Internship American Politics**

Course ID: 5680

Course Details: Advanced reading and critical analysis in American Politics. Students selected will serve as group project leaders and tutors in association with a large introductory American politics course section.

Max Credits: 3
Min Credits: 3

**10.490 Industrial Experience**

Course ID: 35482

Course Details: This zero credit course is used for students in Chemical Engineering who receive special permission.

Max Credits: 0
Min Credits: 0

**42.328 Writing About Women**

Course ID: 30862

Course Details: Writing About Women

Max Credits: 3
Min Credits: 3

**42.335 American Women Novelists**

Course ID: 5119

Course Details: A study of selected novels by American women. Focus on the female voice within the American tradition. Treatment of such issues as domesticity, education, and authorship.

Max Credits: 3
Min Credits: 3

**42.355 Literature of the Romantic Period**

Course ID: 5130

Course Details: A study of English prose and poetry from 1798-1832.

Max Credits: 3
Min Credits: 3

**42.421 Chaucer**

Course ID: 5169

Course Details: A study of the major works of Chaucer in Middle English.

Max Credits: 3
Min Credits: 3

**10.205 Fundamentals of Electricity**
Course ID: 30313
Course Details: An introduction to direct current and alternating current of electric circuits with emphasis on practical application.
Max Credits: 3
Min Credits: 3

16.424 Computational Methods for Power System Analysis

Course ID: 3278
Course Details: The course explores some of the mathematical and simulation tools used for the design, analysis and operation of electric power systems. Computational methods based on linear and nonlinear optimization algorithms are used to solve load flow problems, to analyze and characterize system faults and contingencies, and to complete economic dispatch of electric power systems. Real case studies and theoretical projects are assigned to implement the techniques learned and to propose recommendations. Different software applications will be used concurrently including ATP, PowerWorld Simulator, Aspen, MatLab with Simulink and Power System Toolbox, PSCAD, etc.
Max Credits: 3
Min Credits: 3

16.426 Power Systems Stability and Control

Course ID: 3213
Max Credits: 3
Min Credits: 3

24.432 Nuclear Systems Design & Analysis

Course ID: 4052
Course Details: A design course that focuses on the use of modern computer analysis tools for the design and analysis of nuclear systems. Reactor physics and shielding codes and thermal and transient analysis of nuclear systems are completed by small design teams with individual responsibility for a particular aspect of the design. Oral and written communication skills are emphasized. (10.432 and 24.432 are the same)
Max Credits: 3
Min Credits: 3

26.212 Dynamics

Course ID: 4154
Course Details: This course covers the fundamentals of Newtonian mechanics, including kinematics, motion relative to accelerated reference frames, work and energy, impulse and momentum, 2D and 3D rigid body dynamics. The course pays special attention to applications in plastics engineering including introductory topics in material and energy balance.
Max Credits: 1
Min Credits: 1

26.415 Capstone Project I

Course ID: 4181
Course Details: A two-semester capstone laboratory project course. Student groups design, perform, analyze, report, and defend a research project which incorporates the processing and characterization of plastics materials. Supporting practicums on literature searches, plastics processing, basic plastics testing techniques, and data analysis are included in the course.
Max Credits: 1
Min Credits: 1

**26.416 Capstone Project II**

Course ID: 4182
Course Details: Continuation of 26.415.
Max Credits: 1
Min Credits: 1

**26.417 Honors Capstone Project II**

Course ID: 32560
Course Details: A section of capstone laboratory for honor students only. Honors student groups design, perform, analyze, report and defend a research project which incorporates the processing and characterization of plastics materials. Supporting practicum on literature searches, plastics processing, basic plastics testing techniques, and data analysis are included in the course.
Max Credits: 1
Min Credits: 1

**33.101 Strategies for Acad Success**

Course ID: 33747
Course Details: This introductory course will assist nursing students to learn strategies for creating greater academic, professional, and personal success. Specific attention will be given to exploring the profession of nursing, academic integrity, goal setting, time management, critical thinking and communicating with others. Consideration will be given to note taking skills, test reading and studying, writing, test-taking strategies, library use and research techniques, wellness and stress management, and campus resources.
Max Credits: 1
Min Credits: 1

**33.103 Academic Strategies Portfolio Seminar**

Course ID: 35273
Course Details: Nursing students with a diploma in nursing, associate degree in nursing, or second baccalaureate degree will submit a portfolio to demonstrate how they have met the course objectives. The portfolio will show evidence of goal setting and time management, UML library orientation for literature searches, understanding of academic integrity and writing and referencing using APA style. Students will participate in seminar(s) on communication, cultural sensitivity, and conflict resolution.
Max Credits: 1
Min Credits: 1

**33.310 Health Promotion Risk Reduction Families I**

Course ID: 4553
Course Details: This course focuses on health promotion and risk reduction with young individuals and families who are responding to potential or actual physical and psychosocial health problems. Content is centered on holistic nursing care from a lifespan perspective beginning in pregnancy and ending with adolescence.
Max Credits: 5
Min Credits: 5

**33.314 Health Promotion Risk Reduction Families II**

Course ID: 4557
Course Details: This course focuses on health promotion and risk reduction with adults and their families who are responding to potential or actual biopsychosocial health problems. Content is centered on holistic nursing care throughout the adult lifespan.

Max Credits: 5
Min Credits: 5

33.410 Acute Care Nursing

Course ID: 4567

Course Details: This course addresses the nursing care of adults with life threatening conditions. Particular attention is paid to nursing care of clients with increasing complexity and acuity levels.

Max Credits: 5
Min Credits: 5

33.411 Acute Care Nursing Practicum

Course ID: 4568

Course Details: In this clinical course, students provide nursing care to adults in the acute care setting. The focus of the experience is the development of specifically tailored therapeutic interventions in providing care to adults with acute illness.

Max Credits: 4
Min Credits: 4

33.414 Role Transition Practicum

Course ID: 4571

Course Details: During this clinical experience the student works collaboratively with nurse preceptor and other members of the health team. The student becomes increasingly self-directed in carrying out the professional nursing role.

Max Credits: 6
Min Credits: 6

33.415 Community Health Project

Course ID: 4572

Course Details: The student applies the ANA Public Health Nursing Scope and Standards of Nursing Practice with community as client. Teams of students utilize community assessment data collected from previous semester to develop, implement and evaluate a community health promotion activity.

Max Credits: 2
Min Credits: 2

42.111SI Supplemental Instruction for College Writing I ESL - Navitas only.

Course ID: 38178

Course Details: Supplemental Instruction for College Writing I ESL for Navitas students only.

Max Credits: 1
Min Credits: 1

42.112SI College Writing II ESL Supplemental Instruction - Navitas only.

Course ID: 38209

Course Details: College Writing II ESL Supplemental Instruction for Navitas only.

Max Credits: 1
42.207 English Studies in a Digital Environment

Course ID: 5024

Course Details: This course introduces students to the study of writing, literature, and culture in the digital environment and to skills necessary for courses in the English Studies option. The course will introduce students to the fundamentals of Digital literacy and citizenship, including tools and skills only made possible in the digital environment. Students will read a variety of texts and write in a variety of genres. The course also introduces students to literary and cultural criticism, including close reading skills, various critical approaches, and the practical application of these skills. Emphasis will be placed on the research and writing processes, using MLA-style documentation. The course will also introduce students to the fields of creative writing, journalism, and professional writing.

Max Credits: 3
Min Credits: 3

42.322 Creative Writing: Creative Non-fiction I

Course ID: 5109

Course Details: An intermediate level creative writing workshop in nonfiction (personal essay, memoir, literary journalism, etc.).

Max Credits: 3
Min Credits: 3

42.418 Creative Writing: Creative Non-fiction II

Course ID: 38333

Course Details: An advanced creative writing workshop in nonfiction (personal essay, memoir, literary journalism, etc.).

Max Credits: 3
Min Credits: 3

43.344 Revolutions in the Modern World

Course ID: 38334

Course Details: In this comparative history course, we look at the theories of Marx, Barrington Moore, Crane Brinton, Theda Skocpol, William Sewell, and others on the causes, dynamics, and outcomes of revolutions in the modern world. We then consider the history of the French, Russian, Vietnamese, and Iranian Revolutions (list may vary each semester) to see how well the theories fit the events. The course ends with a discussion of whether the pattern and analyses discussed in the course are helpful in understanding a contemporary revolution, such as that in Egypt.

Max Credits: 3
Min Credits: 3

44.291 Short Study Abroad: Selected Topics

Course ID: 38292

Course Details: This is a short study abroad course, usually 3 weeks in duration. Topic and location vary.

Max Credits: 6
Min Credits: 6

48.115 Social Problems

Course ID: 38335

Course Details: This entry level course uses the core concept of social problems to introduce basic social science reasoning—how social scientists define research questions, develop systematic methods to study them, gather evidence, search for pattern, in link findings to existent knowledge,. Cases provide opportunities to discuss how private problems
develop into public issue, illustrating sociology as a discipline that evolves in response to social conflicts and inequalities. The course also meets General Education requirements for Ethics and Diversity.

Max Credits: 3
Min Credits: 3

**48.330 Fast Food, Hot Planet: Sociological Approaches**

Course ID: 38308

Course Details: With an eye on climate change sustainability, this course maps the social and historical dimensions of crisis and inequalities of food production and distribution. In addition to exploring food security's relation to sustainable food production, students will strengthen critical thinking, writing, and library research skills.

Max Credits: 3
Min Credits: 3

**54.104 Intensive Spanish 1 and 2**

Course ID: 37140

Course Details: This intensive course in Spanish is a six credit blended (hybrid) course taught partly in the classroom and partly online. This one-semester Intensive review of Spanish 1 and 2 courses is restricted to students who have been placed into it by placement examination. Satisfactory completion of this course fulfills the prerequisite for Spanish 3.

Max Credits: 6
Min Credits: 6

**54.495 Advanced Spanish Tutorial**

Course ID: 6108

Course Details: A program of directed study which affords advanced students an additional opportunity to pursue a previously explored problem in greater depth or to initiate an additional problem. The purpose is to sharpen and refine techniques for scholarly research and presentation and for creative expression.

Max Credits: 3
Min Credits: 3

**81.513-I Invertebrate Zoology II**

Course ID: 35512

Course Details: An in depth exploration of the deutorostome phyla with a focus on anatomy, ecology and evolution of the lophophorates, Echinodermata, Chaetognatha, Hemichordata and Chordata. Includes readings from the primary literature.

Max Credits: 3
Min Credits: 3

**81.515-I Invertebrate Zoology Lab II**

Course ID: 35513

Course Details: The laboratory study of live and preserved specimens of invertebrate animals with a focus on anatomy and functional morphology.

Max Credits: 1
Min Credits: 1

**81.557-I Advanced Invertebrate Zoology**

Course ID: 33457

Course Details: Comparative functional morphology, life histories, and phylogeny of a particular taxon (Crustacea, Molusca) of invertebrates.
Max Credits: 3
Min Credits: 3

81.559-I Advanced Invertebrate Zoology Laboratory

Course ID: 33458
Course Details: Classification, identification, anatomy and physiology of selected invertebrates.
Max Credits: 1
Min Credits: 1

81.595-I Immunology Laboratory

Course ID: 36657
Course Details: A series of basic laboratory exercises dealing with the preparation, isolation and characterization of antigens, antibodies and effector cells.
Max Credits: 2
Min Credits: 2

84.115 Principles of Chemistry

Course ID: 7638
Course Details: The course provides an introduction to the basic concepts of Chemistry with an emphasis on critical thinking, problem-solving, and computational skills required for more advanced Chemistry courses. Topics include measurement, chemical calculations, problem solving logic, units analysis, chemical reactions, the periodic table, basic bonding theory and solutions. No previous Chemistry experience is assumed. There is no lab component to this course.
Max Credits: 3
Min Credits: 3

84.360 The Responsible Chemist

Course ID: 7684
Course Details: This course is required of chemistry majors and addresses ethical, regulatory, and environmental aspects of their profession. Students are exposed to a wide range of research integrity issues that include TSCA (Toxic Substance Control Act), SOPs (Standard Operating Procedures) and quality management. Compliance issues include an overview of OSHA (Occupational Safety and Health Administration) and EPA (Environmental Protection Agency), as well as an introduction to patent law. The importance of maintaining integrity in their discipline is emphasized, and case studies are presented for study and discussion.
Max Credits: 3
Min Credits: 3

91.103 Computing I Lab

Course ID: 38309
Course Details: This is the lab class for 91.101 Computing I. This class must be taken with 91.101 Computing I in the same semester.
Max Credits: 1
Min Credits: 1

91.104 Computing II Lab

Course ID: 38310
Course Details: This is a lab class for 91.102 Computing II. This class must be taken with 91.102 Computing II in the same semester.
Max Credits: 1
Min Credits: 1

91.480 Honors Project I

Course ID: 8128

Course Details: This course provides an undergraduate research experience for Computer Science majors enrolled in the Honors Program. Each student develops a project idea in consultation with the instructor. The student writes a proposal for the project, reads the relevant literature, performs the project, writes a project report or thesis, and makes an oral presentation about the project.

Max Credits: 3
Min Credits: 3

92.102 Freshman Seminar in Mathematics

Course ID: 38330

Course Details: This course is designed to orient undergraduate math majors to the university and to their chosen field. Students will learn about the mathematics program, the mathematics faculty and their research interests, careers in math-related areas, internship opportunities, and university resources.

Max Credits: 1
Min Credits: 1

GNDR.199 GNDR 100 level elective

Course ID: 38336

Course Details: GNDR 100 level elective

Max Credits: 3
Min Credits: 3

GNDR.299 GNDR 200 level elective

Course ID: 38338

Course Details: GNDR 200 level elective

Max Credits: 3
Min Credits: 3

GNDR.399 GNDR 300 level elective

Course ID: 38339

Course Details: GNDR 300 level elective

Max Credits: 3
Min Credits: 3

GNDR.499 GNDR 400 level elective

Course ID: 38340

Course Details: GNDR 400 level elective

Max Credits: 3
Min Credits: 3

PCS.555-I Mediation: Theory and Practice
Course ID: 38200

Course Details: Mediation is a form of dispute resolution in which a neutral person helps two or more parties discuss their conflict, explore wants and needs, generate options, and reach agreement. Mediation has become more prevalent over the past few decades in the courts, community-setting, and schools because it empowers the disputing parties to reach a resolution that works for them. This course introduces mediation in the context of other forms of alternative dispute resolution, teaches the principles and theory behind mediation, and trains students in the fundamentals of the mediation process. Interactive exercises and mediation role-plays will be used to provide experiential practice. Upon completion of the course, students will be connected to opportunities to practice mediation in the local courts or with community organizations.

Max Credits: 3
Min Credits: 3

UTL.441 Teaching English Language Learners

Course ID: 33080

Course Details: The purpose of this course is to prepare new teachers with the knowledge and skills to effectively shelter their content instruction, so that the growing population of English language learners (ELLs) in K-12 schools can achieve academic success, and contribute their multilingual and multicultural resources. The course will provide aspiring teachers with practical research-based protocols, methods, and strategies to integrate subject area content, language, and literacy development. Successful completion of this course provides the SEI (Sheltered English Immersion) endorsement required for teaching in the Commonwealth of Massachusetts.

Max Credits: 3
Min Credits: 3

26.3CE Co-op Experience

Course ID: 37157

Course Details: This is a structured educational strategy integrating classroom studies with learning through productive work experiences in a field related to a student's academic or career goals. It provides progressive experiences in integrating theory and practice. Co-op is a partnership among students, educational institutions and employers, with specified responsibilities for each party.

Max Credits: 0
Min Credits: 0

45.340 Mysticism: East and West

Course ID: 5546

Course Details: This course explores the religious and psychological phenomenon known as the mystical experience, both within the context of organized religion and outside it. We will approach this subject from a comparative standpoint, considering examples from Christianity, Judaism, and Islam and also from Eastern religions such as Buddhism and Taoism. We will make use of philosophy, psychology, theology and literature in order to try to understand mysticism and its relation to religion. Readings include The Upanishads, the Tao Te Ching, the Bible, and Plato.

Max Credits: 3
Min Credits: 3

63.490 Internship in Operations Management

Course ID: 38456

Course Details: Opportunity for students to earn academic credit through the integration of professional work experience with related academic work in Operations Management. A project, jointly supervised by a faculty member and representative of the employing organization with mutually defined objective(s), will be completed by the Student. An approved report in written form will be submitted to the supervising faculty member.

Max Credits: 3
Min Credits: 3

70.345 Sonic Arts
Course ID: 30840

Course Details: Sonic Arts is an introductory course to hardware hacking for sculptural installation, audio composition and instrument invention. Assignments will include building piezo microphones, home-made speakers, exploring pickups used in performance and amplification of sculptural objects, manipulating tape head readers and building simple oscillation circuits for noise. Students will learn about electronics and soldering, including how to hack devices for audio and sculptural experiences and experiment with sound as an inspiration for sculpture and performance art.

Max Credits: 3
Min Credits: 3

02.445 Teaching Reading/English Bilingual Student

Course ID: 2379

Course Details:

Max Credits: 3
Min Credits: 3

23.484 Introduction to Pro/ENGINEER

Course ID: 4026

Course Details: This course introduces the user to the principles of Pro/ENGINEER, solid modeling, and parametric design. It is a hands-on project and exercise-based course. Topics will include: feature-based parametric solid modeling, pick and place features, sketched features, the basics of creating parts and assemblies, and drawing creation. Advanced topics will include 3-D sweeps, helical sweeps, and blends.

Max Credits: 3
Min Credits: 3

29.401 National Security/Active Duty Pre

Course ID: 4436

Course Details: An examination of the needs for national security, an analysis of the evolution and formulation of the American defense policy and strategy, aerospace doctrine; an examination of the methods for managing conflict, and an overview of alliances and regional security, arms control, and terrorism. Special topics of interest focus on the military as a profession, officership, the military justice system, and current issues affecting military professionals. Continued emphasis is given to the refinement of communication skills.

Max Credits: 3
Min Credits: 3

36.415 Clinical Virology/Serology Lab

Course ID: 4806

Course Details: This course is designed to survey pathogenic viruses emphasizing diagnosis of disease. Evaluation of new technology and diagnostic tests with reference to diagnosis and prognosis of disease are examined. In addition, this course is designed to instruct students in the principles and techniques used in the clinical immunology/serology setting. Students will become proficient in laboratory techniques such as immunodiffusion, ELISA, hemagglutination, and neutralization techniques used for immunodiagnosis.

Max Credits: 2
Min Credits: 2

46.498 Research and Internship/Service Experience Politics/Law

Course ID: 5695

Course Details: Extensive Research/Writing undertaken in conjunction with an Internship/Service Experience in Politics and/or Law, by special arrangement and with permission of the instructor.
47.308 Industrial/Organizational Psychology

Course Details: An introduction to the application of psychological principles and methods to the work domain. Students will develop an understanding of the individual, social, and environmental factors as they relate to organizational performance. Intended as an introduction to the field of Industrial/Organizational (I/O) Psychology, topics include personnel selection and evaluation, training and development, attitudes and motivation, leadership, group dynamics, diversity, organizational structure and climate, and job design and working conditions.

60.201 Accounting/Financial

Course Details: Presents a comprehensive, detailed exposure to basic accounting theory. Beginning with the accounting equation, students are introduced to the accounting cycle, preparation of the statement of financial position and the income statement, accounting for assets, liabilities, and stockholders’ equity of the firm, and cash flow and financial statement analysis.

60.202 Accounting/Managerial

Course Details: Examines the use of accounting systems for managerial decision-making. Budgeting, forecasting, and cost accumulation systems, which relate to manufacturing systems, will be studied.

70.496 Practicum/Internship

Course Details: The Practicum/Internship is an on-campus or off-campus learning experience. Specific requirements will vary depending on department policies and the nature of the program undertaken by the student. The practicum experience is to provide an occasion for practical experience in an area of particular interest to the student.

76.165 Jazz/Rock Big Band

Course Details: Open to all students by audition. Fusion big band covering a wide variety of contemporary jazz rock literature. Solo improvisational opportunities. Numerous performances.

16.459 Introduction to Nanoelectronics

Course Details: This course introduces the use of nanomaterials for electronic devices such as sensors and transistors. Synthesis methods for nanoparticles, nanotubes, nanowires, and 2-D materials such as graphene will be covered. The
challenges in incorporating nanomaterials into devices will also be discussed. These methods will be compared to
techniques used in the semiconductor industry and what challenges, technically and financially, exist for their widespread
adoption will be addressed. Finally, examples of devices that use nanomaterials will be reviewed. The course will have some
hands on demonstrations.

Max Credits: 3
Min Credits: 3

43.358 Amazing American Lives

Course ID: 5302

Course Details: Biography often has been used by historians as source material for representing the nature of the American
experience. An examination of outstanding biographies of the lives of various Americans can yield insights into all levels and
ranks of American society from colonial days to the late twentieth century.

Max Credits: 3
Min Credits: 3

54.375 Latin American and Spanish Cinema

Course ID: 6092

Course Details: An exploration of representative Spanish and latin American films from a variety of major directors. Areas of
investigation include the cinematic representation of nationality, ethnicity, identity, gender, history and politics. This course
will be taught in English. Knowledge of Spanish is desirable but not required. Spanish majors and minors will complete
written assignments, reviews, quizzes, and exams in Spanish.

Max Credits: 3
Min Credits: 3

54.494 Independent Study in Spanish

Course ID: 31773

Course Details: Students, through regular and frequent consultation with their instructor, develop a course of independent
study in Spanish culture and define a problem for individual research. The student's findings are presented in a paper of
significant proportions.

Max Credits: 3
Min Credits: 3

81.420 Biochemistry II

Course ID: 7514

Course Details: This course will focus on protein dynamics where students will gain facility with thermodynamics of protein
folding/misfolding, catalysis, kinetics and binding equilibria as they apply to proteins and other molecules in biological
systems. The central theme of this course is that living systems can be understood in terms of the fundamental principles
defining the structure and energetics of biological molecules. Attention will be given to quantitative aspects of enzyme
kinetics and molecular binding. Examples of how these principles apply to the understanding and treatment of human
disease will be discussed.

Max Credits: 3
Min Credits: 3

91.493 Cooperative Education in Computer Science

Course ID: 38490

Course Details: Supervision of cooperative educational experiences in Computer Science.

Max Credits: 1
Min Credits: 1
95.141SI Supplemental Instruction for Physics I - Navitas Only
Course ID: 38492
Course Details: Supplemental Instruction for Physics I - Navitas Students Only.
Max Credits: 1
Min Credits: 1

58.352 Contemporary Art and Culture
Course ID: 6244
Course Details: Examination of issues of content, theory, and criticism in traditional, modern and contemporary art. Current exhibitions and criticism are integral to the course. Topics vary from year to year.
Max Credits: 3
Min Credits: 3

79.221 20th Century Art
Course ID: 7415
Course Details: A study of American and European movements in painting, sculpture, and architecture from 1900 to the present. Emphasis is placed on Fauvism, Cubism, Expressionism, Surrealism, International Style, Pop, Op Art, Minimal Art, Photorealism, and Post-Modernism.
Max Credits: 3
Min Credits: 3

79.231 Aesthetics and Critical Studies Seminar
Course ID: 1237
Course Details:
Max Credits: 3
Min Credits: 3

79.352 Contemporary Art and Culture
Course ID: 30832
Course Details: Examination of issues of content, theory, and criticism in contemporary and traditional art and culture. Topics vary.
Max Credits: 3
Min Credits: 3

79.490 Aesthetics and Critical Studies Seminar
Course ID: 1237
Course Details:
Max Credits: 3
Min Credits: 3

36.483 Senior Research I
Course ID: 4825
Course Details: Students along with their faculty advisor will structure a research project commensurate with the students' areas of interest. A paper embodying the results of the research project will be prepared.
Max Credits: 2
Min Credits: 2

**36.484 Senior Research II**

Course ID: 4826
Course Details: Continuation of 36.483
Max Credits: 2
Min Credits: 2

**41.237 Media, Law and Ethics**

Course ID: 38516
Course Details: This course primarily is designed to explore key legal issues you are likely to confront as a journalist, mass media professional or student interested in learning more about the relationships between law, media and ethics in this global community. Nonetheless, you will be challenged to think critically about the applicability of those issues to individuals and to media institutions that transmit information via spoken communications, writing, traditional media, text messages, social network sites, or e-mail messages.
Max Credits: 3
Min Credits: 3

**42.201 Classical Mythology**

Course ID: 5019
Course Details: Literary approaches to Classical Greek and Roman mythology, examining its origins in near Eastern cultures as well as its encounters with Christian Europe. Includes works by Hesiod, Homer, Greek playwrights, Virgil, and Ovid.
Max Credits: 3
Min Credits: 3

**42.277 American Ethnic Literature**

Course ID: 31898
Course Details: The course addresses the literature of America's immigrant and cultural groups and how it contributes to defining our national character.
Max Credits: 3
Min Credits: 3

**42.408 Principles of Technical Writing**

Course ID: 32118
Course Details: Provides the fundamental concepts and principles of technical writing, including technical description, audience analysis, editions, document specifications and outlines, graphics, definitions and revising documents. Writing assignments include preparing a document specification, editing and creating graphics.
Max Credits: 3
Min Credits: 3

**43.279 History of Lowell**

Course ID: 5245
Course Details: This course will provide an overview of the growth, decline, and rebirth of the city of Lowell, Massachusetts. Topics will include the Industrial Revolution, role of women and unions in the workplace, immigration and the formation of ethnic neighborhoods, urban renewal, and historic preservation. The survey will also discuss notable personalities such as
labor activist Sarah Bagley, Civil War general Benjamin Butler, writer Jack Kerouac, Senator Paul Tsongas and boxer Micky Ward. The foregoing names may differ over time.

Max Credits: 3
Min Credits: 3

43.443 'Foreigners' of the Middle East

Course ID: 38524

Course Details: This class focuses on how societies organize difference, looking at the relationships between national, ethnic, religious, racial, gender and/or socio-economic affiliations in creating and concretizing foreignness and minorities in the Arab Middle East and today's Turkey and Iran during the late Ottoman and colonial eras. This class includes engagement with historical sources, movies, memoirs and more, and requires several short papers and one longer term paper and presentation.

Max Credits: 3
Min Credits: 3

44.489 Capstone Seminar in Criminology & Criminal Justice

Course ID: 38519

Course Details: This course is designed to provide criminal justice majors with a capstone experience emphasizing integration of knowledge acquired in previous courses on the causes of criminal behavior and responses to it, particularly the institutions, policies and practices of the criminal justice system. Students engage in the development and production of a senior level research paper grounded in relevant criminology and criminal justice literature.

Max Credits: 3
Min Credits: 3

45.335 Ethical Issues in Technology

Course ID: 5542

Course Details: This course will examine important ethical issues and value conflicts emerging in contemporary science and technology. Through readings and class discussions students will not only have an opportunity to explore the manner in which ethical and technical problems are related, but to develop insight into areas of ethical philosophy and modes of reasoning essential to an intelligent understanding of such issues.

Max Credits: 3
Min Credits: 3

45.339 Poetry and Philosophy After Plato

Course ID: 30406

Course Details: After defining "Neoplatonism" with reference to Plato's Phaedo, Symposium, and Phaedrus, the course will consider the relationships among Homer's Odyssey, Plotinus's Enneads, Virgil's Aeneid, Augustine's Confessions, and Dante's Divine Comedy. The focus will be on coming home to the "source and origin" after having been away and, as the philosopher Plotinus puts it, having been "a stranger in something strange". Students will be invited to work on other literary and philosophical treatments of this theme in English, Irish or American poetry and writing. A principal concern of the course is language "sung, spoken, and written". Accordingly, the course will applicable to, and count for the Philosophy and Communications track.

Max Credits: 3
Min Credits: 3

47.333 Psychology of Consciousness

Course ID: 5722

Course Details: Introduces students to psychological theories and studies of the mind-body dualism, mind-brain identity, and the emergence of mind. Studies of psychosomatic disease and healing imagery, sleep and hypnosis, "subconscious" perception and "extra sensory" perception, multiple personalities and "split brain" patients are discussed. The questions of animal awareness and computer consciousness are also considered.
48.205 Public Sociology

Course ID: 33259

Course Details: Public sociology includes sociological initiatives targeting non-university audiences and serving the public good. This course will 1) introduce and critique the various conceptualizations of public sociology linking them to broad schools of sociological theory; 2) explore alternative field models and methods, preparing students for field projects in future semesters; and 3) expose students to sociological practitioners and practices compatible with the mission of the university and department. From a liberal arts perspective, the course stresses critical thinking and communication skills.

Max Credits: 3
Min Credits: 3

48.320 Community Service

Course ID: 5830

Course Details: Course uses fieldwork approach to understand social problems and to discipline study and career pursuit in the area of public service.

Max Credits: 3
Min Credits: 3

53.237 Portuguese Literature in Translation

Course ID: 38518

Course Details: This course offers a broad overview of Portuguese literature, in English translation, from the Middle Ages to the contemporary period, placing literary movements and major authors in their historical and aesthetic context. It focuses on promoting a basic level of cultural literacy about Portugal based on representative reading drawn from the last seven centuries of the country’s history situated in their social, cultural and historic contexts. Course assignments lead students to develop skills in textural interpretation, critical thinking, and academic writing.

Max Credits: 3
Min Credits: 3

79.225 History Photography Studio

Course ID: 6828

Course Details:

Max Credits: 3
Min Credits: 3

89.325 Geology for Engineers

Course ID: 38517

Course Details: This course will introduce basic geological principles with an emphasis on engineering applications. Topics covered include minerals and rocks and their properties, surface processes, earthquakes and rock deformation, dynamic processes that affect the earth’s surface, geological hazards and their mitigation, earth resources.

Max Credits: 3
Min Credits: 3

92.496 Mathematics Practicum

Course ID: 38533

Course Details: Unpaid internship in the Department of Mathematical Sciences. This allows students to receive up to 3 (free
elective) credits while working on an approved project. Students who have a position and who wish to date advantage of this Practicum should complete and submit the attached form to the department Internship Coordinator.

Max Credits: 3

Min Credits: 1

25.4ACE Cooperative Education Experience

Course ID: 38649

Course Details: This zero credit course is specifically designated for College of Engineering students in Mechanical, Chemical and Electrical/Computer Engineering who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program, and have secured a third, full-time co-op employment experience. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0

Min Credits: 0

26.4ACE Cooperative Education Experience

Course ID: 38650

Course Details: This zero credit course is specifically designated for Plastics Engineering students who have successfully completed the Professional Development Seminar, are participating in the professional Co-op program, and have secured a third, full-time co-op employment experience. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.

Max Credits: 0

Min Credits: 0

30.222 Health and Disease Across the Lifespan

Course ID: 38578

Course Details: This course will introduce the basic principles that promote health of individuals throughout the lifespan. Physiological, socioeconomic, economic, and behavioral factors that impact health, disease, and quality of life across the lifespan will be examined. Health assessment tools will be reviewed. The course emphasizes the role of nutrition and physical activity for health promotion and disease prevention across different life stages and the impact of aging on health and disease. Major causes of morbidity and mortality in the United States will be discussed.

Max Credits: 3

Min Credits: 3

42.346 Homer's Trojan Epics

Course ID: 38591

Course Details: This class will explore the story of the ancient city of Troy from its origins in Homeric epic and classical drama to some of its many European iterations beginning with Vergil's Aeneid. Students will examine how these Trojan texts encode narratives of gender, ethnicity, and welfare, and how they help create an occidental European identity.

Max Credits: 3

Min Credits: 3

42.437 Newspaper Editing

Course ID: 38592

Course Details: This course will explore the techniques of putting together a student newspaper, focusing on everything from brainstorming for coming up with stories, to writing and editing them, writing headlines and captions, and design and layout. The course also discusses the nature of journalism audiences. It also discusses the practicalities of applying for journalism
jobs and writing query letters for freelance writing.

Max Credits: 3
Min Credits: 3

43.369 Russia 1796 to the Present

Course ID: 38594

Course Details: This course covers the history of Russia in its various incarnations—Imperial Russia from the end of Catherine the Great's reign the Soviet Union, and today's Russian Federation. We use both historical works and literature to get a better understanding of the Imperial state, the nature and the social bases of autocracy, the ideologies and actions of the movements that supported the Empire and those that opposed it. We cover the cataclysms of World War I, the Revolutions, Civil War, and the Soviet period (preparing the student for the course on "Stalin's Russia", 43.374). We examine the causes and events involved in the decline and collapse of the Soviet Union, and the rise and emerging patterns of behavior of the Russian Federation.

Max Credits: 3
Min Credits: 3

43.376 20th Century Irish History in Film

Course ID: 38595

Course Details: This course is on the representation of Irish history in narrative feature and documentary films made in or about Ireland. Starting with the revolutionary era, it covers the key events, issues, and debates that defined Irish politics, culture and society in the last hundred years. The course is divided into five thematic sections and proceeds chronologically through the 20th century, starting with the War of Independence against the Britain and the Civil War that followed; the American romanticism of Ireland in film; social issues that plagued the Irish Free State and Republic; the period of violence in the North known as The Troubles; and the issues raised by multi-culturalism during the Celtic Tiger era.

Max Credits: 3
Min Credits: 3

43.421 The Age of European Global Expansion, 1400-1850

Course ID: 38593

Course Details: This course examines the history of European global expansion from 1400-1850. The course begins with the medieval roots of European expansion. We then focus our attention on the expansion of the seaborne empires of Portugal and Spain beginning in the fifteenth century and those of their later challengers—the Dutch, the French, and the British. This course emphasizes how European efforts at empire building in the early modern period were often limited, a process shaped by capacities of the many diverse local populations that Europeans encountered. In addition, European expansion aided in the processes of global integration as it promoted the exchanges of goods, people, germs, plants, diets, ideas, and cultures.

Max Credits: 3
Min Credits: 3

44.221 Criminology

Course ID: 5356

Course Details: The definition and nature of crime, criminal statistics, and theories of crime causation are included. Required of all CJ majors.

Max Credits: 3
Min Credits: 3

46.302 Research and Writing for Political Science

Course ID: 38655

Course Details: This course provides political science majors with opportunities to hone their research and writing skills. Students analyze representative scholarly and popular sources, explore writing for various venues; and practice editing and revising their work. With prior arrangements students may use this course to complete an honors thesis, pursue and
independent research project of revise and expand an especially promising research paper submitted in a previous course.

Max Credits: 3
Min Credits: 3

59.491 Directed Studies - Intercollegiate FAHSS

Course ID: 38609
Course Details: Directed Studies - Intercollegiate FAHSS
Max Credits: 3
Min Credits: 3

64.300 Principles of Innovation and Entrepreneurship

Course ID: 38589
Course Details: This course is designed to help non-business students understand the importance of innovation and entrepreneurship in today's global economy and cultivate an entrepreneurial mindset among students in the Manning School of Business entrepreneurship concentration. It will cover different forms of entrepreneurship such as small businesses, growth ventures, corporate entrepreneurship and social entrepreneurship. The course will focus on the types of innovation, turning innovation into an ongoing new venture and on the entrepreneurial process. Innovation and entrepreneurship theories and concepts will be discussed with real life examples and cases.
Max Credits: 3
Min Credits: 3

69.4ACE Cooperative Education Experience

Course ID: 38648
Course Details: This zero credit course is specifically designated for Manning School of Business students who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program, and have secured a third, full-time co-op employment experience. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.
Max Credits: 0
Min Credits: 0

70.155 Drawing I

Course ID: 6835
Course Details: Provides a foundation in basic drawing concepts using a variety of media and approaches. The emphasis is on building visual literacy and its application to the realm of ideas. A wide range of assignments are given to develop graphic expression.
Max Credits: 3
Min Credits: 3

70.156 Drawing II

Course ID: 6855
Course Details: The emphasis is on giving form to ideas through building a solid sense of visual literacy. Assignments include a wide range of color media, surface, and subject matter with the focus on the psychological and structural use of color, creative experimentation, and the development of personal style. Fall and spring.
Max Credits: 3
Min Credits: 3

70.220 Website Design I
Course ID: 6874

Course Details: This course will focus on the creation of visual content for the web and will explore what constitutes a visually exciting and engaging site. Other topics that will be covered are: file formats, compression, web color strategies, and platform standards. Basic familiarity with Mac OS and/or Windows platforms required.

Max Credits: 3
Min Credits: 3

70.221 Practicum/Internship

Course ID: 6893

Course Details: The Practicum/Internship is an on-campus or off-campus learning experience. Specific requirements will vary depending on department policies and the nature of the program undertaken by the student. The practicum experience is to provide an occasion for practical experience in an area of particular interest to the student.

Max Credits: 3
Min Credits: 3

70.256 Drawing III

Course ID: 6856

Course Details: This advanced course in drawing is designed to help students develop the expressive and conceptual concerns of their drawing practice while developing their ability to work in an independent manner. Designed for students in all disciplines, the course will emphasize the development of strong research skills through the exploration of historical and contemporary modes of drawing. The class will be combination of studio work, presentations, and individual and group critiques. Critiques are designed to provide feedback and to encourage and nurture each students vision. Exploring a variety of drawing media, the ultimate goal of the course is the development of a visually coherent and conceptually unified body of work.

Max Credits: 3
Min Credits: 3

70.257 Monotypes

Course ID: 6864

Course Details: Exploration of the one-of-a-kind "painter's print". Emphasis is on the development of personal expression through a variety of assignments and techniques. Three portfolios of prints are required, two with assigned topics, and one with a self-assigned theme. Fall, alternate years.

Max Credits: 3
Min Credits: 3

70.268 Computer Art II

Course ID: 6862

Course Details: Designed to focus on advanced projects using the Macintosh platform. Focus is on design, layout, animation and video.

Max Credits: 3
Min Credits: 3

70.270 Figure Drawing

Course ID: 6865

Course Details: The study of the draped and undraped figure from life, stressing both sound observation and the creative use of human form as a vehicle for personal expression. A variety of assignments, graphic media, and approaches will be given in order to help explore both philosophical and aesthetic issues. Fall, alternate years.

Max Credits: 3
Min Credits: 3

**70.272 2D Animation**

Course ID: 6867

Course Details: This course will provide students with the fundamental understanding about the process and the concepts in animation for narrative and experimental expression. Preproduction including scripting and storyboarding will be especially emphasized. Hybrid techniques in both traditional and digital animations including hand-drawing, stop-motion, rotoscoping, pixilation as well as tweening will be introduced. Static and kinetic aesthetics of moving images will be explored through the review of historic and contemporary animations, and through the production. Students from this course will make a much smoother transition to 3D animation courses, Language of Video, Interactive media as well as Web Design/Art. The course will also introduce the student to historical and contemporary perspectives related to the discipline.

Max Credits: 3
Min Credits: 3

**70.276 Introduction to 3D Modeling and Animation**

Course ID: 6869

Course Details: This course will focus mainly on the forms, materials, and composition of 3D computer graphics in the various environments. Students will explore the possibility of 3D computer graphics for creative expression as well as innovative visual communications such as animation, game, sculpture, print and design. Rendering, lighting and camera as well as material and texturing techniques will be also explored. The course will also introduce the student to historical and contemporary perspectives related to the discipline.

Max Credits: 3
Min Credits: 3

**70.278 Interactive Media**

Course ID: 6873

Course Details: This course provides students with the ability to create interactive motion graphics for Multimedia projects using Adobe Flash and Adobe After Effects. Students learn how to make sophisticated vector and pixel based graphics with basic action scripting and a variety of interactive graphic elements as well as compositing, editing, character rigging, effects for digital media and animation.

Max Credits: 3
Min Credits: 3

**70.290 Illustration I**

Course ID: 6879

Course Details: This course provides students with a variety of experiences involving skills and techniques including computer use related to the execution of illustrations for children's books, fashion drawings, record albums, book jackets, folders, posters, and magazines. Field trips, discussions related to job opportunities and preparation of portfolios are integral parts of the instruction. Fall.

Max Credits: 3
Min Credits: 3

**70.320 Web Design II**

Course ID: 6877

Course Details: This advanced-level course is designed for students who have completed Website Development (90.238) and Website Design (70.379). The course will cover advanced topics such as user-centered design, information architecture, testing, and usage analysis. Students will have the opportunity to further develop their design, development, and conceptualization skills.

Max Credits: 3
Min Credits: 3
70.330 Typography II
Course ID: 30372
Course Details: Continuation of 70.230
Max Credits: 3
Min Credits: 3

70.420 Web Design III
Course ID: 30373
Course Details:
Max Credits: 3
Min Credits: 3

82.4ACE Cooperative Education Experience
Course ID: 38647
Course Details: This zero credit course is specifically designated for College of Science students who have successfully completed the Professional Development Seminar, are participating in the Professional Co-op program, and have secured a third, full-time co-op employment experience. The co-op is designed to provide students the opportunity to develop and enhance their hands on, technical and professional skills within an industry related to their academic program of study. During the co-op employment experience, students will, in conjunction with their employer, develop and submit written learning goals, participate in a performance evaluation and facilitate an on-site visit by Co-op Coordinator.
Max Credits: 0
Min Credits: 0

91.402 Software Project II
Course ID: 8094
Course Details: A continuation of 91.401. Students must submit a proposal to the directing faculty member, obtain his/her signed approval, and forward a copy of the signed proposal to the department chairperson.
Max Credits: 3
Min Credits: 3

91.481 Windows Practicum/Internship
Course ID: 8129
Course Details: In this course, students continue and complete the project started in 91.480 Honors Project I.
Max Credits: 3
Min Credits: 3

92.302 Introduction to Applied Mathematics II
Course ID: 8304
Max Credits: 3
Min Credits: 3

95.417 Space Science Mission Design
Course Details: This one-semester, 3-credit course intended for junior level science and engineering majors, is centered around the conceptual design of a spaceflight mission. In this project-based and team-based class, students will apply their science and technical knowledge to develop a spacecraft and mission concept tailored to answer a specific science question. Students will perform quantitative trade studies consistent with real-life constraints such as cost, schedule, manufacturability, team-expertise, operational environment, mission lifetime, etc. Students will 1) learn the fundamentals of key subsystems involved in a space flight mission and 2) apply their skills of inquiry, research, critical thinking to design a complete space science mission to solve a real-world problem while working within a multidisciplinary team.

Max Credits: 3
Min Credits: 3

95.456 Radiative Processes in Astrophysics

Course Details: Our knowledge of the universe beyond the Solar System is derived almost entirely from our interpretation of the radiation we receive from the universe; Our knowledge of the Earth's upper atmosphere and the atmospheres of other solar system objects is heavily dependent on observations of electromagnetic radiation. To understand the atmospheres of Earth and other planets, stars, galaxies and the universe, we need to understand the processes which produce electromagnetic radiation, and how radiation interacts with matter and propagates through space. This course describes the basic processes which create and alter such electromagnetic radiation before it's detected here in the Solar System. The course will consist of a combination of lectures, problem sets and class discussion sessions. The lectures will be expanded from the material in the text and will include additional material on the astrophysical and planetary context of radiative processes, drawn primarily from the following list of references. The discussion sessions will often be based on recent problem sets - regular participation of students in class discussions is expected.

Max Credits: 3
Min Credits: 3

95.464 Particle Astrophysics


Max Credits: 3
Min Credits: 3

PUBH.101 Public Health Seminar

Course Details: This course is designed to orient first year Public Health students to the College of Health Sciences and the University as a whole. The general purpose of the course is to help students identify their areas of interest in Public Health and teach students valuable skills that will maximize their likelihood of success in achieving their academic and professional goals. Areas of priority will be time management and study skills, critical thinking, and communication.

Max Credits: 1
Min Credits: 1

PUBH.221 Health Policy

Course Details: This course is designed to orient first year Public Health students to the College of Health Sciences and the University as a whole. The general purpose of the course is to help students identify their areas of interest in Public Health and teach students valuable skills that will maximize their likelihood of success in achieving their academic and professional goals. Areas of priority will be time management and study skills, critical thinking, and communication.

Max Credits: 1
Min Credits: 1
Course Details: This introductory course will provide students with an overview of the healthcare systems that are currently utilized to provide coverage to Americans with emphasis on existing disparities. Students will also review policies that are developed and implemented to enhance the current health care system. An analysis of how healthcare coverage and costs differs between the US and other developed nations will also be covered in this course.

Max Credits: 3
Min Credits: 3

**PUBH.310 Communicable Diseases and Environmental Health**

Course ID: 38611

Course Details: This course introduces students to the fundamentals of communicable diseases and how humans and the environment affect their distribution and impact. The course will provide an overview of infectious diseases including how they affect humans, their vectors and sources. Communicable disease investigation and tracking, as well as prevention planning and response will be discussed. The course covers the following aspects of communicable disease: the public health significance; overview of Immunology and disease development and transmission; sources and carriers of disease, outbreak investigation, and disease control and prevention.

Max Credits: 3
Min Credits: 3

**PUBH.311 Toxicology for Environmental Health**

Course ID: 38610

Course Details: This course introduces students to the principles of toxicology in the context of environmental health. The course will introduce basic principles and mechanisms of toxicology with review of necessary human biology. Toxicology of major organ systems (e.g. respiratory, neurological, immunological, cardiovascular) will be reviewed and presented in the context of major occupational and environmental diseases. The toxic responses of major workplace and environmental health hazards including toxic chemicals, physical agents, biological agents, and their mechanisms of action will be discussed. The course will focus on case examples of toxic agents and their impacts. New directions in toxicology and communicating toxicology will be explored.

Max Credits: 3
Min Credits: 3

**PUBH.331 Occupational Health and Safety I**

Course ID: 38617

Course Details: This is the first semester of a two-semester undergraduate course sequence that provides an overview of the field of occupational health and safety. This course focuses on safety and ergonomics. The identification and control of hazards in the workplace and the safety of consumer products will be explored. Students will discuss the detection and reduction of hazards in the workplace to prevent negative impacts on health.

Max Credits: 3
Min Credits: 3

**PUBH.332 Occupational Health and Safety II**

Course ID: 38614

Course Details: This is the second semester of a two-semester undergraduate course that provides an overview of the field of occupational health and safety. This course focuses on occupational hygiene and includes the recognition and evaluation of health hazards, and the control of health hazards including the use of protective equipment and ventilation systems. A laboratory for the course (PUBH333) allows the student to apply course content in the laboratory setting.

Max Credits: 3
Min Credits: 3

**PUBH.333 Occupational Health and Safety II Laboratory**

Course ID: 38613

Course Details: This is the laboratory associated with Occupational Health and Safety II. It is designed to provide the
students with practical hands-on experience in the various technical topics taught in Occupational Health and Safety I and II. Students will collect and measure noise, gas, vapor, and aerosol samples and evaluate performance of personal protective equipment. The laboratory meets for three hours once a week. Actual laboratory exercises will be held every other week, followed the next week by a discussion of the results from the previous week.

Max Credits: 1
Min Credits: 1

**PUBH.410 Water, Sanitation, and Public Health**

Course ID: 38612

Course Details: This course introduces students to the critical role of water and water sanitation in protection of public health. The course will provide an overview of the basics of water treatment systems and the role of local public health professionals in water preservation. Students will be introduced to the importance of water and the global water crisis; the basic principles of water hydrology and the connection between surface and ground water; water chemistry, microbiology and common contaminants in water supplies (nutrients, pathogens, and chemicals); water and waste water treatment and protection systems (including storm-water runoff, pools and beaches), their functioning, regulation, and testing; and the emerging issues in water protection, such as hydrofracking. The course is supplemented

Max Credits: 4
Min Credits: 4

**PUBH.604L Geographic Information Systems (GIS) for Health Lab**

Course ID: 38628

Course Details:

Max Credits: 1
Min Credits: 1

**01.403 Understanding Child Development in a Diverse Society**

Course ID: 36642

Course Details: Examines the major theoretical frameworks of child development and how cultural differences affect development and learning. Focus is on helping students make responsive and culturally relevant pedagogical decisions.

Max Credits: 3
Min Credits: 3

**01.405 Children with Disabilities in the Classroom**

Course ID: 33095

Course Details: This course examines the nature of cognitive emotional, developmental, sensory, and physical disabilities that compromise student capacity to make adequate academic progress without special intervention. Legal and ethical responsibilities of the educator in inclusive classroom settings and as an active member of a multidisciplinary learning team are emphasized.

Max Credits: 3
Min Credits: 3

**23.301 Manufacturing Technology Laboratory**

Course ID: 3989

Course Details: Students will develop an understanding of precision metrology and the machine tools, related equipment, and systems used in manufacturing. Students will learn the inter-relationships between machine tools, various machining methods, engineering design considerations, and manufacturing techniques studied in the MET program. Lecture, case studies, and laboratory work are supported by a comprehensive text with supplemental materials provided by the instructor to enhance student learning. Students will work with lathes, drill presses, vertical milling machines, and abrasive finishing methods during laboratory sessions to manufacture several precision finished parts from engineering drawings. Course grades will be determined from student performance on examinations and laboratory projects.
23.444 Mechanical Vibrations

Course ID: 38761

Course Details: The course will teach students methods to analyze single and two degree of freedom systems considering free vibration, harmonically excited motion, and transient vibration. Concepts of two degree of freedom systems generalized to multi-degree of freedom systems will be introduced. Various analytical approaches to vibration analysis will be taught. Solutions for continuous systems will be solved by the finite difference, finite element, and mode summation methods. Dynamic systems excited by random forces of displacements (random vibrations) will be covered. Additional mathematical content beyond Calculus C will be introduced within this course as required.

Max Credits: 2
Min Credits: 2

43.200 Early Christianity: The First Centuries

Course ID: 34822

Course Details: This course serves as an introduction to the first 800 years of Christian history. It will begin with an introduction to the Apostolic Church of the first century (and its Jewish/Greco-Roman background) and conclude with an introduction to the Eastern Orthodox Church of Late Antiquity. The course will also cover popular topics like "Gnosticism," "Women in Early Christianity," and "Early Christian Worship and Art."

Max Credits: 3
Min Credits: 3

45.311 Philosophy and Literature

Course ID: 5519

Course Details: This course examines the intersection between philosophy and literature. Course content includes detailed study of philosophical works of literature and works of philosophy about Literature. Featured Topics include competing definitions of Literature, silent and performative reading, models for acquiring literary status, Literature and morality, censorship, the role of truth in literary experience, and the relationship between authors, works, fictional characters, readers, and critics.

Max Credits: 3
Min Credits: 3

45.385 Philosophy of Popular Culture

Course ID: 38726

Course Details: This course analyzes those forms of art/entertainment commonly referred to under the umbrella term "popular culture" through a variety of philosophical lenses. After seeking to establish a categorization of "popular culture," students will examine the mediums of music, film, television, advertisements and sports. Throughout the course, students will read/listen/watch various examples of the mediums listed above and attempt to answer various questions about them such as: what societal values make these examples popular at a current moment? What cultural assumptions do these examples reflect? What is the artistic/aesthetic merit of these examples?

Max Credits: 3
Min Credits: 3

46.372 Crime, Security, and Democracy in Latin America

Course ID: 5658

Course Details: In the past two decades, different forms of organized crime have besieged democratic stability and security in Latin America. The explosion of violence in Mexico in 2006, problems with postconflict criminality in Central America, and complex relations between criminality and political violence in Colombia are only some prominent expressions of a problem that seems to be exacerbated by globalization, but that has clear historic roots and local expressions. The main objective of this class is to provide students with analytic, conceptual and factual tools that will allow them to critically evaluate the impact of criminality on distinct aspects of Latin American politics and society.
Max Credits: 3
Min Credits: 3

46.398 The War on Drugs

Course ID: 5671

Course Details: The war against drugs stands as both a major foreign policy priority for the US and the International community in general, and as a constant source of debate and contention. The aim of this course is to provide students with analytical tools, concepts, and information, which will enable them to critically evaluate the war on drugs beyond the common myths and misconceptions that often surround this highly controversial topic. By analyzing a wide range of countries around the world, students would gain an in depth and nuanced perspective of the relation between drug trade, violence, corruption, development, and democracy. Students will also gauge arguments and possible impacts on different drug policy options.

Max Credits: 3
Min Credits: 3

46.406 The Politics of Identity in the Middle East

Course ID: 5676

Course Details: The course will examine the ethnic, political, religious and social changes in the modern Middle East. The course will start with an introduction to the diverse identities all over the Middle East and then it will comparatively examine a number of those identities.

Max Credits: 3
Min Credits: 3

46.447 Theories of Political and Criminal Violence

Course ID: 38759

Course Details: The study of violence has been a central piece of debates in comparative politics that range from the causes of revolution to the analysis of civil wars. This course aims to provide a broad overview of different bodies of research on violence. The class will also revisit crucial debates in the study of violence, such as the problems of separating criminal and political violence (such as interstate wars). By the end of the class, students will be able to identify major theoretical and methodological approaches to violence, major debates and concepts, as well as key cases across the world.

Max Credits: 3
Min Credits: 3

46.490 War and Peace in the Sovereign State System

Course ID: 5687

Course Details: Despite much effort to limit the occurrence of interstate and intrastate war, such violence is still prevalent in the sovereign state system. This course will focus on the causes, dynamics, and outcomes of interstate and intrastate conflict and ways to sustain peace. We will examine the foundational works in the area of conflict before moving quickly into more recent research. The class will emphasize student participation and the application of concepts we learn in class. Students are asked to write a final paper exploring a concept of war and peace in the sovereign state system.

Max Credits: 3
Min Credits: 3

48.210 Sociology of Food

Course ID: 38760

Course Details: This course is about Sociology of food exploring the connection between food, society and culture. Our food choices are influenced by age, gender, ethnicity, class and religion. History of food and methods of food production contribute to understanding of social relations among individuals and social changes in society. This course will examine 1. role of food in society, culture and change, 2. changes in food production from simple to complex societies and 3. problems associated with new systems of food production locally and globally.

Max Credits: 3
48.311 Sociological Perspectives on Communication and Social Change
(Last Term 2009 Fall)

Course ID: 33285

Course Details: Most social interactions and interventions involve communication. Thus, communication patterns present critical issues for sociological inquiry. This course introduces communication as a central yet often ignored element of social life. It surveys existing communication theories, then focuses on models used by marginalized populations in efforts to democratize communication systems. Finally, it introduces tools for communication strategizing. As a final product students will conduct a frame analysis of a current social topic. From a general liberal arts perspective, the course will stress critical thinking and writing skills.

Max Credits: 3
Min Credits: 3

48.484 Internship I

Course ID: 5890

Course Details:

Max Credits: 3
Min Credits: 1

52.245 Advanced Italian Conversation

Course ID: 30416

Course Details:

Max Credits: 3
Min Credits: 3

52.345 Advanced Italian Conversation

Course ID: 30416

Course Details:

Max Credits: 3
Min Credits: 3

53.113 Portuguese 1 and Culture

Course ID: 6040

Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 113, 114 and 213, 214 levels must be elected in the prescribed sequence.

Max Credits: 3
Min Credits: 3

53.213 Portuguese 3 and Culture

Course ID: 6055

Course Details: Development of fundamental skills in oral expression, aural comprehension, reading and writing is required in language courses. Beginning and intermediate language courses at the 113, 114 and 213, 214 levels must be elected in the prescribed sequence.

Max Credits: 3
54.352 Hispanic Perspectives

Course Details: In this course we will explore some of the foundational texts of Hispanic literature while discussing the intersections of political, literary, and cultural traditions that connect the United States with Spain and Latin America.

Max Credits: 3
Min Credits: 3

58.302 Studies In World Art

Course Details: Historical and critical examination of regions works of art from China, Asia, the Islamic world, India, Africa, North America, Latin America, Native American Art and Mexico. Topics vary from year to year. Course may be repeated.

Max Credits: 3
Min Credits: 3

59.302 Studies In World Art

Course Details: Historical and critical examination of regions works of art from China, Asia, the Islamic world, India, Africa, North America, Latin America, Native American Art and Mexico. Topics vary from year to year. Course may be repeated.

Max Credits: 3
Min Credits: 3

62.315 New Product & Service Management

Course Details: Course number was formerly 62.311. Focuses on the process of new product & service development and marketing. Emphasis is given on market opportunity identification, R&D-marketing interface, business model development, market potential estimation, and market entry timing.

Max Credits: 3
Min Credits: 3

62.411 Marketing Analytics

Course Details: Course number was formerly 62.312. Focuses on marketing strategies and tactics. Emphasis is given on research methods and applications for strategy building and implementation.

Max Credits: 3
Min Credits: 3

62.412 Global Marketing

Course Details: Course number was formerly 62.303. Focuses on the marketing aspect of global business. Emphasis is given on cultural dynamics and economics as well as political, social and regulatory constraints as they affect the global marketing practice and strategy implementation.

Max Credits: 3
Min Credits: 3
64.360 Principles of Innovation and Entrepreneurship

Course ID: 38589

Course Details: Course number was formerly 64.300. This course is designed to help non-business students understand the importance of innovation and entrepreneurship in today’s global economy and cultivate an entrepreneurial mindset among students in the Manning School of Business entrepreneurship concentration. It will cover different forms of entrepreneurship such as small businesses, growth ventures, corporate entrepreneurship and social entrepreneurship. The course will focus on the types of innovation, turning innovation into an ongoing new venture and on the entrepreneurial process. Innovation and entrepreneurship theories and concepts will be discussed with real life examples and cases.

Max Credits: 3
Min Credits: 3

64.496 Entrepreneurship Strategy Implementation

Course ID: 38814

Course Details: The Course focuses on innovation and entrepreneurship utilizing experiential learning and venturing projects. It will deal with ideation methods and tools, technology commercialization, business planning and potential initial incubation of an early-stage business by project teams, and the development of an investment proposal to launch a new business. Students will be exploring, identifying and analyzing the path from Idea to Market for technology projects.

Max Credits: 3
Min Credits: 3

64.499 Independent Studies

Course ID: 6656

Course Details:

Max Credits: 3
Min Credits: 3

66.150 Introduction to Business

Course ID: 38128

Course Details:

Max Credits: 3
Min Credits: 3

66.455 Compensation Management

Course ID: 6658

Course Details:

Max Credits: 3
Min Credits: 3

66.491 Independent Study in Management

Course ID: 38747

Course Details: An opportunity for the student to carry out individualized study relating to the field of management under the supervision of a member of the faculty.

Max Credits: 6
Min Credits: 1

70.101 Art Concepts I
Course ID: 6823

Course Details: Art Concepts I will focus on learning the visual language of the creative process through an examination of the principles of two-dimensional visual organization. These fundamental basics form the underlying structure of all studio and communication arts. Through slide lecture, guest lecturers, field trips, and studio projects, students will begin to understand the many forms that visual expression takes. The course will develop creative problem solving skills and students will learn to respond to personal challenge. Students will also be instructed in the principles of professional execution and be introduced to diverse modes of thought, media, and aesthetic expression.

Max Credits: 3
Min Credits: 3

70.210 Graphic Design I

Course ID: 6849

Course Details: Exercises, lectures and projects will introduce students to graphic design principles and techniques. Course will begin with a fundamental study of image, form, and space relations, then cover such topics as working with grids, typography basics, page layout, the introduction of color, rendering techniques, history, and more. Students will be assigned a series of projects to enhance their visual communication skills.

Max Credits: 3
Min Credits: 3

70.230 Typography I

Course ID: 6830

Course Details: The study of lettering concepts and techniques, including the history of letters, styles and families of type, letter design, hand-drawn to computer-based lettering approaches and their effect and uses in communication. Emphasis will be on creative and aesthetic communication. Fall, alternate years.

Max Credits: 3
Min Credits: 3

70.232 Ceramics I

Course ID: 6848

Course Details: Introduces the student to the basic hand-building techniques, wheel throwing, and ceramic sculpture. The course will also examine clay, the material, glaze techniques, and firing processes.

Max Credits: 3
Min Credits: 3

70.235 Sculpture I

Course ID: 6846

Course Details: The exploration of three-dimensional form through the use of basic materials, methods and approaches. Assignments will include expressive problems based on human and non-objective form relationships. Spring.

Max Credits: 3
Min Credits: 3

70.242 Language of Video

Course ID: 6870

Course Details: An introductory course in video camera principles and editing functions. Utilizing writing and still photography, students will explore the language of video in both images and sound as they produce factual documents and/or personal fiction.

Max Credits: 3
Min Credits: 3
70.272 2D Animation I

Course ID: 6867

Course Details: This course will provide students with the fundamental understanding about the process and the concepts in animation for narrative and experimental expression. Preproduction including scripting and storyboarding will be especially emphasized. Hybrid techniques in both traditional and digital animations including hand-drawing, stop-motion, rotoscoping, pixilation as well as tweening will be introduced. Static and kinetic aesthetics of moving images will be explored through the review of historic and contemporary animations, and through the production. Students from this course will make a much smoother transition to 3D animation courses, Language of Video, Interactive media as well as Web Design/Art. The course will also introduce the student to historical and contemporary perspectives related to the discipline.

Max Credits: 3
Min Credits: 3

70.310 Graphic Design II

Course ID: 6880

Course Details: Students will be assigned a variety of advanced-level projects dealing with areas such as logo design, publication design, interactive screen design, direct mail projects, corporate identity systems, poster design, and more. Projects in this class are designed to better develop the students' ability to take a project to its final stage and render it as a professional portfolio piece.

Max Credits: 3
Min Credits: 3

70.332 Ceramics II

Course ID: 35291

Course Details: Building on Ceramics I as an introductory course, Ceramics II will ask the student to explore functional and nonfunctional ceramic form. Students will be expected to challenge themselves with scale, advanced glaze methods and they will become familiar with kiln firings. Historical and contemporary issues in ceramics will be covered through lectures, slide presentations and critiques.

Max Credits: 3
Min Credits: 3

70.335 Sculpture II

Course ID: 6858

Course Details: A course allowing the student to further develop his or her techniques and understanding of sculptural form, leading to a more personal vocabulary. Conventional techniques will be extended to cover more contemporary materials and methods. Spring, alternate years.

Max Credits: 3
Min Credits: 3

70.342 Intermediate Video

Course ID: 36430

Course Details: This course will continue the exploration of video as an expressive medium. Students will explore video installation, interactivity, video compositing and streaming media to produce creative works.

Max Credits: 3
Min Credits: 3

70.377 2D Animation II

Course ID: 6872

Course Details: This course focuses on applying industry-standard storyboarding, character and layout design and scripting
techniques to animation. Contents to be covered include the various purposes and formats of storyboards, the basic terminology and concepts used in production, and the application of production techniques to the creation of animated films with or without a written script and the production process of an animated film from idea to execution of complete film.

Max Credits: 3
Min Credits: 3

**70.410 Graphic Design III**

Course ID: 31971

Course Details:

Max Credits: 3
Min Credits: 3

**70.432 Ceramics III**

Course ID: 35288

Course Details: Ceramics III will require students to develop a personal visual voice in clay, resulting in a focused coherent body of work. Students will be expected to develop productive studio habits, continue to explore advanced glaze methods and participate in kiln firings.

Max Credits: 3
Min Credits: 3

**70.435 Sculpture III**

Course ID: 30834

Course Details: Sculpture III will allow students with a continued, special interest in three-dimensional media and installation art to find their personal visual voice and begin to develop a structured studio practice. Students will be asked to identify a conceptual theme for the semester that they will explore through research, development and execution in a series of installation works. The course will introduce and expand on contemporary media and methods not covered in Sculpture I and II. Verbal analysis and articulation of the final sculptural works will continue to be stressed.

Max Credits: 3
Min Credits: 3

**79.225 History of Photography**

Course ID: 6828

Course Details: Less than 200 years old, photography seems to span millennia. With 1839 as the invention's launch date, there is no photograph of George Washington, but very soon we are flooded with the faces of composers, painters, and presidents: we know and are reminded of the ravages of civil and world wars, industrial progress and social injustice, or the beauty of pristine landscapes and their ecological demise. In this course, students will become familiar with some 100 notable photographers, from the beginning years of its invention to contemporary times with works by major artists and forgotten visionaries, all serving as a foundation for inspiration and understanding of the art worlds most visible medium. Grading in the course is based on a mid-term and final exam along with a major research paper.

Max Credits: 3
Min Credits: 3

**81.342 Comp Vertebrate Anatomy**

Course ID: 7501

Course Details: This course is designed to provide students a broad understanding of the anatomy of vertebrates with an emphasis on comparison between taxa and their evolutionary significance. Students will acquire knowledge and understanding of anatomical structure and terminology of vertebrates and an understanding of how these structures have evolved from ancestral forms. There will also be some reference to the fields of embryology, histology and paleontology in the course. This course may interest students who might want to go into various animal/human focused fields (e.g. veterinary science, medicine or graduate studies with more organismal focus), and students who simply want a course focused on vertebrates. However, students should note that this course does not focus on human nor veterinary anatomy. This course
could also help undergraduates in the General Biology and Ecology Option satisfy free elective requirements.

Max Credits: 3
Min Credits: 3

**85.301 Atmospheric Thermodynamics**

Course ID: 7774


Max Credits: 3
Min Credits: 3

**85.495 Honors Research: Atmospheric Science**

Course ID: 7794

Course Details: An individual or team research project carried out by qualified students with the approval of and supervision by a faculty member.

Max Credits: 3
Min Credits: 3

**87.495 Honors Research: Environmental Studies**

Course ID: 38727

Course Details: An individual or team research project carried out by qualified students with the approval of and supervision by a faculty member.

Max Credits: 3
Min Credits: 3

**89.495 Honors Research: Geoscience**

Course ID: 7922

Course Details: An independent scientific research project carried out by a qualified senior under the supervision of a faculty member.

Max Credits: 3
Min Credits: 3

**91.423 Computer Vision I**

Course ID: 38743

Course Details: Computer vision has seen remarkable progress in the last decade, fueled by the ready availability of large online image collections, rapid growth of computational power, and advances in representations and algorithms. Applications range from 3-D scene reconstruction, to visual Simultaneous Localization and Mapping (SLAM) for robotics, to real-time human body pose estimation. This introductory computer vision course explores various fundamental topics in the area, including the principles of image formation, local feature analysis, segmentation, multi-view geometry, image warping and stitching, structure from motion, and object recognition.

Max Credits: 3
Min Credits: 3

**10.315 Unit Operations Laboratory**

Course ID: 2869
Course Details: Students perform laboratory base experimental analyses in fluid flow and heat transfer and fluid flow and heat transfer unit operations processes common in Chemical Engineering practice. The course is team based and students are expected to develop and improve in their ability to work and interact in a group environment. Written and oral reports are required. Safety in both lab and industrial practice are emphasized.

Max Credits: 3
Min Credits: 3

17.322 Signals and Systems I

Course ID: 38851

Course Details: Introduction to signals and systems. Signal classification, Normalized energy and power. Signal families, time-domain representation by differential equations, linear time invariance, classical solution to various signal families, frequency domain representation, total solution of system with initial conditions. Impulse and pulse response of LTI systems. Convolution methods, Fourier series analysis, Fourier transforms, properties and use, inversion by partial fractions, residues with s-plane vectors, application to LTI systems with initial conditions and sources. Introductions to digital elements and equations.

Max Credits: 3
Min Credits: 3

42.215 The Essay

Course ID: 5032

Course Details: Studies the essay as the literature of ideas, and presents selections from Montaigne to the present.

Max Credits: 3
Min Credits: 3

42.336 From Beowulf to Tolkien

Course ID: 38856

Course Details: We will read Beowulf in translation, and discuss contemporary approaches as well as engage with critical traditional questions. We will also read other Anglo-Saxon poetry and Old Norse-Icelandic sagas in translation in order to gain a cultural context for the Beowulf poem. Class will conclude with a look at how Tolkien's books were inspired and influenced by these works.

Max Credits: 3
Min Credits: 3

42.338 Medieval Women Writers

Course ID: 38857

Course Details: Woman have always written and read and participated in culture. This class will explore writings on literary and non-literary genres by woman in the European Middle Ages (600-1500). Students will learn how different pre-modern cultural conditions affected the possibilities for women's authorship, readership, and patronage. We will also examine how women writers interacted with literary traditions and constructions of gender.

Max Credits: 3
Min Credits: 3

42.392 Visual Rhetoric

Course ID: 38869

Course Details: This course introduces students to the theory and practice of visual communication. Students will explore what scholars mean by terms such as visual rhetoric and visual literacy in order to think concretely about how these concepts apply to the communication practices they will engage in their academic, professional, and everyday life. Special attention will be paid to the ways in which visual representations communicate culturally-specific meanings about race, gender, class, sexuality, age, nationality, and difference. Assignments include contributions to a course blog, rhetorical analyses of visual texts, design modules, and a multimodal project.
Max Credits: 3
Min Credits: 3

**42.435 Writing About Culture**

Course ID: 38882

Course Details: In this course, students will write about local culture, using a mix of first-hand observation, archival research, and/or contextual or geographic readings of culture of literature produced in the region. This course is designed to serve as a course in a study abroad program or one that focuses on regional authors such as Jack Kerouac or Henry David Thoreau.

Max Credits: 3
Min Credits: 3

**44.141 Introduction to Policing**

Course ID: 5350

Course Details: This course provides an examination of the historical development of police work with special emphasis on the conflicting role expectations facing police officer.

Max Credits: 3
Min Credits: 3

**44.497 Terrorism Internship**

Course ID: 5425

Course Details: This course is a semester long internship with the Center for Terrorism & Security Studies (CTSS) where students will work on one or more of the center's research projects. After an initial period of training in data collection and coding, CTSS interns will then work under the supervision of Center faculty and staff.

Max Credits: 6
Min Credits: 3

**45.386 Ancient Philosophy**

Course ID: 5506

Course Details: A survey of the beginnings of philosophy, mainly western, from the Presocratics to Augustine. Studies the emergence of philosophy out of mythical forms of thinking and the development of rational thought in the work of Plato, Aristotle, the Stoics, the Epicureans, and the Neoplatonists.

Max Credits: 3
Min Credits: 3

**46.175 Introduction to Environmental Politics**

Course ID: 31964

Course Details: This course introduces major concepts in environmental politics to provide a comprehensive understanding of the formation of environmental policy in the United States. Throughout the course, particular attention is paid to the role of government and markets in creating environmental crises and shaping policy responses.

Max Credits: 3
Min Credits: 3

**47.269 Research I: Methods**

Course ID: 5710

Course Details: An introductory course on the fundamentals of empirical research in psychological science. Instruction will promote understanding and competence in the basic vocabulary of psychological research, addressing information literacy, measurement, reliability, and validity in observed variables and unobserved constructs. Students will learn critical components of experimental, quasi-experimental, and correlational designs, as well as the basics of descriptive statistics,
hypothesis and statistical testing, and matching design to analysis strategies. Students will demonstrate this knowledge through the preparation of a research proposal. Finally, this course will provide students a strong basis from which to pursue advanced coursework in a variety of methodological approaches to psychological research.

Max Credits: 3
Min Credits: 3

47.375 Research III: Statistics

Course ID: 5738

Course Details: An advanced course in which students design and carry out an empirical research project from start to finish, resulting in an individually written research report using APA style and an oral presentation. The primary goal is for students to experience discovery by completing an original study that reasonably extends the prior research literature. Topics may vary, reflecting the interests of the instructor. Students will perform literature reviews; formulate a research question; operationalize variables; develop research designs; obtain ethical review and approval; and collect, analyze, and interpret data. Students will also demonstrate knowledge of the research process in assessments that may include assignments, quizzes, or exams.

Max Credits: 3
Min Credits: 3

50.303 Special Topics: in Fancophone Studies

Course ID: 38870

Course Details: An in-depth study of a specific topic in literature, culture, civilization or cinema from the French-speaking world. Class discussions, readings, oral and written work all in French. May be repeated once for credit, if content changes, and with written consent of the Instructor.

Max Credits: 3
Min Credits: 3

53.110 Portuguese for Spanish Speakers I

Course ID: 38871

Course Details: Taught at a faster pace than a regular beginning course in Portuguese, is an introduction to the foundations of the Portuguese language and the cultural diversity of the Lusophone world for speakers of Spanish. Specific attention is devoted to the advantages and challenges that Portuguese presents to native or near-native speakers of Spanish. The course acknowledges that, in spite of the similarities between the two languages, there are important differences in pronunciation, vocabulary and grammatical structures. The course gives emphasis to all four language skill-listening, speaking, reading, writing-in order to achieve communicative goals. Portuguese is the language of instruction.

Max Credits: 3
Min Credits: 3

53.200 Introduction to Southeast Asian Cultures

Course ID: 38872

Course Details: This course focuses on the development of the arts and cultures in Southeast Asia from ancient times to the present. As a diverse region that is home to Muslims, Catholics and other Christian, Buddhists, Hindus and animists, examining the arts and cultures in Southeast Asia provides fascinating insight into the region's societies. This course examines performance, architecture and material culture from a variety of Southeast Asian cultures. Students will gain an understanding of the geography and demography of Southeast Asia, its contacts with neighboring regions, and how these diverse influences are reflected in the production of art. Students will be introduced to theater, dance, puppetry, martial arts and music of Southeast Asia.

Max Credits: 3
Min Credits: 3

53.301 Special Topics: in Lusophone Studies

Course ID: 38873
Course Details: An in-depth study of a specific topic in literature, culture, civilization from the Lusophone world. Class discussions, readings, oral and written work all in Portuguese or in English. May be repeated once for credit, if content changes, and with written consent of the Instructor.

Max Credits: 3
Min Credits: 3

53.302 Special Topics: in Portuguese Studies
Course ID: 38874

Course Details: An in-depth study of a specific topic in literature, culture, civilization or cinema from Portugal. Class discussions, readings, oral and written work all in Portuguese or in English. May be repeated once for credit, if content changes, and with written consent of the Instructor.

Max Credits: 3
Min Credits: 3

53.400 Special Topics: in Southeast Asian Studies
Course ID: 38875

Course Details: An in-depth study of a specific topic dealing with the literature, culture, civilization, cinema etc., of Southeast Asia. Class discussions, readings, oral and written work all in English. May be repeated once for credit, if content changes, and with written consent of the Instructor.

Max Credits: 3
Min Credits: 3

54.300 Special Topics in Hispanic Studies
Course ID: 38876

Course Details: An in-depth study of a specific topic in literature, culture, civilization or cinema from the Hispanic world. Class discussions, readings, oral and written work all in Spanish. May be repeated once for credit, if content changes, and with written consent of the Instructor.

Max Credits: 3
Min Credits: 3

54.304 Special Topics: in Latin American Studies
Course ID: 38879

Course Details: An in-depth study of a specific topic in literature, culture, civilization or cinema from Latin American countries. Class discussions, reading, oral and written work all in Spanish. May be repeated once for credit, if content changes, and with written consent of the Instructor.

Max Credits: 3
Min Credits: 3

70.430 Typography III
Course ID: 38878

Course Details: This course is a continuation of Typography II. Students will expand on their understanding of typography including applications for print and web design. The course covers organization, systems, grids and form. Through readings, lectures and projects/critiques, students will be introduced to various theoretical approaches to the typographic page. They will study the different interactive structures and systems (book, web page/site) that hold and present typographic content.

Max Credits: 3
Min Credits: 3

79.241 Art Serving Political, Religious, & Social Needs
Course ID: 7417

Course Details: This course studies cultural and artistic production for political, religious and social education aims. The objectives are to study the production of meaning in paintings and frescos, sculpture, stained glass, architecture and other art forms that were commissioned through the church and state patronage system; to analyze how these images are used to represent and define social order; how these images support the recording and interpretation of history and support the educational, inspirational, and propagandistic aims of church and state; and to introduce students to the visual and critical language of are produced at this time.

Max Credits: 3
Min Credits: 3

79.280 From Collective to Personal Aesthetics

Course ID: 38880

Course Details: This course is an exploration in aesthetics and culture. The seminar examines a variety of works by contemporary artists and designers; and also introduces important texts by philosophers, art theorists, and critics. Throughout the semester, student will study current trends in visual studies. They will examine a range of works form popular culture to high art and respond to various readings through class discussions and papers. In addition, the course will facilitate intellectual engagement with ones own visual work. Through their research, student will explore the connections between their work and that of other artists and designers. They will situate their artwork within the field of criticism, creating a bridge across the traditional divide between theory and practice.

Max Credits: 3
Min Credits: 3

84.223 Organic Chemistry IIB

Course ID: 7657

Course Details: The course covers the chemical and mechanistic principles of organic reactions utilized in biological systems. Spectroscopy, organic reactions and related mechanisms of bio-molecules or small molecules in biological systems will be discussed from a functional group perspective. Multiple examples from medicinal chemistry, chemical biology and biochemistry will be used to illustrate the concepts. Knowledge of organic mechanistic arrow-pushing formalism is required.

Max Credits: 3
Min Credits: 3

85.325 Weather Communications

Course ID: 38852

Course Details: An introduction to the field of weather communication. Topics will include the basic principles of communicating weather forecasts, television and radio broadcasting, written communication of weather, the use of social media applications, and applied forecasting techniques. Individual and group projects utilizing commercial broadcast facilities.

Max Credits: 3
Min Credits: 3

85.493 Internship: Atmospheric Science

Course ID: 38853

Course Details: Work experience with private or public employer. Written report and supervisor evaluation required.

Max Credits: 3
Min Credits: 1

87.493 Internship: Environmental Studies

Course ID: 38854

Course Details: Work experience with private or public employer. Written report and supervisor evaluation required.
Max Credits: 3
Min Credits: 1

89.493 Internship: Environmental Geoscience

Course ID: 38855

Course Details: Work experience with private or public employer. Written report and supervisor evaluation required.

Max Credits: 3
Min Credits: 1

91.442 Natural Language Processing

Course ID: 38884

Course Details: This course introduces principles and techniques behind natural language processing (NLP), and covers a large selection of important automatic text processing tasks. Selected topics include n-gram language models, part-of-speech tagging, statistical parsing, word sense disambiguation, discourse segmentation, information extraction, sentiment analysis, machine translation. Quantitative techniques are emphasized, with a focus on applying statistical models to large collections of text. The course provides students with a hands-on experience in building a substantial NLP application of their choice.

Max Credits: 3
Min Credits: 3

92.232 Math Lab I

Course ID: 31891

Course Details: An introduction to mathematics related software. Topics from Calculus & Differential Equations will be explored using a symbolic package like Maple. the course will also introduce LaTeX, the standard for typesetting mathematics.

Max Credits: 1
Min Credits: 1

92.272 Introduction to Programming with MATLAB

Course ID: 38929

Course Details: This course will introduce basic programming concepts using MATLAB as the programming environment. Topics include an introduction to MATLAB, array manipulation, graphics, script files, data input and output, relational and logical operators, conditional statements, loops, and iterative procedures. Additional topics will be discussed as time permits. Additional topics will be chosen from the following: finding roots of nonlinear equations, random number generation, Markov processes, simple statistics, interpolation, and the basics of Fourier analysis.

Max Credits: 3
Min Credits: 3

DGMD.100 Introduction to Digital Media

Course ID: 37736

Course Details: This foundational course is an introductory survey of the theory, history, structure, and function of mass communication in the United States.

Max Credits: 3
Min Credits: 3

DGMD.102 Introduction to Telecommunications

Course ID: 38656
Course Details: This is an introductory course in the field of journalism designed to introduce students to a survey of the radio and television industries, with an emphasis on their formation, growth, and change. The course examines the historical development of broadcasting as a vital component of American cultural identity, looking at the development of U.S. radio, television, and new media in the context of social and cultural change.

Max Credits: 3
Min Credits: 3

DGMD.231 Media, Law and Ethics

Course ID: 38516

Course Details: This course primarily is designed to explore key legal issues you are likely to confront as a journalist, mass media professional or student interested in learning more about the relationships between law, media and ethics in this global community. Nonetheless, you will be challenged to think critically about the applicability of those issues to individuals and to media institutions that transmit information via spoken communications, writing, traditional media, text messages, social network sites, or e-mail messages.

Max Credits: 3
Min Credits: 3

DGMD.300 Multimedia Storytelling

Course ID: 38225

Course Details: This course will facilitate a deeper understanding of the uses of online and multimedia communication technologies in a democratic society and the impact of such technologies on the way we communicate. The course will provide students with the opportunity to develop professional knowledge and skills with the tools used in online and multimedia creation. Students will develop a critical understanding of multiplatform and multimedia technologies and will learn how to use video, digital photography, audio, video, social networking and other new technologies.

Max Credits: 3
Min Credits: 3

DGMD.320 Documentary Photography

Course ID: 38227

Course Details: In a world of increasing manipulation, documentary photographs still astound us with their visual truths. In this course, students will utilize words and images "the primary tools of the photojournalist" to explore the significant issues of our time. Works by Fenton, O'Sullivan, Gardner, Riis, Hine, Bourke-White, Lang, Smith, Davidson, Salgado, Mark and others are studied for content, style, and inspiration.

Max Credits: 3
Min Credits: 3

DGMD.340 Lighting Principles

Course ID: 38877

Course Details: In this course students are going to understand the principles of lighting, its nature, its physical characteristics, and its artistic role in media production. Class will have significant hands-on assignments and demonstrations beside theoretical background lectures. The concept will be developed based on a one-camera setting only. Students will work with light meters to guide their lighting schemes.

Max Credits: 3
Min Credits: 3

DGMD.400 Directed Study in Journalism and Media Studies

Course ID: 38224

Course Details: Through frequent consultation with the instructor, the student carries out the investigation of a particularly specialized area of interest. This course may be repeated for up to a total of 6 credits.

Max Credits: 3
DGMD.410 TV Studio Production

Course ID: 38651

Course Details: This course will offer you the opportunity to produce different types of live programs using digital technology. Plan, organise and direct TV studio-based broadcasting. Work effectively as part of a group. It provides a working knowledge of compositional, personal and organizational production skills in relation to the making of a live broadcast program using at least three cameras having in mind that you will cut/edit form a camera to another without stopping. It requires collaboration, teamwork and strict, organized structures. In most cases, it requires leadership. But for everybody, personal qualities such as determination, enthusiasm and persistence are almost essential. So too is engaged participation.

Max Credits: 3
Min Credits: 3

42.435 Literary Journalism

Course ID: 38582

Course Details: This course that looks at the genre of Literary Journalism, a largely American Innovation in literature that developed in the late 19th and 20th centuries. Students will closely read and discuss books and articles by literary journalists, seeking to understand the genesis and shifts of this hybridized form (literary techniques applied to true or fact-based stories), and the contributions literary journalism is making to literature, to documentary and witness narratives, to historical records, and to the notions of truth reportage.

Max Credits: 3
Min Credits: 3

47.375 Research III: Laboratory

Course ID: 5738

Course Details: An advanced course in which students design and carry out an empirical research project from start to finish, resulting in an individually written research report using APA style and an oral presentation. The primary goal is for students to experience discovery by completing an original study that reasonably extends the prior research literature. Topics may vary, reflecting the interests of the instructor. Students will perform literature reviews; formulate a research question; operationalize variables; develop research designs; obtained ethical review and approval; and collect, analyze, and interpret data. Students will also demonstrate knowledge of the research process in assessments that may include assignments, quizzes, or exams.

Max Credits: 3
Min Credits: 3

DGMD.400 Directed Study in Digital Media

Course ID: 38224

Course Details: Through frequent consultation with the instructor, the student carries out the investigation of a particularly specialized area of interest. This course may be repeated for up to a total of 6 credits.

Max Credits: 3
Min Credits: 3

Academic Integrity Policy

UNIVERSITY OF MASSACHUSETTS LOWELL POLICY AND PROCEDURES RELATING TO STUDENT ACADEMIC INTEGRITY AND MISCONDUCT

I. Statement of Principles: The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others’ academic endeavors. Academic dishonesty is prohibited in all programs of the university.

II. Academic Misconduct Subject to Disciplinary Action:
Academic misconduct is an act in which a student:

(a) Seeks to claim credit for the work or efforts of another without authorization or citation;
(b) Uses unauthorized materials or fabricated data in any academic exercise;
(c) Forges or falsifies academic documents or records;
(d) Intentionally impedes or damages the academic work of others;
(e) Engages in conduct aimed at making false representation of a student’s academic performance; or
(f) Assists other students in any of these acts.

Examples of academic misconduct include, but are not limited to: cheating on an examination; collaborating with others in work to be presented, contrary to the stated rules of the course; submitting a paper or assignment as one’s own work when a part or all of the paper or assignment is the work of another; submitting a paper or assignment that contains ideas or research of others without appropriately identifying the sources of those ideas; getting unauthorized access to examinations or course materials; submitting, without the permission of the current instructor, work previously presented in another course; tampering with the laboratory experiment or computer program of another student; knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

III. Possible Disciplinary Sanctions:

(1) The following are the disciplinary sanctions that may be imposed by an instructor for academic misconduct:

(a) An oral or written notice of misconduct;
(b) An assignment to repeat the work, to be graded on its merits;
(c) A lower or failing grade on the particular assignment or test;
(d) A lower grade in the course;
(e) A failing grade in the course;

In addition, an instructor or the Academic Dean may recommend the following sanctions:

(f) A non-deletable failing grade in the course;
(g) Suspension from the University; (h) Expulsion from the university.

Sanctions f – h are imposed by the Office of the Provost.

(2) One or more of the disciplinary sanctions listed above may be imposed for an incident of academic misconduct.

IV. Definitions

As used herein:

(1) “Office of the Provost” means the Provost, Vice Provost or a designee.

(2) “Days” means academic calendar days and excludes Saturdays, Sundays, legal holidays and days upon which the university is closed.

(3) “Academic Dean” means the Academic Dean or designee for the college in which the subject course is taught.

(4) “Instructor” refers to the Instructor of Record.

(5) “Minor Disciplinary Sanction” means a disciplinary sanction, identified in paragraph III (1) (a)-(e) and imposed, for academic misconduct, upon a student by an instructor.

(6) “Major Disciplinary Sanction” means a disciplinary sanction, identified in paragraph III (1) (f)-(h) and imposed, for academic misconduct, upon a student by the Office of the Provost or the Academic Integrity Appeals Board upon the recommendation of the instructor or the Academic Dean or imposed at the discretion of the Office of the Provost.

(7) Notice to the student, whenever required herein, shall be e-mailed to the student’s official student.uml.edu e-mail address or mailed to the student by regular first class United States mail at his or her current address as maintained by the university.

V. Imposition of Disciplinary Sanctions by the Instructor:

(1) Where an instructor concludes that a student enrolled in one of his or her courses has engaged in academic misconduct, the instructor may impose one or more of the following disciplinary sanctions, as listed under paragraph III, subsections (a) through (e):

(a) An oral or written notice of misconduct;
(b) An assignment to repeat the work, to be graded on its merits;
(c) A lower or failing grade on the particular assignment or test;
(d) A lower grade in the course;
(e) A failing grade in the course.

(2) When possible, prior to imposing a minor sanction, the instructor shall notify the student that the instructor believes an act of academic misconduct has occurred, that a sanction may be imposed, and that a Notification of Academic Dishonesty Form will be filed with the Office of the Provost.

(3) Upon the imposition of a minor sanction under this section, the instructor shall notify the Office of the Provost. Notification to the Office of the Provost shall occur within 10 days, using the Notification of Academic Dishonesty Form, and shall include identification of the student, a description of the misconduct and a specification of the sanction imposed.

(4) Within 10 days following receipt of such notice, the Office of the Provost shall provide notice of the imposed discipline to the student, the instructor and to the Academic Dean. Notification to the student shall include a statement of the misconduct, specification of the sanction imposed, a statement indicating the student’s right to an appeal before the Academic Dean and a link to the policy and procedures set forth herein.

(5) A student who receives notice of a disciplinary sanction imposed under this section has the right to a hearing before the Academic Dean to contest the determination that academic misconduct occurred or the disciplinary sanction imposed or both. If the student desires such a hearing, he or she must file a written request with the Office of the Provost and the Academic Dean within 10 days of receipt of notice from the Office of the Provost.

(6) In the event that the student does not file a written request for an appeal within 10 days, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold the recommended sanction or impose a major sanction. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, the instructor and to the Academic Dean.

VI. Recommendation of Major Disciplinary Sanction by the Instructor:

(1) Where an instructor concludes that a student enrolled in one of his or her courses has engaged in academic misconduct in the course, the instructor for that course may recommend one or more of the following disciplinary sanctions:

(f) A non-deletable failing grade in the course;
(g) Suspension from the University
(h) Expulsion from the university.

(2) When possible, prior to the recommendation of a major sanction, the instructor shall notify the student that the instructor believes an act of academic misconduct has occurred, that a major sanction is being recommended, and that a Notification of Academic Dishonesty Form will be filed with the Office of the Provost.

(3) Upon the recommendation of a major sanction under this section, the instructor shall notify the Office of the Provost using the Notification of Academic Dishonesty Form. Notification to the Office of the Provost shall occur with 10 days and shall include identification of the student, a description of the misconduct and a specification of the sanction recommended.

(4) Within 10 days following receipt of such notice, the Office of the Provost shall provide notice of the recommended discipline to the student, the instructor, and the Academic Dean. Notification to the student shall include a statement of the misconduct, specification of the sanction recommended, a statement indicating the student’s right to an appeal before the Academic Dean and a copy of the policy and procedures set forth herein.

(5) A student who receives notice of a disciplinary sanction recommended under this section has the right to a hearing before the Academic Dean to contest the determination that academic misconduct occurred or the disciplinary sanction recommended or both. If the student desires such a hearing, he or she must file a written request with the Office of the Provost and the Academic Dean within 10 days of receipt of notice from the Office of the Provost.

(6) In the event that the student does not file a written request for an appeal within 10 days, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold the recommended sanction or impose a major sanction. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, the instructor and to the Academic Dean.

VII. Appeal to the Academic Dean: When an appeal to the Academic Dean is commenced in accordance with the provisions set forth in Paragraphs V(5) or VI(5), the Academic Dean shall proceed in accordance with this section to consider one or more of the disciplinary sanctions listed in paragraph IV, subsections (1) (a) through (h).

(1) Conference With Student: The Academic Dean shall offer to discuss the matter with the student. The purpose of this discussion is to permit the Academic Dean to review with the student the charges levied against him or her and to afford the student an opportunity to respond.

(2) Conference With Instructor: The Academic Dean shall attempt to discuss the matter with any involved instructor. This discussion may occur either before or after the conference with the student. It should include consultation with the instructor on the facts underlying the alleged academic misconduct and on the appropriateness of the imposed or recommended sanction.

(3) Determination that No Academic Misconduct Occurred: If, as a result of discussions under subsections (1) and (2), the Academic Dean determines that academic misconduct did not in fact occur or that the disciplinary sanction is not appropriate under the circumstances, the Academic Dean shall notify the instructor and the Office of the Provost. The Office
If, as a result of discussions under subsections (1) and (2), the Academic Dean determines that academic misconduct did occur and that one or more of the disciplinary sanctions listed under paragraph III, subsections (a) through (h) is appropriate, the Academic Dean shall prepare and forward to the Office of the Provost, within 10 days, a written Finding of Misconduct which shall include identification of the student, a description of the alleged misconduct, a summary of evidence, findings of fact and a specification of the disciplinary sanction imposed.

VIII. Appeal to the Office of the Provost

The decision reached by the Academic Dean may be appealed to the Provost Office of the Provost if the student believes that he or she did not receive due process.

Grounds for Appeal of Due Process

An appeal to the Office of the Provost shall be limited to a review of supporting documents and the process and outcome of the Academic Dean or designee for one or more of the following grounds:

- Bias by the Instructor, Academic Dean, or designee substantially influenced the outcome of the process to the detriment of the student.
- New, relevant information has come to light that was not available at the time of the hearing by the Academic Dean.
- Unusual procedures were followed or the procedures outlined herein were not followed, to the detriment of the student.

If the student desires such a hearing, he or she must file a written request with the Office of the Provost and the Academic Dean within 10 days of receipt of notice from the Office of the Provost. The request must be based upon the “Grounds for Appeal” listed above.

(2) When an appeal to the Office of the Provost is commenced in accordance with this paragraph, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold, vacate or modify the discipline imposed or direct such appeal to be heard by the Academic Integrity Appeals Board. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, instructor, and to the Academic Dean.

(3) In the event that the student does not file a written request for an appeal within 10 days, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold or modify the discipline imposed. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, instructor and to the Academic Dean.

IX. Role of the Academic Integrity Appeals Board:

(1) The Academic Integrity Appeals Board is an ad hoc committee appointed by the Office of the Provost and consists of a minimum of three faculty members chosen by the Office of the Provost with no two members selected from the same College; the board shall not include a faculty member from within the department initiating charges of academic dishonesty. The Board is chaired by the Office of the Provost who shall vote only in the case of a tie. [Or One member shall serve as Chair at the direction of the Office of the Provost. The Chair shall vote only in the case of a tie.]

When an appeal is directed to the Academic Integrity Appeals Board by the Office of the Provost in accordance with the provisions set forth in Paragraphs VIII, the Academic Integrity Appeals Board shall schedule the hearing, within a reasonable time period, at a time that is mutually agreed upon by the student, Office of the Provost and members of the Academic Integrity Appeals Board.

(2) Reasonably in advance of the hearing, the Academic Integrity Appeals Board shall obtain from the Academic Dean, in writing, a full explanation of the facts upon which the determination of misconduct was based and shall provide to the student a copy of the policy and procedures set forth herein.

(3) The hearing before the Academic Integrity Appeals Board shall be conducted in accordance with the following requirements:

(a) The Academic Integrity Appeals Board shall consider relevant evidence including documentary evidence and testimony of the instructor, student, Chair and/or Dean where appropriate.

(b) The student shall have the right to be heard and to present relevant evidence, including documentary evidence and the testimony of witnesses, in his or her own behalf.

(c) The Academic Integrity Appeals Board shall maintain a record of the hearing including any and all pleadings and documentary evidence presented.

(d) The Academic Integrity Appeals Board shall prepare written findings of fact and a written statement of its decision based upon the record of the hearing.

(e) The Academic Integrity Appeals Board may find academic misconduct and impose a sanction of suspension or expulsion only if the proof of such misconduct is clear and convincing. In other cases, a finding of misconduct must be based
on a preponderance of the credible evidence.

(f) The Academic Integrity Appeals Board may impose a disciplinary sanction that differs from the recommendation of the Academic Dean.

(g) The instructor or Academic Dean may be witnesses at the hearing conducted by the Academic Integrity Appeals Board, but shall not have responsibility for conducting the hearing.

(4) Determination that No Academic Misconduct Occurred: If, after the hearing, the Academic Integrity Appeals Board determines that there is insufficient evidence that academic misconduct occurred or that no disciplinary sanction is appropriate under the circumstances, the Academic Integrity Appeals Board shall notify the instructor, the Academic Dean and the Office of the Provost. The Office of the Provost shall promptly thereafter notify the student and take appropriate action with respect to the student records.

(5) Process Following Determination by the Academic Integrity Appeals Board that Academic Misconduct Occurred:

(a) If, after the hearing, the Academic Integrity Appeals Board determines that academic misconduct did occur and that one or more of the disciplinary sanctions listed under paragraph III, subsections (1) (a) through (h) is appropriate, the Academic Integrity Appeals Board shall prepare and forward to the Office of the Provost, within 10 days, a written Finding of Misconduct which shall include identification of the student, a description of the misconduct and a specification of the disciplinary sanction to be imposed.

(b) Within 10 days following receipt of the written Finding of Misconduct from the Academic Integrity Appeals Board, the Office of the Provost shall provide written notice of the imposed discipline to the instructor, the Academic Dean and the student.

Academic Standing

Warning Notice
Probation
Academic Dismissal and Reinstatement
Graduate Fresh Start

GPA Minimum

No more than 6 course credits of grades below a B may be counted toward the master's degree; no more than 9 credits of the same grades may be counted toward the doctorate. No graduate degree will be awarded to any student whose overall cumulative grade point average falls below 3.0.

Academic Standing

Students on academic warning or academic probation after the Spring semester and who are registered for a Summer I course at the University of Massachusetts Lowell will have the grade for that course included in evaluating the academic standing. The academic standing will be adjusted to include the grade(s) received during Summer I session.

The consequences of the academic standing of warning or suspension will not apply for students completing degree requirements for that semester.

Warning Notice

Any graduate student whose semester grade point average (GPA) falls below 3.0 will automatically receive a warning notice which will also be sent to the graduate coordinator, and filed with the student's record in the Registrar's Office. The student will be strongly advised to meet with the graduate coordinator or his/her designee within 30 days of receipt of the warning notice and develop an academic plan to bring his or her GPA to a level above 3.0.

Probation

Any graduate student whose semester GPA falls below 3.0 for a second time, will automatically receive a letter of probation from the Vice Provost for Graduate Education. Copies of the letter will be sent to the graduate coordinator, chairperson, college dean, and also placed on file with the student's record in the Registrar's Office. Within 30 days, the department graduate committee, chaired by the graduate coordinator or his/her designee, will meet with the student and decide whether to recommend loss of degree candidacy. Such a decision or other course of action will be fully documented in writing with copies sent to the chairperson, and college dean. A recommendation of loss of degree candidacy and dismissal are subject to the approval of the college dean.

Academic Dismissal and Reinstatement

Any student whose semester GPA falls below 3.0 for a third time, and whose cumulative GPA is below 3.0, will automatically be dismissed from his or her graduate program and the University. Reinstatement will be considered if the student provides
a detailed justification and academic plan concerning how he or she will correct this academic deficiency. The plan must be attached to a Graduate Academic Petition and approved by the graduate coordinator, chairperson, the college dean, and the Vice Provost for Graduate Education or his/her designee. If any of the above individuals disapproves of the reinstatement, the dismissal will remain in effect and no subsequent appeals will be considered.

Independent of the warning/probation/dismissal system, the dean of the college where the student's degree program resides may at any time examine the performance of any student not meeting the academic standard expected of graduate students within that college and recommend to the appropriate graduate committee a course of action including dismissal.

For the procedure for formal adjudication of any academic issues (non-misconduct) which may arise, please see University Appeals Process Regarding Academic (non-misconduct) Issues of Graduate Students.

**Graduate Fresh Start**

Master and Doctoral degree candidates and non-degree students who have been absent from the University for four years or longer may be readmitted under the program Graduate Fresh Start. If admitted into a degree granting program, under the terms of Graduate Fresh Start, a returning graduate student will be treated as if s/he were a new student. A maximum of two courses (six credits) at the 500 level or higher completed during earlier periods of enrollment with grades of "B" or better may, with the approval of the department granting department, be transferred into the degree program. These courses must be transferred via an academic petition and will be accepted toward graduation but not included in the cumulative grade point average (GPA). Thesis and dissertation research credits are ineligible for transfer. Courses completed during earlier periods of enrollment with grades below "B" are not eligible for transfer. A student may be readmitted under the Graduate Fresh Start program only once at the graduate level.

Students who wish to be considered for the Graduate Fresh Start Program must follow the normal procedures for admission to the University and file a at Academic Petitions for transfer credits must be approved by the appropriate graduate coordinator and/or department chair of the degree granting department, and must be filed with the University Registrar. In addition, the student must submit a personal statement which addresses personal and professional growth during the period of time in which the student was absent from the University which supports the student's potential for academic success. If admitted, credits and GPA start at zero. Transfer courses may count towards the degree, but are not included in the GPA.

All courses taken and grades achieved during earlier periods of enrollment will appear on the transcript along with a notation that they are not included in the cumulative grade point average. Once this change is made to the academic record, the change can NOT be reversed.

**Acceptance of Foreign or American Master’s Degree toward Doctoral Requirements**

Students accepted into a doctoral program who hold a master's degree in the same or a closely related discipline from a U.S. or foreign academic institution will have their transcripts and supporting documentation reviewed by the department graduate committee.

The committee may choose one of the following actions:

1. Approve all coursework and thesis for the master's degree up to the total number of credits granted by the University of Massachusetts Lowell department for its master's degree, and thereby require the student to complete only "beyond the master's" course/thesis credits for the doctorate.
2. Accept the U.S. or foreign master's degree, but because of deficiencies in the student's master's program, require a limited number of graduate courses to be added to the total credits required for doctoral degree completion "beyond the master's".
3. Require that a student with a U.S. or foreign master's degree obtain a University of Massachusetts Lowell master's degree before proceeding to the doctorate.

All coursework for U.S. or foreign master's degrees considered for approval by the department must be at a grade level of B or better. Official, documented verification of the degree awarded must also be provided.

**Commencement**

- **Commencement**
- **Conferring of Degrees**
- **Academic Honors**
- **Replacement Diploma**

**Commencement**

Graduation exercises are held once a year at the end of the spring semester. Students who have completed degree requirements during the previous summer term or fall semester are permitted to attend commencement exercises, and their names are listed in the commencement booklet. Attending commencement exercises is not compulsory. An individual who
wishes to receive a diploma by mail must notify his/her college dean and file a corrected address through student self service if he or she anticipates moving from a previously reported permanent address.

**Conferring of Degrees**

Diplomas are awarded three times a year:
1. In June for students completing degree requirements during the spring semester.
2. In October for students completing degree requirements during the summer term.
3. In February for students completing degree requirements during the fall semester.

Individuals who wish to submit verification of degree completion to employers or to graduate schools during the period between the end of their final grading period and the awarding of diplomas may obtain a letter of completion from the Registrar's Office.

**Academic Honors**

Due to the many fields and diversity of study at UMass Lowell, academic honors for graduate students are discipline-based and vary within respective colleges. Honors for graduate students are not listed on transcripts.

**Replacement Diploma**

Replacement diplomas may be ordered through University Alumni Relations for an additional fee.

**Registration and Enrollment Policies**

- Continuous Registration
- Dropping Classes and Refund Policy
- Changes in Registration
- Change of Program

**Continuous Registration**

In order to maintain continuity of enrollment, a matriculated student must register each fall and spring until the program of study is complete and the degree has been earned. A graduate student who plans to receive his/her graduate degree in the summer term (awarded in October) must register during the previous summer session in order to maintain continuous matriculation.

If for any reason a student is not registered for a course (because of a leave of absence or because the thesis or dissertation has been successfully defended, but the final manuscript has not been submitted to the library), the student must register for CM.601.201 (Continued Matriculation) in order to maintain continuous registration. Since students are not allowed to register if they have outstanding financial obligations to the university, it will be necessary for them to clear their financial record in order to register for Continued Matriculation.

Continued Matriculation does not entitle a student to any use of university facilities, services or resources, but only maintains an active record and provides for appropriate mailings. Students who are engaged in academic work necessary to complete their thesis or dissertation, participate in a required full time internship or curricular practical training, or otherwise engage in or make use of University facilities or other resources must register for a minimum of 1 credit. (Note: Specific internship/CPT requirements will vary by department and students may be required to register for 3, 6, or 9 credits depending upon their program of study.)

The rules regarding the Statute of Limitations for the completion of master's and doctoral degrees still apply to students registered for Continued Matriculation.

All international students on F-1 or J-1 visas must register as full-time students (9 credits) each semester until their degree requirements are completed. Any variance from this policy must be approved by the International Student and Scholars Office.

A student who fails to maintain continuous matriculation loses the status of a degree candidate and must reapply to the () for readmission and for renewal of candidacy.

**Dropping Classes and Refund Policy**

Graduate students may drop courses during the first ten days of classes and receive a refund. No refund will be given after these time periods. To formally withdraw from a course during this period, or thereafter, the student must drop the course through self service (). If the student fails to officially drop a course, he or she will remain enrolled and be required to pay for tuition and fees. In addition, if the student does not drop a course and does not attend classes, he or she will receive an "F" on the official transcript.

**Changes in Registration**

Courses may be added or dropped through self-service in (). In addition, students may change from audit to credit or from
credit to audit during this period. Courses dropped during the first 10 academic days will not appear on the student's permanent record. No new courses may be added and no course may be changed from audit to credit after the tenth academic day. Thereafter, a student wishing to drop courses must do so by the date indicated in the Graduate Academic Calendar. No refund of tuition and fees is allowed after the tenth day of the semester. The grade for these courses will appear as W on the student's record.

Change of Program

A graduate student wishing to change departments or transfer to a doctoral program upon completion of his or her master's degree must follow the steps listed below:

1. No transfers will be considered until the student has been in the original department in which he or she was accepted for at least one semester.
2. All sections of a new application sheet must be completed.
3. If so desired, the student may request that all test scores, letters of recommendation, etc., in his or her original file be used as part of his or her new application package.
4. The student must specify on the application form when his or her master's degree will be completed and when he or she will actually begin doctoral studies (for students applying to a doctoral program).
5. A check made payable to University of Massachusetts Lowell to cover the application fee must be included, or payment must be made by credit card when applying online.

Course Credit

Maximum Semester Credit Limit

Graduate Credit for Undergraduate Courses
Undergraduate Credit for Graduate Courses

Maximum Semester Credit Limit

The usual course load for full-time graduate students is 9 credits/semester. Depending upon the program requirements and abilities of the student, individuals may carry more than 9 credits each semester. However, the absolute maximum number of total credits (combined undergraduate and graduate) for which a graduate student will be allowed to register is 18 credits/semester. The maximum number of thesis or dissertation credits for which a student may enroll in any semester is nine credits.

Graduate Credit for Undergraduate Courses

UMass Lowell courses at the 400 level are designed for seniors but under certain circumstances may be taken by graduate students for graduate credit. A maximum of 6 credits of 400 level courses may be used for credit toward the graduate degree with the permission of the degree granting department. Three hundred level courses and below are never counted toward a graduate degree. If a graduate student takes certain undergraduate courses to make up for background deficiencies or to satisfy language requirements, the course credit hours are not used as part of the graduate degree program but will appear on the graduate transcript.

Undergraduate Credit for Graduate Courses

A qualified junior or senior may take a course at the 500 level for undergraduate credit in accordance with the policy and procedures of the department or college in which the course is offered. The grade received in any such course is used in calculating the undergraduate's cumulative grade point average. Counting of graduate credits for both the bachelor's and master's degrees is subject to departmental requirements.

At no time may grades computed in an undergraduate GPA be used toward a graduate GPA.

Course Designations

Course Numbering System
Continuing Graduate Research
Course Prefixes
Audit

Maximum Semester Credit Limit

The usual course load for full-time graduate students is 9 credits/semester. Depending upon the program requirements and abilities of the student, individuals may carry more than 9 credits each semester. However, the absolute maximum number of total credits (combined undergraduate and graduate) for which a graduate student will be allowed to register is 18 credits/semester. The maximum number of thesis or dissertation credits for which a student may enroll in any given semester is nine credits.

Course
Numbering System and Designation:

400-499 - Undergraduate courses usually designed for juniors or seniors; no more than six credits may be taken for graduate credit with the permission of the graduate coordinator.

500-599 - Courses for graduate credit, but which may be taken by advanced undergraduates with the advisor's permission.

600-699 - Graduate courses which are open only to graduate students.

700-799 - Seminars, special topic courses, projects, or thesis research for advanced candidates in master's and doctoral degree programs.

Each course offering is designated by a two-digit prefix and a three-digit course number (e.g., 81.529).

Continuing Graduate Research

Once a student has completed the required number of credits for master's or doctoral thesis/dissertation research with grades of PR or S (see summary of degree credit requirements), he or she will not be allowed to sign up for additional thesis/dissertation research credits. Instead, if required for teaching/research assistantships or immigration/visa purposes, the student may enroll in 3, 6, or 9 credits of Continuing Graduate Research designated _ _763, 766, or 769 _ _ _ where the first two blanks represent the departmental designation, 3, 6, and 9 indicate the respective number of credits, and the last three blanks are the standard numbers which code to a particular faculty member in the department.

The two digit college prefix identifies a college department and/or special area. The three-digit course number identifies the course level.

Course Prefixes

Each college department and/or special subject area has been assigned an identifying two digit number within the numerical ranges specified as follows:

Education - 01-09
Engineering - 10-18 & 20-28
Health - 19 & 29-39
Humanities/Social Sciences, Fine Arts - 40-59, 70-79
Management - 60-69
Science and Math - 80-99
Biomedical Engineering - IB
Marine Science - IM

Audit

A graduate student may, upon approval of the advisor and the instructor, register for a course on an audit basis, but must pay the full amount of tuition and fees. An audit student is not required to take tests or the final examination. A change in registration from audit to credit or credit to audit must be done during the add/drop period. Under no circumstances can a course taken for audit be given credit at a later date.

General Regulations for Graduate Students

Each University student is subject to two sets of academic regulations - those of the University as a whole, which are cited in this section, and the academic rules of the college and program in which he or she is enrolled. The academic rules of colleges and programs are listed in sections devoted to college programs.

In registering for courses, each student assumes full responsibility for knowledge of and compliance with the definitions, regulations, and procedures for the University, as set forth in this publication. Moreover, in accepting admission to the University, each student assumes responsibility for knowledge of and compliance with the definitions, regulations, and procedures of the University pertaining to his or her student status as set forth in the appropriate UML publications.

Students who have questions about the interpretation or application of University academic policy should consult the dean of their college or the Vice Provost for Graduate Education.

Equal and Fair Treatment

Under federal and state laws, all students are protected from discrimination based on race, color, religion, national origin, disability, gender, (including sexual harassment), age, sexual orientation, marital or veteran status. If you feel that you have been discriminated against based upon any one of these areas, you must contact Equal Opportunity and Outreach (EOO). These protections also include retaliation for filing complaints of discrimination. Concerns regarding course offerings, instructor and student attitudes should also be directed to EOO staff at 978-934-3565.

Students are responsible for adhering to the polices of the University regarding equal and fair treatment.

Graduate Grading Policies
Grading System

The grading system uses grades:

A+(4.0), A(4.0), A-(3.7)
B+(3.3), B(3.0), B-(2.7)
C+(2.3), C(2.0)
F(0.0).

The following special grades are also used:

INC (Incomplete),
S (Satisfactory, B or better),
U (Unsatisfactory) for projects, theses/dissertations, and seminars only
AU (Audit)
W (Withdrawal from a course or from the University)
X (Withdrawal because of illness or personal emergency)
Y (Administrative dismissal),
Q (Never attended but did not withdraw. This grade requires a letter from the instructor to the University Registrar stating the student never attended the class.)
PR (In Progress for theses or dissertations)
NC (No Credit for theses or dissertations where no progress has been made).

A student registering for research will do so each semester up to the total number recommended. No graduate degree will be awarded to a student whose cumulative average for course work in his or her program is below 3.0. Some programs may require a higher grade point average for graduation. The cumulative grade point average is computed from all graduate level courses taken for a grade at the University of Massachusetts Lowell.

Grade Exclusion

A request may be submitted to omit a specific course (grade and credits) from the GPA for matriculated students. Such a request must be presented on an Academic Petition, provide detailed justification for the specific action, and certify that the action has been approved by a majority of the departmental graduate committee. Only one grade exclusion in total, including a grade for a repeated course, will be permitted for each degree sought by the student as recommended by the departmental graduate committee. However, the official transcript will list grades for all undergraduate and graduate courses taken at the University with the notation that the grade and credits are excluded from the GPA. Grade substitutions are not permitted.

Grades for Projects, Theses/Dissertations and Seminars

- **Projects** (Enrollment Restricted to Matriculated Graduate Students):
  - Only one of three grade designations will be allowed for projects:
  - S for projects completed at a satisfactory level
  - U for unsatisfactory completion of a project (no credit toward degree requirements)
  - INC Incomplete

- **Theses/Dissertations** (Enrollment Restricted to Matriculated Graduate Students):
  - PR will be given for thesis/dissertation research if the student has made satisfactory progress during the semester.
  - NC will be given if the student has made no progress during the semester on thesis/dissertation research.
  - U Unsatisfactory (no credit toward degree requirements)

After successful defense of the thesis/dissertation, a grade of "S" (Satisfactory) will be given for all semesters of the thesis/dissertation research. Only the Registrar's Office can issue this grade.

- **Seminars:**
  - S - Satisfactory
  - U - Unsatisfactory (no credit toward degree requirements)
  - INC - Incomplete

Under no circumstances will letter grades (A, B+, etc.) be allowed for projects, theses/dissertations, or seminars.

Incompletes

If, because of unusual circumstances, a student is unable to meet all the requirements of the course by the end of a semester, the grade of Incomplete (INC) may be given. Responsibility for making arrangements with an instructor to
complete all outstanding coursework rests entirely with the student, who must complete all outstanding coursework by the date listed on the ( ). Under no circumstances will a student be allowed to graduate with incomplete(s) on his or her transcript.

Prior to completion of the missing work, the incomplete will not be computed into the grade point average (GPA). If the student completes the missing work within the specified period, the instructor must evaluate the work and turn in a grade change form to the Registrar’s Office before the deadline for instructors to submit final grades for incomplete courses as specified on the ( ) . However, if the student does not complete the missing work by the specified date and no grade change form is submitted by the instructor, the student’s grade will automatically change to a grade of "F" and be computed into the GPA.

Course Listing on the Graduate Transcript

All graduate courses for which a student registers (including repeated courses) are listed on the transcript and are used to calculate the student’s grade point average whether or not they are taken to fulfill degree requirements. In addition, undergraduate courses which a student takes to fulfill prerequisite requirements before or during matriculation in a graduate program, or courses taken for personal enrichment, will also be listed on the transcript.

Audited Courses

A graduate student may, upon approval of the advisor and the instructor, register for a course on an audit basis, but must pay the full amount of tuition and fees. An audit student is not required to take tests or the final examination. A change in registration from audit to credit or credit to audit must be done during the add/drop period. Under no circumstances can a course taken for audit be given credit at a later date.

Graduate Clearance

Applying for graduation is a two step process for graduate students. First, the student must file a with the Registrar’s Office. The Registrar’s Office will mail the Graduate Clearance Form to

Graduate Grade Appeal Process for Students

The instructor of the class is the primary authority with respect to a student’s proficiency and final grade in that course. A student who believes that his or her final grade reflects an erroneous, capricious, arbitrary, or prejudiced academic evaluation may appeal the grade. The academic judgment used in determining the merits of the grade to be awarded shall not be reviewable. This process does not apply to cases of academic dishonesty, which are adjudicated through the "academic dishonesty process."

1. The student may file an appeal of his or her complaint, in writing, to the instructor within 30 days after a final grade is posted to the student’s record. The instructor must respond within 14 days of receiving the appeal.
2. If the student remains dissatisfied by the decision of the instructor under step (1), he or she may, within 14 days after formal receipt of the instructor’s final decision, appeal, in writing, to the chairperson of the program (or the Dean of the College if the instructor is the chairperson) in which the course or other exercise or activity is offered. The chairperson must respond within 14 days of receiving the appeal. The decision may be: (a) that the appeal be dismissed; (b) if there is demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the chairperson will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or (c) that another appropriate remedy be administered.
3. If no satisfactory resolution is reached in step (2) then the student or the instructor may appeal, in writing, to the Dean of the College within 14 days after formal receipt of the chairperson’s final decision.
4. The Dean, after discussion with the appropriate parties, may resolve the grievance by agreement or render a decision within 21 days of receipt of the written appeal. The decision may be: (a) that the appeal be dismissed; (b) if the student provides demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the Dean will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to
retake an examination or other exercise; or (c) that another appropriate remedy be administered.

5. The decision of the Dean is final and not subject to additional appeal by either student or instructor. The appeals process ends at this step.

6. The Department chair or his/her designee is responsible for keeping a record of the appeal on file in accordance with University Records Retention Policy.

Right of Access to Student Records

Access
University Student Records
Release of Student Records
Release Exclusions
Additional Information

Access

The Family Educational Rights and Privacy Act of 1974 (FERPA) grants any student currently in attendance, or any former student, the right of access to inspect or review his or her educational files, records, or data. Students who wish to inspect their records must file a Right of Access form with the office or department in which the desired record is kept. Right of Access forms are available in the Office of Student Services or through student self service. Wherever practicable, within ten days of receipt of the Right of Access form, the office or department will notify the student as to the date, time, and location when the desired record will be available for inspection. If a student believes that circumstances effectively prevent inspecting and reviewing the records at the designated date, time and location, he or she may request alternative inspection arrangements or copies of the records instead, subject to a fee for copies. The Dean of Students or the Dean’s designee will consider the request.

University Student Records

The University maintains the following general records on students:

Admission File - -
Permanent Academic Records - -
Financial Aid Records - -
Health Records - -
Account and Payment Records - -
Campus Conduct Records - -

The file of each student must contain a record of all non-University affiliated individuals or organizations requesting access to information in the file, plus statements that specify the legitimate educational purposes for which access was requested.

Except as otherwise permitted under FERPA, information or records concerning individual students may not be released to any individual or agency without the student’s written permission. Any request for such information received without such written permission will not be honored and will be returned with a request for a written release from the student.

Release of Student Records

FERPA allows release of a student’s education records without the student’s written permission under certain circumstances, including the following:

1. To personnel of the University, i.e., faculty, administrators, or staff for legitimate educational purposes only.
2. To officials of other institutions in which the student seeks admission or intends to enroll, provided that the student is notified of the release.
3. To federal or state officials in connection with the audit and evaluation of programs funded by federal or state governments, with the enforcement of legal requirements that relate to such programs, or in connection with the student’s application for or receipt of financial aid.
4. To accrediting organizations in order to carry out their accrediting functions.
5. To parents who claim the student as a dependent on their IRS statement.
6. In connection with an emergency, to appropriate persons if revealing such information is necessary to protect the health or safety of the student or other persons.
7. In response pursuant to a validly issued subpoena, subject to advance notification of the student unless such notice is prohibited by court order.
8. As otherwise permitted under or consistent with FERPA.

The following data are considered informational in nature and may be released without the permission of the student, at the discretion of the University: student’s name, major, acknowledgement of a student’s participation in officially recognized activities and sports, weight and height of members of athletic teams, date(s) of attendance; degrees, certificates, awards received; the most recent previous educational agency or institution attended by the student and appointment as a Resident
Assistant or Community Development Assistant. For graduate students who are teaching credit courses, work department, office address, and employments category are also defined as directory information.

Release Exclusions

Any student who wishes to have some or all of his or her directory information excluded from release by the University without prior permission must complete the appropriate selections available thru . ()

Additional Information

Any student who believes that his or her records are inaccurate or misleading may request a hearing with the Dean of Students to discuss the contents of such records and whether or not they need to be changed. Additional information on procedures or policies relating to University compliance with the Family Rights and Privacy Act can be obtained from the Office of Student Services or the Registrar's Office.

Statute of Limitations (Time Limit for Degree Completion)

A graduate degree, at either the master's or doctoral level, implies a significant mastery of a discipline within a specified time period. A well designed curriculum is not a mere collection of classes that add up to a set number of credits. It is, rather, a coherent selection of courses with an overall educational achievement that is greater than the sum of its parts. However, this coherence is lost if the program is completed over a long time span.

Master's degree requirements must be completed within a five-year period from the semester of admission. For those master's programs requiring 45 or more credits, the time limit is six years.

The doctoral degree must be completed within an eight-year period beginning with the semester of admission as fully matriculated or matriculated with conditions.

A student may obtain an extension of one year by filing an () signed by his or her coordinator, department chair, and college dean, and which is then submitted to the Registrar's Office.

Time Extension Appeal Procedure

In exceptional cases, an additional extension may be granted by the Graduate Policy and Affairs Committee (GPAC). In this case, the student must submit an (), a letter of explanation accompanied by a detailed schedule for degree completion, and a letter from the student's coordinator or thesis advisor in support of the request.

Transcripts

In order to obtain a transcript, a student may print an unofficial transcript or order an official copy though self-service in (). If ISIS is not available, a transcript may be ordered by filling out a () and submitting it to the University of Massachusetts Lowell Registrar's Office at 883 Broadway Street, Lowell, MA 01854.

Course Listing on the Graduate Transcript

All graduate courses for which a student registers (including repeated courses) are listed on the transcript and are used to calculate the student's grade point average whether or not they are taken to fulfill degree requirements. In addition, undergraduate courses which a student takes to fulfill prerequisite requirements before or during matriculation in a graduate program, or courses taken for personal enrichment, will also be listed on the transcript.

Transfer Credit

The following are minimal guidelines for transfer of credit. Individual departments are free to impose more stringent requirements. Only courses completed elsewhere within five years prior to the date of admission to a graduate degree program at the University of Massachusetts Lowell may be considered by the faculty of the department for transfer in accordance with the following regulations.

1. A maximum total of 12 graduate credits earned with a grade of B or better taken at another accredited institution may be transferred to a master's degree program (see individual programs for further restrictions, if any). A maximum of 24 credits with a grade of B or better may be transferred to a doctoral program. The limits of 12 credits toward a master's and 24 toward a doctoral degree do not apply to any credits earned at UMass Lowell by students while in a non-degree or undergraduate BA/MA or BS/MS status, provided the courses were taken within the department offering the master's or doctoral degree.

2. Grades of C or better for courses taken at UMass Lowell when the student held non-degree status may also be transferred (by Academic Petition) into a degree program. However, the 6 and 9 credits with grades below a B (graduation limit) for master's and doctoral degrees, respectively, (see Retention Policy) and calculation of the cumulative grade point average based on all graduate courses taken at the University (see Academic Grades) remain in effect.

3. An official transcript and description of the course(s) must be submitted with the written request.

4. The courses presented must be from an accredited U.S. or Canadian institution authorized to grant graduate degrees.
5. The courses presented for a master’s degree must not have been used in earning another master’s degree.
6. The courses presented must be appropriate to the degree program for which the applicant is applying.
7. The courses presented must be graduate level.
8. Transfer credit may not be granted for research seminars, clinical courses, practica, internships, or special projects.
9. Transfer credit from another U.S. or Canadian institution must not exceed equivalent course credit (typically 3) at UMass Lowell, and will be based on UMass Lowell’s standard of 37.5 semester contact hours being equal to 3 credits. One and two course credit transfers will also be considered providing they are proportional to the 37.5 semester contact hour standard.
10. Students who wish to transfer credit must file (within the first semester of matriculation) the Academic Petition form available from the Registrar’s Office.
11. With the approval of the department, a maximum of 6 credits of 400 level courses taken at the University of Massachusetts Lowell with grades of C or better, not used for the baccalaureate degree, may be considered for transfer and counted toward the graduate degree.

University Appeals Process Regarding Academic (Non-Grade Appeal and Non-Misconduct) Issues

The underlying purpose of the University's appeals procedure is to guarantee due process and to protect the rights of both students and faculty in graduate programs.

The following procedure provides a mechanism for formal adjudication of any academic issues (non-misconduct and not related to grade appeal) which may arise. (For information regarding the process for grade appeals, see the Graduate Grade Appeal Process.)

Responsibility for initiation of each of the steps belongs to the appellant.

Step 1. If an informal discussion between the student and the instructor or individual with whom the student has a conflict does not resolve the issue, the resolution of an academic appeal of a student should begin within the department. The first step in the resolution of a problem or disagreement should be a discussion between the instructor, the student, and his/her faculty advisor or the coordinator of the program.

Step 2. If the matter cannot be resolved after such a discussion, a formal appeal, in writing and containing the pertinent facts, should be presented by the student to the chairperson/head of the department within two months of the occurrence that precipitated the appeal. Any appeal made outside this time period shall not be considered by any University body. The chairperson of the department will appoint committee composed of faculty members in the department. Within seven working days, this committee shall convene and discuss the appeal with the student and the instructor, coordinator, or individual with whom the student has a conflict. The student may be accompanied by his or her advisor or a faculty representative during the discussion of the appeal. The committee, by a majority vote after deliberations with only members of the committee present, shall render a decision within five working days and notify the appropriate parties in writing with the rationale for the decision included in the notification.

Step 3. If the decision of the departmental committee is not satisfactory to all parties, the appeal may be forwarded to the College Dean within two weeks of the decision of the departmental committee. The Dean will appoint a college committee composed of area coordinators of all graduate programs within the college or a suitable committee of faculty. The committee will be chaired by the college dean, or his/her designee. Within seven working days, the committee shall convene and discuss the appeal with the student. At this level the student may request to be present at the committee meetings, that discussions or proceedings be tape recorded, and that a transcript be prepared from the tape. The request for a recording must be made at the time the appeal is made to the college committee. The college committee shall render a decision by majority vote after deliberations with only members of the college committee present within five working days and notify the appropriate parties in writing with the rationale for the decision included in the notification.

Step 4. If the decision of the college committee is not satisfactory to all parties, the appeal may be forwarded to the Graduate Policy and Affairs Committee (GPAC) within ten working days after the decision of the college committee. The committee shall convene within 10 working days after the GPAC chairperson has received a written request for a hearing from the appellant, and discuss the appeal with the student and faculty advisor or representative. A request for recording and preparing a transcript of the discussions with the student present may be made at the time of appeal. The committee shall render a written decision within five working days and notify the appropriate parties. The decision of the Graduate Policy and Affairs Committee shall be final, and the information accumulated during the appeal procedure shall be forwarded to the Provost to be kept on file. If any decision involving the awarding of a degree is made and the official deadline for graduation exercises has passed during the appeal, the degree date will reflect the initiation of the appeal.

The above time periods define working days as days when classes are in session for the fall and spring semesters. Efforts will be made to honor the same time periods during intercession and June - August although some flexibility must be accepted by the appellant because of potential difficulties in assembling committee members during these periods.

The GPAC chairperson may modify the Step 4 hearing time framework at his/her discretion to coincide with regularly scheduled GPAC meetings. In either of the above cases, the appellant must be notified in writing by the hearing officer (along with an explanation) of any modification of the hearing time schedule. The chairperson may recommend that final voting/discussion of Step 4 cases be done in Executive Session with only committee members present.
University Disciplinary Procedures for Graduate Students

Academic Dishonesty -

Administrative Dismissal from the University

Administrative dismissal may be invoked when a student fails to comply, after due notice, with an administrative regulation of the University. Examples of some conditions which justify administrative dismissal are listed in the Undergraduate Catalog at and apply to all students, undergraduate and graduate.

Non-Academic Misconduct

Improper conduct or behavior of graduate students is subject to the University of Massachusetts Lowell Student Conduct Code and Judicial Process (www.uml.edu/student-services/DOS_Documents/Student%20Conduct%20Code%20&%20Discipline%20Process.pdf). Copies of this document may be obtained from the Dean of Students Office.

Withdrawal Policies

Withdrawal from a Course

Withdrawal from the University

Withdrawal from a Course

A student finding it necessary to withdraw from a course must do so within the time specified in the graduate catalog. The student's permanent record will indicate a grade of W for the course(s) from which he or she has withdrawn unless the withdrawal has taken place within the first 10 class days of the semester during which time no record will be kept. (See in this Catalog for information on dropping a course.)

Withdrawal from the University

A student who wishes to withdraw from the University must submit his/her request in writing to the Registrar’s Office. This procedure ensures that the student's academic and financial obligations are cleared before leaving the University. If a student officially withdraws from the University by the withdrawal date indicated in the graduate academic calendar, the permanent record will indicate a grade of W. If the student fails to follow the official withdrawal procedure and does not withdraw in good standing, the student will not be permitted readmission to a graduate program at the University except under extenuating circumstances.

All previous application materials will remain on file for a two year period. At any time during this period, a student who has officially withdrawn may request readmission by completing and submitting only the cover page of the graduate application and paying the application fee. After two years, a student must file a new, complete application and submit the appropriate fee to the ( ) in order to be readmitted.

Academic Integrity

Statement of Principles

The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Academic dishonesty is prohibited in all programs of the university.

Academic Misconduct Subject to Disciplinary Action

(1) Academic misconduct is an act in which a student:

(a) Seeks to claim credit for the work or efforts of another without authorization or citation;
(b) Uses unauthorized materials or fabricated data in any academic exercise;
(c) Forges or falsifies academic documents or records;
(d) Intentionally impedes or damages the academic work of others;
(e) Engages in conduct aimed at making false representation of a student’s academic performance; or
(f) Assists other students in any of these acts.

(2) Examples of academic misconduct include, but are not limited to: cheating on an examination; collaborating with others in work to be presented, contrary to the stated rules of the course; submitting a paper or assignment as one’s own when a part or all of the paper or assignment is the work of another; submitting a paper or assignment that contains ideas or research of others without appropriately identifying the sources of those ideas; getting unauthorized access to examinations or course materials; submitting, without the permission of the current instructor, work previously presented in another course;...
tampering with the laboratory experiment or computer program of another student; knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

Possible Disciplinary Sanctions
(1) The following are the disciplinary sanctions that may be imposed by an instructor for academic misconduct:

(a) An oral or written notice of misconduct;
(b) An assignment to repeat the work, to be graded on its merits;
(c) A lower or failing grade on the particular assignment or test;
(d) A lower grade in the course;
(e) A failing grade in the course;

In addition, an instructor or the Academic Dean may recommend the following sanctions:

(f) A non-deletable failing grade in the course;
(g) Suspension from the University;
(h) Expulsion from the university.
Sanctions f–h are imposed by the Office of the Provost.

(2) One or more of the disciplinary sanctions listed above may be imposed for an incident of academic misconduct.

Definitions
As used herein:
(1) "Office of the Provost" means the Provost, Vice Provost or a designee.
(2) "Days" means academic calendar days and excludes Saturdays, Sundays, legal holidays and days upon which the university is closed.
(3) "Academic Dean" means the Academic Dean or designee for the college in which the subject course is taught.
(4) "Instructor" refers to the Instructor of Record.
(5) "Minor Disciplinary Sanction" means a disciplinary sanction, identified in paragraph III (1) (a)-(e) and imposed, for academic misconduct, upon a student by an instructor.
(6) "Major Disciplinary Sanction" means a disciplinary sanction, identified in paragraph III (1) (f)-(h) and imposed, for academic misconduct, upon a student by the Office of the Provost or the Academic Integrity Appeals Board upon the recommendation of the instructor or the Academic Dean or imposed at the discretion of the Office of the Provost.
(7) Notice to the student, whenever required herein, shall be e-mailed to the student’s official student.uml.edu e-mail address or mailed to the student by regular first class United States mail at his or her current address as maintained by the university.

Imposition of Disciplinary Sanctions by the Instructor
(1) Where an instructor concludes that a student enrolled in one of his or her courses has engaged in academic misconduct, the instructor may impose one or more of the following disciplinary sanctions, as listed under paragraph III, subsections (a) through (e):
(a) An oral or written notice of misconduct;
(b) An assignment to repeat the work, to be graded on its merits;
(c) A lower or failing grade on the particular assignment or test;
(d) A lower grade in the course;
(e) A failing grade in the course.

(2) When possible, prior to imposing a minor sanction, the instructor shall notify the student that the instructor believes an act of academic misconduct has occurred, that a sanction may be imposed, and that a Notification of Academic Dishonesty Form will be filed with the Office of the Provost.

(3) Upon the imposition of a minor sanction under this section, the instructor shall notify the Office of the Provost. Notification to the Office of the Provost shall occur within 10 days, using the Notification of Academic Dishonesty Form (pdf), and shall include identification of the student, a description of the misconduct and a specification of the sanction imposed.

(4) Within 10 days following receipt of such notice, the Office of the Provost shall provide notice of the imposed discipline to the student, the instructor and to the Academic Dean. Notification to the student shall include a statement of the misconduct, a description of the misconduct and a specification of the sanction imposed.

(5) A student who receives notice of a disciplinary sanction imposed under this section has the right to a hearing before the Academic Dean to contest the determination that academic misconduct occurred or the disciplinary sanction imposed or both. If the student desires such a hearing, he or she must file a written request with the Office of the Provost and the Academic Dean within 10 days of receipt of notice from the Office of the Provost.

(6) In the event that the student does not file a written request for an appeal within 10 days, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold the recommended sanction or impose a major sanction. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, the instructor and to the Academic Dean.

Recommendation of Major Disciplinary Sanction by the Instructor
(1) Where an instructor concludes that a student enrolled in one of his or her courses has engaged in academic misconduct in the course, the instructor for that course may recommend one or more of the following disciplinary sanctions:
A non-deletable failing grade in the course;
(g) Suspension from the University
(h) Expulsion from the university.

(2) When possible, prior to the recommendation of a major sanction, the instructor shall notify the student that the instructor believes an act of academic misconduct has occurred, that a major sanction is being recommended, and that a Notification of Academic Dishonesty Form will be filed with the Office of the Provost.

(3) Upon the recommendation of a major sanction under this section, the instructor shall notify the Office of the Provost using the Notification of Academic Dishonesty Form (pdf). Notification to the Office of the Provost shall occur with 10 days and shall include identification of the student, a description of the misconduct and a specification of the sanction recommended.

(4) Within 10 days following receipt of such notice, the Office of the Provost shall provide notice of the recommended discipline to the student, the instructor, and the Academic Dean. Notification to the student shall include a statement of the misconduct, specification of the sanction recommended, a statement indicating the student’s right to an appeal before the Academic Dean and a copy of the policy and procedures set forth herein.

(5) A student who receives notice of a disciplinary sanction recommended under this section has the right to a hearing before the Academic Dean to contest the determination that academic misconduct occurred or the disciplinary sanction recommended or both. If the student desires such a hearing, he or she must file a written request with the Office of the Provost and the Academic Dean within 10 days of receipt of notice from the Office of the Provost.

(6) In the event that the student does not file a written request for an appeal within 10 days, the Office of the Provost shall review the matter and may, at his or her discretion, impose or modify the sanction recommended. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, the instructor, and to the Academic Dean.

**Appeal to the Academic Dean**

When an appeal to the Academic Dean is commenced in accordance with the provisions set forth in Paragraphs V(5) or V(6), the Academic Dean shall proceed in accordance with this section to consider one or more of the disciplinary sanctions listed in paragraph IV, subsections (1) (a) through (h).

1. **Conference With Student:** The Academic Dean shall offer to discuss the matter with the student. The purpose of this discussion is to permit the Academic Dean to review with the student the charges levied against him or her and to afford the student an opportunity to respond.

2. **Conference With Instructor:** The Academic Dean shall attempt to discuss the matter with any involved instructor. This discussion may occur either before or after the conference with the student. It should include consultation with the instructor on the facts underlying the alleged academic misconduct and on the appropriateness of the imposed or recommended sanction.

3. **Determination that No Academic Misconduct Occurred:** If, as a result of discussions under subsections (1) and (2), the Academic Dean determines that academic misconduct did not in fact occur or that the disciplinary sanction is not appropriate under the circumstances, the Academic Dean shall notify the instructor and the Office of the Provost. The Office of the Provost shall promptly thereafter notify the student and take appropriate action with respect to the student records.

4. **Within 10 days following receipt of such notice, the Office of the Provost shall provide notice of the recommended discipline to the student, the instructor, and the Academic Dean.**

**Grounds for Appeal of Due Process**

An appeal to the Office of the Provost shall be limited to a review of supporting documents and the process and outcome of the Academic Dean or designee for one or more of the following grounds:

- Bias by the Instructor, Academic Dean, or designee substantially influenced the outcome of the process to the detriment of the student.
- Unusual procedures were followed or the procedures outlined herein were not followed, to the detriment of the student.
- New, relevant information has come to light that was not available at the time of the hearing by the Academic Dean.

Within 10 days of receipt of notice from the Office of the Provost. The request must be based upon the "Grounds for Appeal" listed above.

(2) When an appeal to the Office of the Provost is commenced in accordance with this paragraph, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold, vacate or modify the discipline imposed or direct such appeal to be heard by the Academic Integrity Appeals Board. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, instructor, and to the Academic Dean.

(3) In the event that the student does not file a written request for an appeal within 10 days, the Office of the Provost shall review the matter with respect to the subject student and may, at his or her discretion, uphold or modify the discipline imposed. In any event, the Office of the Provost shall, within a reasonable time, provide notice of the outcome to the student, instructor and to the Academic Dean.

**Role of the Academic Integrity Appeals Board**

(1) The Academic Integrity Appeals Board is an ad hoc committee appointed by the Office of the Provost and consists of a minimum of three faculty members chosen by the Office of the Provost with no two members selected from the same College; the board shall not include a faculty member from within the department initiating charges of academic dishonesty.
The Board is chaired by the Office of the Provost who shall vote only in the case of a tie. [Or One member shall serve as Chair at the direction of the Office of the Provost. The Chair shall vote only in the case of a tie.]

When an appeal is directed to the Academic Integrity Appeals Board by the Office of the Provost in accordance with the provisions set forth in Paragraphs VIII, the Academic Integrity Appeals Board shall schedule the hearing, within a reasonable time period, at a time that is mutually agreed upon by the student, Office of the Provost and members of the Academic Integrity Appeals Board.

(2) Reasonably in advance of the hearing, the Academic Integrity Appeals Board shall obtain from the Academic Dean, in writing, a full explanation of the facts upon which the determination of misconduct was based and shall provide to the student a copy of the policy and procedures set forth herein.

(3) The hearing before the Academic Integrity Appeals Board shall be conducted in accordance with the following requirements:

(a) The Academic Integrity Appeals Board shall consider relevant evidence including documentary evidence and testimony of the instructor, student, Chair and/or Dean where appropriate.

(b) The student shall have the right to be heard and to present relevant evidence, including documentary evidence and the testimony of witnesses, in his or her own behalf.

(c) The Academic Integrity Appeals Board shall maintain a record of the hearing including any and all pleadings and documentary evidence presented.

(d) The Academic Integrity Appeals Board shall prepare written findings of fact and a written statement of its decision based upon the record of the hearing.

(e) The Academic Integrity Appeals Board may find academic misconduct and impose a sanction of suspension or expulsion only if the proof of such misconduct is clear and convincing. In other cases, a finding of misconduct must be based on a preponderance of the credible evidence.

(f) The Academic Integrity Appeals Board may impose a disciplinary sanction that differs from the recommendation of the Academic Dean.

(g) The instructor or Academic Dean may be witnesses at the hearing conducted by the Academic Integrity Appeals Board, but shall not have responsibility for conducting the hearing.

(4) Determination that No Academic Misconduct Occurred: If, after the hearing, the Academic Integrity Appeals Board determines that there is insufficient evidence that academic misconduct occurred or that no disciplinary sanction is appropriate under the circumstances, the Academic Integrity Appeals Board shall notify the instructor, the Academic Dean and the Office of the Provost. The Office of the Provost shall promptly thereafter notify the student and take appropriate action with respect to the student records.

(5) Process Following Determination by the Academic Integrity Appeals Board that Academic Misconduct Occurred:

(a) If, after the hearing, the Academic Integrity Appeals Board determines that academic misconduct did occur and that one or more of the disciplinary sanctions listed under paragraph III, subsections (a) through (h) is appropriate, the Academic Integrity Appeals Board shall prepare and forward to the Office of the Provost, within 10 days, a written Finding of Misconduct which shall include identification of the student, a description of the misconduct and a specification of the disciplinary sanction to be imposed.

(b) Within 10 days following receipt of the written Finding of Misconduct from the Academic Integrity Appeals Board, the Office of the Provost shall provide written notice of the imposed discipline to the instructor, the Academic Dean and the student.

**Academic Standing**

Academic standing and eligibility for a degree are determined by the quality of the student's course work.

**Determination of Academic Standing**

**Appeal of Suspension**

**Academic Probation**

**Extended Academic Probation**

**Academic Dismissal**

**Fresh Start Program**

**Determination of Academic Standing**

To ascertain the student's academic standing, the University uses a point system, each qualitative grade having an equivalent numerical value.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Numerical Value</th>
</tr>
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<tbody>
<tr>
<td>A 4.0</td>
<td></td>
</tr>
<tr>
<td>A- 3.7</td>
<td></td>
</tr>
<tr>
<td>B+ 3.3</td>
<td></td>
</tr>
<tr>
<td>B 3.0</td>
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<tr>
<td>B- 2.7</td>
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<td>C+ 2.3</td>
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<td>C 2.0</td>
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<td>C- 1.7</td>
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<td>D+ 1.3</td>
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<tr>
<td>D 1.0</td>
<td></td>
</tr>
<tr>
<td>F 0.0</td>
<td></td>
</tr>
</tbody>
</table>

Quality points are computed by multiplying the number of course credits by the numerical value of the qualitative grade assigned. For instance, a three-credit course with a grade of B+ would carry 9.900 quality points (3 x 3.300). Grade-point
averages and cumulative grade-point averages are obtained by dividing the number of quality points earned by the number of credit hours attempted.

Specified grade-point averages are computed solely on the basis of those courses attempted at the University of Massachusetts Lowell which have been qualitatively evaluated with the following letter grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.

**Academic Standing**

Students who are on Academic Warning or Academic Suspension after the Fall semester and are registered for a Winter Intersession course at the University of Massachusetts Lowell will have the grade for that course included in evaluation of their Academic Standing. The Academic Standing will be adjusted to include the grade received during Winter Intersession.

Students who are on Academic Warning or Academic Suspension after the Spring semester and are registered for Summer 1 classes offered May through June at the University of Massachusetts Lowell will have the grade(s) for those courses included in evaluation of their Academic Standing. The Academic Standing will be adjusted to include the grade received during the Summer 1 session.

The consequences of the academic standing of warning or suspension will not apply for students satisfying all degree requirements that semester.

All students are required to maintain at least a 2.000 average throughout their academic career. Academic records are evaluated at the end of each semester. No student, however, will be academically suspended without having at least one semester of academic warning.

The academic status of a student is one of the following categories:

- **Satisfactory Academic Standing**
  
  A student whose semester grade-point average is at least 2.000 and whose cumulative grade-point average is at least 2.000 is in Satisfactory Academic Standing.

- **Academic Warning**
  
  Beginning with the Fall 2011 semester, a first-semester freshmen whose grade point average (GPA) falls below 2.0 will not be placed on Academic Warning but will be notified that he or she is considered to be academically at risk and strongly advised to seek help through appropriate University Resources. After the first semester at the University the student will be subject to the following Academic Standings:

  A student whose semester GPA is below 2.000 is placed on Academic Warning. A student on warning is still considered to be in acceptable academic standing, and may register for the following semester and participate in campus and athletic activities. Certain campus programs and activities may choose to prohibit the participation of students on Academic Warning. At the end of the student’s warning semester the student's cumulative grade point average must equal or exceed 2.000 to continue in Satisfactory Academic Standing.

- **Academic Suspension**:

  A student who was on Academic Warning at the end of the previous semester and whose cumulative GPA falls below 2.000 is placed on Academic Suspension. A student who is on Suspension may not enroll in the succeeding semester, and therefore may not represent the University in athletic programs nor participate in campus activities.

- **Academic Dismissal**:

  A student who was on Academic Suspension at the end of the previous semester and whose cumulative GPA at the end of the probationary semester is below 2.000 is automatically dismissed from the University.

**Appeal of Suspension**

A suspended student may submit a written appeal to the College Dean requesting permission to continue enrollment for an additional semester an academic probation. If permission to continue is granted, the program of study that must be undertaken and the minimum semester grade-point average that must be attained during the additional semester of academic warning will be made explicit.

Entering freshmen and transfer students who are permitted to initiate their University studies with summer school day courses should note that credits attempted in University summer sessions are included in grade-point averages. Subsequent to preliminary evaluations for retention purposes, the records of all students (including probationary students) are evaluated at the end of each semester.

Grades earned during summer session or winter intersession may be used to change a student's academic status prior to the beginning of the following semester. A student who has been suspended is prohibited from enrolling in any credit-bearing program of the University, including credit courses offered by continuing studies, in summer sessions, or in winter intersession. If a suspended student chooses to enroll in another accredited degree-granting institution, earns credit at that
institution, and subsequently seeks to return to the University of Massachusetts Lowell, such credit may or may not be accepted in transfer at the University of Massachusetts Lowell, depending upon the specific circumstances.

Students who enroll in University summer school and/or continuing studies courses after they have been notified by the Office of the Registrar that they are suspended from the University for unsatisfactory academic standing are in defiance of University regulations. Grades received by such students will not be credited to University baccalaureate programs, even if the students are subsequently reinstated as probationary students or achieve satisfactory academic standing after reinstatement.

**Academic Probation**

A student who has been suspended from the University is entitled to apply to the suspension hearing office for immediate readmission as a probationary student in accordance with procedures enumerated under the admission policy heading Probationary Readmission.

Students who have been suspended and decide to remain un-enrolled for four semesters or more must apply for readmission on probation through the Office of the Registrar whenever they decide that they are prepared to undertake such a probationary period. The student will receive a letter that specifies the conditions of their probation, and the semester average that they must achieve during their probationary semester in order to achieve satisfactory academic standing.

Probationary students are prohibited from holding student offices or running for elective office and from representing the University in athletic or other activities.

A student who achieves the required minimum semester grade-point average during his or her probation is automatically reinstated as a student in satisfactory academic standing.

**Extended Academic Probation**

Students whose academic performance during a probation semester has significantly improved, but whose cumulative grade average is still slightly below 2.0, may apply to the suspension hearing office for an extended period of probation. Students who are granted such extensions will be notified in writing prior to the beginning of classes for the following semester that they have been granted an additional semester to achieve satisfactory academic standing.

Students who fail to achieve satisfactory academic standing and are not granted extensions of their probation by the Provost and students who are granted such extensions and fail to achieve satisfactory academic standing are dismissed from the University.

Students readmitted on probation should not withdraw from any course unless they withdraw from the University for emergency or medical reasons. A probationary student who withdraws from any course may thus be unable to satisfy the conditions of his or her probation and may be dismissed from the University at the end of the current semester of enrollment.

Probationary students who receive course evaluations of INC (incomplete) and who fail to make up their work prior to the beginning of the next semester are advised that they may not qualify for extension of their probation and may not register for or attend University courses (including continuing studies courses) until such time as a final determination of their status has been made. Probationary students who have received permission from the suspension hearing office to extend their make-up period should understand that such extension does not waive the requirement for a final determination of academic standing that is based upon grades for all probationary courses.

**Academic Dismissal**

Students on academic probation who fail to achieve satisfactory academic standing during their probationary semester and are not granted extensions of their probation by the suspension hearing office and students who are granted such extensions and fail to achieve satisfactory academic standing are dismissed from the University and are subsequently barred from attending both day and evening courses.

While on dismissal, students are not allowed to make progress toward a University degree. Students who have enrolled in University summer school and/or continuing education courses after they have been notified by the Office of the Registrar that they are dismissed for unsatisfactory academic standing are in defiance of University regulations. Grades received by such students will not be credited to University baccalaureate programs even if the students are subsequently reinstated as probationary students or achieve satisfactory academic standing after reinstatement.

The University recognizes that dismissal from the institution for reasons of academic failure need not be permanent. Under the following circumstances readmission is possible.

Freshman and sophomore students [attempted less than 60 credits] who have been academically dismissed may qualify for readmission to the university as follows: 1) under the provisions of the Massachusetts Transfer Compact after completion of an associate's degree at a Massachusetts Community College; and 2) after a lapse of two years, under the provisions of the Fresh Start program.

Students of junior or senior standing at the time of dismissal may reapply to the University after an absence of at least two years, under the provisions of the Fresh Start program.

The procedure for readmission of academically dismissed students begins with filing an application with the Office of the
Registrar. The final decision to readmit an academically dismissed student rests with the dean of the college in which the student was enrolled at the time of dismissal from the University.

**Fresh Start Program**

Students who have been absent from the University for two years or longer may be readmitted under the terms of the Fresh Start program. Under this program, a returning student will be treated as if he or she were a transfer student. Courses completed during earlier periods of enrollment with grades of C or above will be accepted toward graduation but will not be included in the cumulative average. Courses completed during earlier periods of enrollment with grades below C will not be counted toward graduation or included in the cumulative average.

A maximum of 75 earlier the University of Massachusetts Lowell transfer credits will be accepted toward graduation, and after readmission under Fresh Start the student must earn a minimum of 45 credits in residence at the University of Massachusetts Lowell in a matriculated program of study.

Courses taken in the academic major during earlier periods of enrollment must be approved by the major department before those courses can be counted toward the requirements of the major. (This provision is especially important in majors that undergo regular curriculum revision).

Students may opt to use the Fresh Start Program only once in their career at the University of Massachusetts Lowell.

**Administrative Dismissal**

A student may be administratively dismissed from the University through cancellation of registration for due cause, through suspension or expulsion for academic dishonesty (cf. Academic Dishonesty, Cheating and Plagiarism), and through disciplinary procedures for violations of good conduct. For information concerning procedures that govern violations of campus conduct contact the Dean of Students.

Administrative dismissal may be invoked when a student fails to comply, after due notice, with an administrative regulation of the University. Official notification of an administrative dismissal is noted on the permanent record card by the symbol X, which is entered for each course carried by the dismissed student.

Reinstatement of a student who has been administratively dismissed may be made only by application for readmission with the Office of the Registrar and only when the condition that has necessitated administrative dismissal can be ameliorated to the satisfaction of University officials. Examples of some conditions that may justify administrative dismissal are:

- forgery or fraudulent use of University records, documents, or forms; unauthorized entry into University records (including computerized records);
- non-payment of tuition, board, room charges, student fees, library fines, overdue University loans, and other official University fiscal obligations;
- failure to comply with a duly authorized administrative order relating to the safety of persons or the protection of University property;
- failure to submit required health forms to University Health Services.

**Attendance Policies**

Although the University does not require class attendance as a matter of institutional policy, course instructors may establish required attendance in their courses and specify penalties for student violations of such attendance requirements. Colleges also have this option and sometimes have adopted attendance policies for introductory courses and special learning situations.

**Instructor Attendance Policies**

At the beginning of each course, the instructor will inform students of any specific attendance regulations which apply.

**Attendance Requirements of the Veterans Administration**

In compliance with the requirements of the Veterans Administration (VA), all recipients of Veterans benefits, including eligible children of veterans, must certify their attendance at the University, under penalty of perjury through directions received with the students benefits.

**Absence of Students for Religious Beliefs**

Chapter 375, Acts of 1975 of the Commonwealth of Massachusetts, requires recognition of student religious beliefs as noted.

"Any student...who is unable, because of his religious beliefs, to attend classes or to participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or study or work requirements, and shall be provided with an opportunity to make up such examination, study, or work requirement which he may have missed because of such absence on a particular day; provided, however, that such make up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the
said student such opportunity. No adverse or prejudicial effects shall result to any student because of his availing himself of the provisions of this section.”

Students should inform the course instructor in writing of the day(s) when they will be absent. This should be done as early as possible in the semester and always prior to the day(s) the student will be absent for religious reasons.

**Bachelor’s Degrees**

Undergraduate programs that are offered by the University of Massachusetts Lowell lead to one of the following degrees: Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Liberal Arts, Bachelor of Science, Bachelor of Music, Bachelor of Science in Business Administration, Bachelor of Science in Industrial Management, Bachelor of Science in Engineering Technology, and Bachelor of Science in Industrial Technology. The complete list of bachelor’s degrees can be found at

**Commencement**

Graduation exercises are held once a year at the end of the spring semester. Undergraduates who have completed degree requirements during the previous summer term or fall semester are permitted to attend commencement exercises, and their names are listed in the commencement booklet. Attending commencement exercises is not compulsory, but all seniors are required to pay the specified graduation fee, which covers the cost of the diploma, academic attire, and incidental graduation expenses. An individual who wishes to receive a diploma by mail must notify their college dean and file their corrected address through student self service if he or she anticipates moving from a previously reported permanent address.

**Conferring of Degrees**

Diplomas are awarded three times a year: 1) in June for students completing degree requirements during the spring semester, 2) in October for students completing degree requirements during the summer term, and 3) in February for students completing degree requirements during the fall semester. Individuals who wish to submit verification of degree completion to employers or to graduate schools during the period between the end of their final grading period and the awarding of diplomas may obtain a letter of completion from their college dean. Duplicate diplomas are not issued for any reason.

**Online & Continuing Education**

Subject to University residency requirements and college regulations, the following categories of day students may be permitted to register for continuing studies courses at the University of Massachusetts Lowell and to have such courses credited to baccalaureate day programs:

1. individuals who have been admitted to day colleges for baccalaureate study;
2. individuals in satisfactory academic standing who are currently matriculating in day colleges of the University,*
3. previously matriculated students in day colleges who withdrew from the University while in satisfactory academic standing, and who have been readmitted to programs in which they were previously enrolled;
4. full-time undergraduate day school student tuition and fees do not cover courses offered by Online & Continuing Education. Full-time undergraduate students who register for OCE courses will be charged OCE tuition and fees as specified on the OCE website (a minimum $900 per course);
5. In addition to the OCE tuition and fees, all students registered for OCE courses are charged a non-refundable $30 OCE registration fee.

Individuals are warned that departments reserve the right to deny baccalaureate credit for the University of Massachusetts Lowell continuing studies courses which have been taken in violation of University residency requirements, curriculum requirements of their baccalaureate day programs, and/or special college regulations. Students who have been suspended or dismissed from day programs of the University are prohibited from enrolling in any program of the University. Students who combine University day courses with continuing education courses during the regular academic year are subject to all restrictions concerning semester course loads (cf. Registration and Course Enrollment Policies).

*Students on Academic Warning are permitted to register for continuing studies, winter intersession, and summer school courses; students who have been suspended are prohibited from enrolling in any course offered by the University.

For further information visit [Online & Continuing Education](http://www.uml.edu/).

**Course Descriptions**

Each course offering is designated by a two-digit or 2-4 alpha designated prefix and a three-digit course number. The digit or alpha designated prefix identifies a college department and/or special area. The three-digit course number identifies the course level.

Each college department and/or special subject area has been assigned an identifying digit or alpha designation. View the () on the Office of the Registrar's website.
Course Numbers

A course number consists of the three digits that follow the course/department prefix (for example, 92.131). Courses numbered 001-099 are pre-freshman and special undergraduate courses and do not carry baccalaureate degree credit. Those numbered 100-299 are lower-division undergraduate courses and those numbered 300-499 are upper-division undergraduate courses. The 400 level courses are generally limited to juniors and seniors majoring in a field but are open, with permission, to other advanced undergraduates and to graduate students.

Directed studies courses and practicum experience courses are generally limited by departmental policy to students majoring in the area in which such courses are offered.

Courses numbered 500-599 are graduate courses open to upper division undergraduates with the consent of instructors and chairpersons. Courses numbered 600 and above are graduate courses open only to graduate students.

Course Restrictions

Special course pre-requisites, co-requisites, and enrollment restrictions are indicated at the end of the course description. A course listed as a pre-requisite must have been completed and passed prior to taking the course for which the pre-requisite is specified.

A course listed as a co-requisite must be taken during the same semester as the course for which the co-requisite is specified. Subject to college or department policy to the contrary, exceptions may be granted by the designated department chair.

Courses that carry such notations as "open for majors only" and "sophomore status required" are restricted to the specified students. Courses that carry the notation "permission of instructor" require instructor's approval. Approved students will be given permission numbers to enroll through self-service.

Courses at the 100-300 levels that do not carry pre-requisite, co-requisite, and enrollment restrictions are open for election by all students unless general restrictions have been listed under the department or course area heading, or unless policy of the college or department in which the student is matriculated prohibits such registration.

Course Equivalency Examinations

The University recognizes two types of course equivalency for which credit is awarded. These are 1) College Level Examination Program (CLEP) examinations, and 2) departmental examinations. Restrictions, where applicable, are noted below.

Subject to specified policies of academic departments, unusually qualified degree candidates are given the opportunity to demonstrate their special competencies and receive University credit for such competencies through established course equivalency procedures without having to fulfill classroom or faculty course requirements.

Students may demonstrate their special competencies through subject examinations of the CLEP and through departmental equivalency examinations. Credits granted through course equivalency procedures are so noted on the student's permanent record. However, no grades for equivalency examinations are recorded and examination credit so granted is not included in grade-point averages.

The purpose of course equivalency procedures is to provide credit for existing competencies — that is, those competencies which students possess prior to their applications for equivalency credit and prior to their registration for a University course.

Students may not receive credit for a specific proficiency examination if they have registered at the University in the same course for which the examination covers, if they have previously received a University grade either for that course or a course in sequence above the course for which they wish to take an examination, or if they have previously attempted an equivalent course at another institution. Credit for general examinations of CLEP may not be granted to students after their admission to the University as matriculating students. University departments reserve the right to refuse to grant by examination for those courses which are presented by a student for his or her major(s) and to deny recognition of previously granted credit for students who, prior to their declaration of major field, have received equivalency credit in their subsequently declared major.

Subject to the additional limitations of the college and program in which the student is enrolled, the maximum number of credits that a matriculating student may earn through course equivalency procedures is 30 semester credits. Students who have transferred to the University may not apply for equivalency credit in excess of a number determined by subtracting all course equivalency and transfer credits accepted by the University from the maximum of 90 total credits permitted for both transfer and equivalency credit. Nor may transfer students present equivalency credits in fulfillment of the major field residency requirement of 15 credits in University courses.

Course Requirements

Within the policies listed below, faculty members are permitted to establish their examination and course requirements.

Course Examination Policies
Final examinations are required for all undergraduate courses of the University unless exemptions have been granted by the department chairperson and the dean of the college. Exemption requests must be made by the end of the first month of the semester. Final examinations may not be given at a place or time other than those which have been specified by the Student Records Office.

There shall be no final examinations other than those administered during the final examination period. No hour examination shall be administered during the last five academic days of the semester unless exemption has been allowed by the college dean. Final take-home examinations may be submitted to instructors during the final examination period only. Take-home examinations may be submitted only on the day and time at which the Student Records Office has scheduled the final examination for the course in question.

**Instructor Course Requirements**

By the end of the first full week of classes, instructors must distribute a written statement of requirements, pre-requisites and co-requisites for each course and section to all students and to the department chairperson. This statement must include a specification of the number and types of course evaluations to be employed throughout the semester (including approximate date and nature of the first evaluation), special requirements for completing assignments and taking examinations, and a definition of course attendance policy.

A minimum of three evaluations of student progress (written or oral examinations, written reports, recitations, laboratory techniques and reports, jury or performance evaluations) should be made in each course, with at least one evaluation being required during each half semester. Upon the request of a student, an instructor is required to provide a statement of the student’s course progress.

Appeals of grades or grading policies arising from alleged violations of established or published policies must follow procedures cited under the heading Grading Policies. The terms “grade” and “grading policy” refer 1) to all grades awarded, 2) to the computation of grades examinations including final examinations, tests, quizzes, papers, essays, laboratory reports, practicum experiences, and any other kind of academic activity for which a grade of any kind is awarded, and 3) the final course grade which is submitted to the Student Records Office.

**Declaration or Change of Major**

- Declaration of Major
- Declaration of Second Major
- Dual Degree Programs
- Change of Major
- Change of Major within College of Enrollment
- Change of Major with Intercollegiate Transfer

**Declaration of Major**

Students who have declared a major at the time of their admission to the University are officially enrolled in the college in which their designated major is offered and are referred by the college dean to the chairperson of the designated major for assignment of a faculty advisor.

Although the University does not require students to declare their major fields until they have achieved 60 semester credits, an early decision by students will greatly facilitate the selection of appropriate prerequisite courses for major fields.

Students enrolled in the College of Fine Arts, Humanities and Social Sciences are strongly encouraged to declare their major fields by the end of the freshman year. Students contemplating majors in chemistry or environmental sciences should initiate prerequisite course work immediately upon entrance to the College of Fine Arts, Humanities and Social Sciences and should make a declaration of major at this time or prior to the end of their freshman year.

Students in the College of Health Sciences should not delay declaration of major beyond their freshman year.

Additional course work beyond the minimum degree requirement and extension of the normal four-year period of study may be expected when individuals declare a major later than recommended above.

Students who make no declaration of major prior to the end of their sophomore year are listed as undeclared students for their first two years. Individuals who wish to designate a major which is offered by the college in which they are enrolled as undeclared students must secure the signature of the appropriate department chairperson (or the chairperson of the committee which exercises jurisdiction over an interdepartmental major) on a declaration of major form and must file the completed form with the Office of the Registrar. Individuals who wish to designate a major which is not offered by the college in which they are enrolled as undeclared students must file an approved form for intercollegiate transfer and declaration of major with the Office of the Registrar. This form requires the signatures of the dean of the college to which the student transfers and the appropriate department chairperson.

Undeclared students are advised that openings may be limited or unavailable in some programs and that different admission criteria may be applied to program or college applicants when staffing or facilities render it necessary to establish limits upon enrollments.

Students seeking professional advice regarding selections of majors, second majors, and minors should consult a college
Declaration of Second Major

Students who wish to declare a second major should consult with their college dean to determine if a second major can be completed within specified degree requirements or will require additional study beyond the minimum degree requirements and extension of the regular period of baccalaureate study. Students who wish to declare a second major in the college in which they are enrolled as degree candidates ordinarily may do so by filing an approved declaration of second major with the Office of the Registrar. Students who wish to declare such a major in another college of the University may do so only when regulations of that college and the college in which they are enrolled as degree candidates both permit. Such declarations require the approval of both college deans. Students who are permitted to carry two majors are assigned an advisor in each major department.

Individuals who are matriculating for the Bachelor of Arts degree may not count more than 72 credits in their two academic majors combined toward the minimum degree requirement of 120 credits. Students who present more than 72 credits in the two majors combined may not present less than 48 semester credits outside the two major fields in satisfying the minimum degree requirement of 120 credits. Accordingly, students who present more than 72 credits in the two majors combined must present a number of credits beyond the minimum degree requirement of 120 credits that equals the number of credits by which they exceed the combined major credit maximum.

Except as noted under the heading Dual Degree Program, students who elect academic majors in more than one college are candidates for one degree only, and they are considered to be degree candidates in the college of their initial major unless they indicate to the contrary by filing for intercollegiate transfer at the time they make a declaration of second major. Accordingly, a student who pursues academic majors in two colleges is subject to all degree requirements as specified by the college of his or her initial academic major and is subject only to major course requirements (including collateral and prerequisite courses for the major) as specified by the department of his or her second academic major. Individuals who pursue double majors within different degree programs will receive the degree that is designated for their initial academic major unless they also filed for intercollegiate transfer when they filed their declaration of second academic major.

Professional programs in business administration, engineering, health education, clinical laboratory sciences, nursing, exercise physiology, industrial management, industrial technology and Bachelor of Music programs may be designated as degree majors only. Although students in these programs may be permitted to pursue a second major in an academic field offered by another college, they are subject to all degree requirements are specified by the college for their professional major.

Dual Degree Programs

Students who wish to pursue a dual degree program must establish simultaneous matriculation in both programs and designate their candidacy for two degrees. The curricula for dual degree programs are approved by participating college faculties and must be completed as prescribed. It is therefore imperative that a student who wishes to pursue an approved dual degree program obtain a copy of the specified curriculum that enumerates the specific semester-by-semester course requirements. Students interested in this program must receive authorization from all relevant chairs and deans. The minimum credits to receive two degrees is 150.

Change of Major

Once students have begun a program of major studies, they may change their major field only by filing an approved change of major form with the Office of the Registrar. Students who make substantial changes in their plans of study after the beginning of their sophomore year, regardless of major, may find it difficult to complete degree requirements within the normal four-year period of study.

Change of Major within College of Enrollment

Students who wish to change their declaration of major within the college in which they are enrolled as degree candidates are required to file an approved change of major form with the Office of the Registrar. This form requires the approval of the chairperson of the major department to which the student desires to transfer and should be filed by November 1 for spring semester transfer and by April 1 for fall semester transfer to insure proper advising during the periods of fall and spring registration. Filing after the recommended dates may be permitted by the chairperson of the department with jurisdiction over the new major.

Change of Major with Intercollegiate Transfer

Students desiring to transfer from a baccalaureate continuing studies program to a baccalaureate day program, to transfer from a baccalaureate day program to a baccalaureate continuing studies program, must complete appropriate paperwork in the Admission Office.

An individual seeking an intercollegiate transfer must file a change of major form with the chairperson and dean having jurisdiction over the program to which transfer is desired. Following endorsement by both the chairperson and the dean, this form must be filed with the Office of the Registrar. Individuals petitioning for intercollegiate transfer are required to satisfy and maintain the admission requirements of their desired college and program.

Individuals seeking transfer from one college to another are advised that openings may be limited or unavailable in some
programs, that different admission criteria may be applied to program or college applicants when staffing or facilities render it necessary to establish limits on enrollments, and that the completion of degree requirements within the customary four-year period may not be possible since the correction of deficiencies cannot always be accommodated within the schedule of course offerings.

The official date of intercollegiate transfer is the first day of the semester following approval of a student’s application. Since course registration may be conducted prior to the official date of transfer, students should make immediate arrangements for advising with the dean of the college to which they will transfer. Subsequent to approval of a student’s application for transfer and prior to the official date of transfer, the college dean will review the academic record of the student to determine the applicability of previously completed courses to the requirements of the college and, if appropriate, to the new major.

**Academic Policies**

Each University student is subject to two sets of academic regulations—those of the University as a whole, which are cited in this section, and the academic rules of the college and program in which he or she is enrolled. The academic rules of colleges and programs are listed in sections devoted to college programs.

In registering for courses, each student assumes full responsibility for knowledge of and compliance with the definitions, regulations, and procedures for the University, as set forth in this publication. Moreover, in accepting admission to the University, each student assumes responsibility for knowledge of and compliance with the definitions, regulations, and procedures of the University pertaining to his or her student status as set forth in the appropriate University of Massachusetts Lowell publications.

Students who have questions about the interpretation or application of University academic policy should consult the dean of their college or the Office of the Provost.

**Departmental Examinations**

Students who are interested in taking departmental examinations may obtain applications for such examinations from the Office of the Registrar at any time during the fall and spring semesters, but they must initiate the application process in sufficient time to permit the completion of examinations and the processing of examination results prior to the final deadline for filing course grades during the semester in which they are examined. Applications for departmental course-equivalency examinations are filed with the chairperson of the student’s major department, the chairperson of the department in which the examination is to be administered, and the faculty examiner.

Students may not repeat departmental equivalency examinations and, except for documented medical reasons or personal emergencies, they may not reapply for such examinations in the event that they fail to keep an examination appointment.

Examinations must be wholly or substantially written unless the nature of the course makes more appropriate an oral or performance examination. Departments may authorize instructors to administer end-of-semester examinations that are scheduled during the final examination period when such examinations are adequate measures of total course requirements. After the student has completed an authorized examination, the faculty examiner must file his or her recommendation for course credit with the Office of the Registrar by the final deadline for filing semester grades.

**General Degree Requirements**

To qualify for University degrees, baccalaureate candidates are required to obtain a minimum of 2.000 (C) average in their total course of study; to present a minimum of 120 semester credits; to fulfill the minimum residency requirement; to satisfy the regulations and academic standards of the colleges that exercise jurisdiction over the degree for which they are matriculating; to complete all curriculum requirements specified by the college in which they are enrolled and department(s) in which they are majoring; and to complete the University general education requirements.

- General Education Requirements
- Residency Requirements
- Residency Requirement for Active Duty Service Members, their Spouse and College-age Children
- Dual Degree Program

**General Education Requirements**

For students who enrolled in September, 2000 and subsequently...

**Residency Requirements**

Please note that all credits transferred may not be used to satisfy requirements in your program of study.

All candidates for baccalaureate degrees, must meet the residency requirement by completing a minimum of 60 semester credits at the University of Massachusetts Lowell except as indicated below. The following residency options apply, as specified, to candidates for baccalaureate degrees:

1. Complete three years at the University of Massachusetts Lowell, earning not less than 90 credits, and an approved junior or senior year program at another accredited baccalaureate institution, earning not more than 30 semester
2. Complete an associate’s degree at a Massachusetts community college under the provisions of the Mass Transfer agreement and complete the last two years at the University, earning not less than 60 semester credits with grades of C- (1.700 on a 4.000 scale) or better, and the remaining years in the University, earning not less than 60 semester credits. An exception to this residency requirement, not to exceed 15 credits, may be granted by the Department Chair of the major field with the approval of the College Dean at the time of initial matriculation at the University of Massachusetts Lowell.

3. Complete up to the first two years in an accredited two-year institution, earning not more than 60 semester credits with grades of C- (1.700 on a 4.000 scale) or better, and the remaining years in the University, earning not less than 60 semester credits. An exception to this residency requirement, not to exceed 15 credits, may be granted by the Department Chair of the major field with the approval of the College Dean at the time of initial matriculation at the University of Massachusetts Lowell.

4. Complete up to the first three years of a baccalaureate program in an accredited four-year institution, earning not more than 90 semester credits, with grades of C- (1.700 on a 4.000 scale) or better, and the remaining year(s) in full-time study in University classes, earning not less than 30 credits.

An individual who has been admitted to day courses of the University as a non-matriculating (special) student is not considered a student in residence. If subsequently admitted as a matriculating student, such an individual must petition the dean for recognition of non-matriculated courses. Up to 15 credits of non-matriculated day courses may be recognized for application to the minimum residency requirements of 30 semester credits of University courses.

**Off Campus Study**

Once students have matriculated at the University of Massachusetts Lowell, they are expected to complete their coursework at the University of Massachusetts Lowell. Such coursework may also include credits earned through approved study-abroad programs. In some cases, in order to clear a deficiency or to remain on track for graduation, a student may seek permission for off-campus study to take a course at another accredited institution. Even when authorization for off-campus study is granted, all students are required to fulfill their University of Massachusetts Lowell residency requirements.

Matriculating students in satisfactory academic standing may be permitted to apply off-campus courses to their degree programs when they comply with established procedures. Students wishing to apply credits earned off-campus must obtain prior to off-campus enrollment, through an (pdf) form available in the Office of the Registrar.

Off-campus courses may be taken in regionally accredited institutions only, and ordinarily should be taken at baccalaureate colleges or universities. Permission to pursue off-campus courses in regionally accredited associate degree institutions may be granted to students only for courses which are to be presented for lower-division requirements of University of Massachusetts Lowell curricula and provided that such courses do not lead to a violation of the University Residency Requirements. All off-campus courses must be taken under the regular grading system and may not be taken on a pass-no credit (pass/fail) basis.

To view the list of courses approved by departments for transfer into the University of Massachusetts Lowell, visit the Transfer Dictionary on the Registrar’s Office website.

**University Restrictions Concerning Off-Campus Study**

Students are not permitted to pursue off-campus courses until an initial evaluation of their academic progress at the University has been made. Students who have transferred to the University with 60 or more semester credits, or who have been admitted from another institution with a baccalaureate degree to pursue a second bachelor’s degree, are not permitted to pursue off-campus studies. Students who combine University courses with off-campus courses during the regular academic year are subject to University restrictions on semester course loads.

**Residency Requirement for Major Fields**

Baccalaureate degree candidates must complete at least 15 semester credits within the academic department(s) in which they are majoring for each major presented for a degree. Upon the approval of the appropriate college dean, the course requirement of 15 credits within the major department may be satisfied through satisfactory completion of courses in the University of Massachusetts Lowell Continuing Studies Division.

**Residency Requirement for Active Duty Service Members, their Spouse and College-age Children**

The University of Massachusetts Lowell will limit academic residency to twenty-five percent (30 credits for bachelor’s degree, 15 credits for associates degree) or less of the degree requirement for all degrees for active-duty servicemembers and their adult family members (spouse and college-age children). In addition, there are no “final year” or “final semester” residency requirements for active-duty servicemembers and their family members. Academic residency can be completed at any time while active-duty servicemembers and their family members are enrolled. Reservist and National Guardsmen on active-duty are covered in the same manner.

**Dual Degree Program**

Students who wish to pursue a dual degree program must establish simultaneous matriculation in both programs and
designate their candidacy for two degrees. The curricula for dual degree programs are approved by participating college faculties and must be completed as prescribed. It is therefore imperative that a student who wishes to pursue an approved dual degree program obtain a copy of the specified curriculum that enumerates the specific semester-by-semester course requirements. Students interested in this program must receive authorization from all relevant chairs and deans. The minimum credits to receive two degrees is 150.

Grading Policies

Please review the following grading policies:

- Grading Policies
- Mid-term Grades
- Pass-No Credit Course Registration
- Satisfactory-Unsatisfactory Course Registration
- Incomplete Courses
- Audited Courses
- Grade Changes
- Course Grade Appeal Policy

The following qualitative letter grades are employed by faculty members to characterize the quality of a student’s work in a course:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Qualitative Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Superior Work: Highest Quality</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td>High Honors Quality</td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>High Quality</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>Basic Honors Quality</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td>Below Honors Quality</td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Above Satisfactory Quality</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td>Below Satisfactory Quality</td>
<td>1.7</td>
</tr>
<tr>
<td>D+</td>
<td>Above Minimum Passing</td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td>Minimum Passing</td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>Failed</td>
<td>0.0</td>
</tr>
<tr>
<td>FX</td>
<td>Failed due to Academic Misconduct (may not be replaced or deleted)</td>
<td>0.0</td>
</tr>
</tbody>
</table>

In addition to the above qualitative letter grades, the following symbols are used to designate special enrollment provisions or course statuses and do not affect the student’s academic average:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>Audit</td>
</tr>
<tr>
<td>W</td>
<td>Withdrawed</td>
</tr>
<tr>
<td>CR</td>
<td>Credit Only</td>
</tr>
<tr>
<td>INC</td>
<td>Incomplete</td>
</tr>
<tr>
<td>W</td>
<td>Voluntary withdrawal (before deadline-to-withdraw indicated on academic calendar)</td>
</tr>
<tr>
<td>X</td>
<td>Administrative withdrawal</td>
</tr>
<tr>
<td>NC</td>
<td>No credit</td>
</tr>
<tr>
<td>P</td>
<td>Satisfactory Grade C- or Above</td>
</tr>
<tr>
<td>S</td>
<td>Satisfactory Grade C or Above</td>
</tr>
<tr>
<td>U</td>
<td>Unsatisfactory Failed</td>
</tr>
<tr>
<td>T</td>
<td>Transfer Credit</td>
</tr>
<tr>
<td>Y</td>
<td>Administrative Dismissal</td>
</tr>
</tbody>
</table>

Academic Honors

Academic honors are of three types: University honors, honors in major fields, and dean’s list (semester honors). Undergraduate students may qualify for University honors and the dean’s list. Honors in major fields are available at the option of the major departments.

University Honors

The University recognizes baccalaureate graduates who have attained exceptional scholastic distinction. To be eligible for such recognition a student must achieve a minimum grade point average of 3.25 for all courses completed at the University and must have earned a minimum of 60 credits from the University of Massachusetts Lowell. A total of nine (9) credits of departmental exam and/or courses graded "S" may be used toward the 60 credits needed to be considered for University Honors. Credits taken on a Pass/Fail basis may not be counted toward the 60 credit requirement.
Three levels of distinction are noted at commencement:

Summa Cum Laude 3.85 - 4.0
Magna Cum Laude 3.50 - 3.849
Cum Laude 3.25 - 3.499

University honors are officially entered on the permanent record of students.

Honors in Major Fields

In addition to honors awarded by the University, honors in major fields may be awarded by the colleges in which students are enrolled or (in the case of Continuing Studies students) by the colleges that exercise academic jurisdiction over the program in which they are enrolled. Recommendations for such honors are made by the faculty of the student's major department (or by interdisciplinary committees that exercise academic jurisdiction over the student's major studies) for outstanding achievement in the major field. In order to qualify for such honors, the student must fulfill the following requirements:

- complete a minimum of 24 credits in the major field at the University of Massachusetts Lowell;
- fulfill any honors requirement specified by colleges, departments, or interdisciplinary committees in the major field;
- achieve a certain grade-point average as specified below.

High Honors

4.00 in all courses that are taken in the major field at the University of Massachusetts Lowell.

Honors

3.50 to 3.99 in all courses that are taken in the major field at the University of Massachusetts Lowell with no course grade in such courses less than B.

Honors in the major field are not noted on the permanent records of students.

Dean's List (Semester Honors)

At the end of the fall and spring semesters, the dean of each college issues a list of undergraduate students who have achieved distinguished semester records. The dean's list recognizes students who have completed full-time programs (at least 12 credits of which must have been qualitatively graded) with a minimum GPA of 3.25, no grade less than C, and with no grades of INC [Incomplete] (Please note that students who are approved through Disability Services for a reduced course load in accordance with the American Disabilities Act (ADAAA) will be exempt from the 12 credit minimum).

University Honors Program

Undergraduate students enrolled in the University Honors Program who complete all program requirements graduate as Commonwealth Honors Program Scholars.

Language Requirements

Students enrolled in Bachelor of Arts programs in the social sciences and humanities (with the exception of Economics) are required to demonstrate intermediate level proficiency in a foreign language. Students with documented learning disabilities may be allowed to fulfill the language requirement through an alternate set of courses. Such students should file appropriate documentation with the office of Disability Services, at which time they will receive information on their alternative requirement.

For information on test scores that may be applied to the foreign language requirement, please consult .

Major Field Requirements

Candidates for the Bachelor of Arts degree may not be required to take more than 45 credits in their major fields. Candidates for the Bachelor of Science degree may not be required to take more than 60 credits in their major fields. However, candidates for either degree may elect to take additional courses in the major beyond the specified maximum providing that such additional courses are not presented for the minimum degree requirement of 120 credits.

Credits for each course may be counted only once in a student's program of studies. A course which is specified as a requirement for both a student's major and minor will satisfy both requirements, as stated, but course credits may not be counted more than once and may be applied to one category of a student's program of studies only. Individual departments may have a more restrictive policy.

Maximum Period of Bachelor's Degree Study
Depending on the nature of the subject and discipline, courses taken by a student may become obsolete for curricula of the University when they have been completed over a period of time that exceeds the customary period for bachelor's degree study. Accordingly, University departments reserve the right to delete courses from a student's program of study when such courses have been determined to be obsolete for the curriculum in which the student is enrolled.

**Minor Area Requirements**

The requirements for minors are established by University departments or by interdisciplinary committees. No minor program may consist of less than 18 semester credits in the minor field or more than 24 semester credits. At least six credits must be completed at the upper-division course level for all minor studies. Students are advised that an aggregation of courses that totals 18 or more credits may not constitute a minor field. Specific options for minor programs depend on the major field which a student has elected to pursue and the collateral course requirements specified by major departments. Individuals interested in electing a minor program should consult the relevant section for curriculum requirements and prerequisites.

Credits for each course may be counted only once in a student's program of studies. A course which is specified as a requirement for both a student's major and minor will satisfy both requirements, as stated, but course credits may not be counted more than once and may be applied to one category of a student's program of studies only. Individual departments may have a more restrictive policy.

Students in the College of Fine Arts, Humanities, and Social Sciences should consult additional College policies on minors at the FAHSS Policies and Requirements section of the catalog.

(http://www.uml.edu/Academics/minors.aspx)

**Off-Campus Study**

Once students have matriculated at the University of Massachusetts Lowell, they are expected to complete their coursework at the University of Massachusetts Lowell. Such coursework may include credits earned through approved study-abroad programs. In some cases, in order to clear a deficiency or to remain on track for graduation, a student may seek permission for off-campus study to take a course at another accredited institution. Even when authorization for off-campus study is granted, all students are required to fulfill their University of Massachusetts Lowell residency requirements.

Students wishing to apply credits earned off-campus must obtain approval prior to off-campus enrollment, through an Authorization of Off-Campus Courses form available in the Office of the Registrar.

Off-campus courses may be taken in regionally accredited institutions only, and ordinarily should be taken at baccalaureate colleges or universities. Permission to pursue off-campus courses in regionally accredited associate degree institutions may be granted to students for courses that are to be presented for lower-division requirements of University of Massachusetts Lowell curricula provided that such courses do not lead to a violation of the University Residency Requirements. All off-campus courses must be taken under the regular grading system and may not be taken on a pass-no credit (pass/fail) basis.

To view the list of courses approved by departments for transfer into the University of Massachusetts Lowell, visit the Office of the Registrar's website (http://www.uml.edu/registrar/transfer/).

**University Restrictions Concerning Off-Campus Study**

Students are not permitted to pursue off-campus courses until an initial evaluation of their academic progress at the University has been made. Students must comply with current . Students who combine University courses with off-campus courses during the regular academic year are subject to University restrictions on semester course loads.

**Full-Time Off-Campus Study**

Off-campus courses may be authorized on a full-time basis for those students who have completed (or who will complete prior to graduation) three years of full-time study at the University of Massachusetts Lowell (earning no fewer than 90 semester credits) and who wish to pursue a year abroad or who wish to complete a year as visiting students at another baccalaureate institution while completing a University of Massachusetts Lowell degree. Prior to departure, students planning to undertake full-time off-campus study should present to the dean of the college of their enrollment an academic petition that seeks authorization of the proposed course of study. Following a review of the petition and of the proposed course of study, the dean will endorse the petition, informing both the student and the Office of the Registrar of the acceptability of the course of study to the student's degree program.

Since some colleges of the University do not permit full-time off-campus study, students should ascertain the policy of their college before pursuing arrangements with other institutions. Students who wish to pursue full-time off-campus studies are advised that they must satisfy academic and residency requirements concerning courses in the major field (cf. General Degree Requirements: Residency Requirements)

**Programs of Study and Declaration of Intent to Graduate**

All students are required to file with their advisor a copy of their final semester course registrations (including notification of course withdrawal) and an accurate account of courses taken, grades received, and changes of designated programs of
study. Deadlines for conferring with faculty advisors concerning the completion of degree requirements and for filing final programs of study and declarations of intent to graduate with college deans are specified in the University calendar.

Each college has adopted a program of studies form that best reflects the nature of its degree programs. Forms employed by the College of Fine Arts, Humanities and Social Sciences and the College of Health Sciences have been standardized and designate three areas: University general education requirements, major requirements, and collateral programs (second majors, minors, and unrestricted elective courses).

Credits for each course may be counted only once in a student’s program of studies. A course which is specified as a requirement for both a student’s major and minor will satisfy both requirements, as stated, but course credits may not be counted more than once and may be applied to one category of a student’s program of studies only. Individual departments may have a more restrictive policy.

At the end of the semester following the filing of a declaration of intent to graduate, the college dean verifies course completions and required cumulative and major averages. The names of students who have satisfied all degree requirements are then forwarded to the appropriate college faculty for endorsement and, finally, to the Office of the Provost, which orders appropriate diplomas for conferral at graduation. Students who unofficially complete all degree requirements and fail to file either a declaration of intent to graduate or a program of studies will not be recommended to the Office of the Provost and conferral of the degree will be delayed until an approved declaration has been filed.

Registration and Course Enrollment Policies

Students are required to register for courses during periods which are officially designated for registration unless they have been authorized to make other arrangements by the dean of the college in which they are matriculated. Non-matriculated students are permitted to enroll for course loads only as specified by their conditions of admission and must comply with the policies (below) concerning semester course loads and reduced load status.

Semester Registration

Semester Course Loads

Deadline for Changes of Course Enrollment Status

Semester Registration

First time students are strongly encouraged to register in person. Returning students are required to register during the designated registration periods. They have satisfied the registration requirement when they have paid the required tuition and fees and have complied with the course drop and add process.

Students who pre-register for courses for which they subsequently fail to satisfy prerequisites must initiate changes of registration during the add-drop period. Students are not enrolled in classes for which they are not properly registered.

Student schedules are available through the university’s self-service website (). Students who believe that errors have been made in their registrations should consult with the Office of the Registrar prior to the deadline for adding courses. Students who do not check their schedule and, accordingly, fail to correct scheduling errors by established deadlines may not expect to have University regulations waived for their benefit.

Course Additions

Students who wish to add a course during the first five days of classes may do so in person at the Office of the Registrar or through self-service.

Dropped Courses

A student who wishes to drop a course may do so in person at the Office of the Registrar or through student self-service during the first ten days of classes.*

There are only two cases for which a drop is not necessary:

1. if the course is cancelled by the University; or
2. if courses (or sections) carry no credit and will not appear on their transcript

*Courses dropped during the first ten days of classes will not show on the permanent record. Courses dropped from the eleventh to the fiftieth day of class will be assigned a grade of W and will appear on the permanent record.

Courses Cancelled by the University

Students are not required to drop courses or sections that are cancelled by the University. If students wish to replace a cancelled course with another, they must follow the procedures above for course additions.

Semester Course Loads

The typical course load expectation for full-time students is 15 credits. Professional curricula may specify credits in excess of
this number, in which case such specifications are regarded as regular course loads.

**Maximum Credit Loads**

Students may enroll for course loads in excess of 15 credits but are advised that course loads in excess of the number of credits specified by recommended courses of study may not be in their academic interests when their grade-point averages are less than 3.000.

Unless specified as part of an established course of study, course loads in excess of 15 credits are recommended for enrichment purposes only and should be taken as no-credit courses. In any event, a student is prohibited from registering for course loads in excess of 20 credits unless such loads are required by established University curricula or unless special permission has been granted by the dean of the college in which the student has established matriculation.

Students who are enrolled in curricula which do not require a semester course load in excess of 20 credits and who wish to obtain permission to carry such an overload must file an academic petition with the dean of the college in which they have established matriculation. Students who register for course loads in excess of 20 credits (including continuing studies courses) without the prior authorization of the dean of the college in which they have established matriculation will not receive credit for more than 20 credits per semester, and the college dean will determine which course(s) shall receive the administrative symbol of Y. Permission to carry course loads in excess of stated maxima will be denied when resources of a college or program render it necessary to establish limitations on course enrollments.

**Minimum Credit Loads**

Matriculating students are classified as full-time when they carry the course credit load in University day programs that is specified by their curricula. Full-time students are required to register for a minimum of 12 credits of day courses each semester. Please note that students who are approved through Disability Services for a reduced course load in accordance with the American Disabilities Act (ADAAA) will be exempt from the 12 credit minimum to be considered full time.

**Part-time Enrollment**

A student enrolled on a part-time basis is charged by the credit hour for tuition and all applicable fees.

Students enrolled on a part-time basis should understand that part-time enrollment may have an impact on financial aid and on eligibility for insurance through non-University agencies. Students who enroll for fewer than six credits may be required to begin repayment of student loans. Varsity athletes and international students on I-20 permits must enroll for a minimum of 12 credits per semester and may not be part-time students.

**Deadline for Changes of Course Enrollment Status**

The last day for students to add a course is the fifth day of class of the semester. To change sections within a course, and to change enrollment status from audit to credit or from credit to audit and from pass-no credit to letter grade or from letter grade to pass-no credit is the tenth class day of the semester. The last day for dropping a course with a course notation of W is the fiftieth class day of the semester. Students dropping a course during this time are charged full tuition and fees.

**Repeated Coursework/Course Deletions**

Course repetition is permitted only in accordance with the policies cited below, the provisions of which are applicable only to courses taken at the University of Massachusetts Lowell and consequently do not apply to off-campus courses.

A course substitution is not permitted under the provisions of this regulation unless a course has been dropped as a University offering and an alternate course has been authorized as a suitable substitution by the chairperson of the department that offered the course. Once a student has reached the credit limitations cited below, no further courses may be replaced for the purpose of grade substitution, nor may a student who has used the maximum number of course repetitions for the purpose of grade substitution petition to revoke one or more of these substitutions in order to permit course repetition and grade substitution in an additional course or courses.

**Grade Substitution/Deletion Rule**

Students who entered the University of Massachusetts Lowell as freshmen or transfer to the University of Massachusetts Lowell with fewer than 60 semester credits are permitted a maximum of 15 semester credits for course repetitions/deletions to remove grades of C- or below earned in previously completed courses from their cumulative grade-point averages. Transfer students who enter the University with 60 or more credits are permitted a maximum of 7 semester credits of course repetitions for this purpose. The number of actual course repetitions permitted for any student depends on the number of credits allocated to the courses that he or she wishes to repeat.

**Administrative Requirements**

**Repetition of Passed Courses**

Except for courses of a professional nature, which regulations of a particular college may designate as being non-
repeatable, students may repeat a course previously passed with a grade of C-, D+, or D within the provisions of the grade substitution rule cited above. When a course previously passed has been repeated within the provisions of this regulation, the cumulative grade-point average is appropriately corrected for the semester in which the course is repeated. If the grade for the repeated course is lower than the original grade in the course, the lower grade may be deleted under the provisions of the grade deletion rule (see above). Credit is never granted twice for a course that has been passed and subsequently taken again and passed for a second time.

Repetition of Failed Courses

Except for courses of a professional nature, which regulations of a particular college may designate as non-repeatable, students may substitute passing grades for repeated failed courses in the computation of cumulative grade-point averages. Except for non-repeatable courses, students must repeat all required courses which they have failed. Courses in which F grades have been received must be repeated and passed before students may take courses for which those failed are prerequisites.

A course which is failed but is not required for a student's program need not be repeated, but other course work must be taken when a student's total degree program will fall short of the specified credit hours for degree requirements. Unless a failed course is repeated within the deadlines for grade substitution, cited above, both the original failing grade and the repeated course grade are counted in computing grade-point averages. Although the provisions of the grade substitution rule and the requirements for maintaining satisfactory academic standing may indirectly limit the number of failed courses which a student may repeat, no formal limitation is placed upon the number of failed courses that may be repeated.

Repetition of Transferred Courses

When competence is demonstrably inadequate, a student who has been granted transfer credit (and on this basis has been assigned to advanced courses for which the transferred course is a prerequisite) may be advised to repeat such transferred work at the University or to take a more elementary course than that which has been transferred.

Permission to repeat a transferred course is granted upon filing an academic petition form with the dean of the college. Since credit may not be granted more than once for the completion of any course, a condition for filing such a petition is the simultaneous filing of a request to revoke recognition of the previously transferred course.

Right of Access to Student Records

The Family Educational Rights and Privacy Act of 1974 (FERPA) grants any student currently in attendance, or any former student, the right of access to inspect or review his or her educational files, records, or data. Students who wish to inspect their records must file a Right of Access form with the office or department in which the desired record is kept. Right of Access forms are available in the Office of Student Services or through student self service. Wherever practicable, within ten days of receipt of the Right of Access form, the office or department will notify the student as to the date, time, and location when the desired record will be available for inspection. If a student believes that circumstances effectively prevent inspecting and reviewing the records at the designated date, time and location, he or she may request alternative inspection arrangements or copies of the records instead, subject to a fee for copies. The Dean of Students or the Dean's designee will consider the request.

The University maintains the following general records on students:

- Admission File
- Admissions Office
- Permanent Academic Records
- Office of the Registrar
- Financial Aid Records
- Financial Aid Office
- Health Records
- Health Services Office
- Account and Payment Records
- Business Office
- Campus Conduct Records
- Dean of Students Office
- Academic Dishonesty
- Office of the Provost

The file of each student must contain a record of all non-University affiliated individuals or organizations requesting access to information in the file, plus statements that specify the legitimate educational purposes for which access was requested.

Except as otherwise permitted under FERPA, information or records concerning individual students may not be released to any individual or agency without the student’s written permission. Any request for such information received without such written permission will not be honored and will be returned with a request for a written release from the student.

FERPA allows release of a student’s education records without the student’s written permission under certain circumstances, including the following:

1. to personnel of the University, i.e., faculty, administrators, or staff for legitimate educational purposes only;
2. to officials of other institutions in which the student seeks admission or intends to enroll, provided that the student is notified of the release;
3. to federal or state officials in connection with the audit and evaluation of programs funded by federal or state governments, with the enforcement of legal requirements that relate to such programs; or in connection with the student’s application for or receipt of financial aid;
4. to accrediting organizations in order to carry out their accrediting functions;
5. to parents who claim the student as a dependent on their IRS statement;
6. to in connection with an emergency, to appropriate persons if revealing such information is necessary to protect the health or safety of the student or other persons;
7. in response to pursuant to a validly issued subpoena, subject to advance notification of the student unless such notice is prohibited by court order; and
8. as otherwise permitted under or consistent with FERPA.

The following data are considered informational in nature and may be released without permission of the student, at the discretion of the University: student’s name, major, acknowledgement of a student’s participation in officially recognized activities and sports, weight and height of members of athletic teams, date(s) of attendance; degrees, certificates, awards received; the most recent previous educational agency or institution attended by the student and appointment as a Resident Assistant or Community Development Assistant. For graduate students who are teaching credit courses, work department, office address, and employment category are also defined as directory information.

Any student who wishes to have some or all of his or her directory information excluded from release by the University without prior permission must complete the appropriate selections available thru student self service.

Any student who believes that his or her records are inaccurate or misleading may request a hearing with the Dean of Students to discuss the contents of such records and whether or not they need to be changed. Additional information on procedures or policies relating to University compliance with the Family Rights and Privacy Act can be obtained from the Office of Student Services or the Registrar’s Office.

Student Complaints

Student Complaints Arising from Grades and Grading Policy of a Faculty Member

Faculty members are expected, as a matter of right and professional standards, to recalculate any grade in which a computational error is alleged or suspected, provided that the student challenges the grade before the deadlines established by the policy on grade appeals. Generally speaking grades may only be challenged when a faculty member is alleged to have violated University, college, or departmental academic regulations and policies, or to have violated the faculty member’s own grading policy, as determined from the published course requirements for the course or section in question.

Complaints Concerning Classroom Matters Exclusive of Grades and Grading Policy

Students confronting classroom problems that are a source of legitimate concern are entitled to have their complaints heard and resolved according to the procedures specified below.

Classroom problems may include, but are not limited to, the following examples (but note that questions concerning grades and grading policies are reserved to the process specified above):

1. faculty failure to observe University policy and/or regulations, such as violating the regulation against scheduling examinations during the last week of the semester;
2. changing class schedules without the permission of the department chairperson and the college dean, or rescheduling final examinations (including setting a due date for take-home examinations) to a time and place other than that established by the Student Records Office;
3. terminating semester classes prior to the date specified by the University calendar;
4. failing to fulfill instructional obligations (such as unjustified cancellation of classes, frequent absenteeism, and lateness);
5. failing to provide and distribute a written statement of course requirements within the first 10 days of classes, which is mandated for all instructors;
6. failing to adhere to the written statement of course requirements; and
7. failing to post office hours or to maintain such hours.

Students normally should seek to resolve problems by discussion with the faculty member. If this is not feasible or if, after discussion, the matter cannot be resolved, the student must inform the faculty member in writing that he or she will initiate a formal complaint. This complaint must be in writing and addressed jointly to the chairperson of the department and the dean of the college in which the alleged problem and/or violation occurred.

After discussing the problem with the student and the faculty member, the chairperson and the dean determine whether the complaint is valid. (Should the subject of a formal complaint be a department chairperson, the review and determination will be made by the dean and the chairperson of another department.) Copies of the complaint, together with the written decision of the chairperson and the dean, will be sent to the student, the faculty member, the Provost, and the President of the MSP.

Formal complaints about classroom problems shall be initiated before the last day of semester examinations in the semester during which the violation is alleged to have occurred. The determination of the chairperson and the dean must be made within ten working days following receipt of the student complaint and, if unchallenged by the MSP, it is final.
Equal and Fair Treatment

Under federal and state laws, all students are protected from discrimination based on race, color, religion, national origin, disability, gender, (including sexual harassment), age, sexual orientation, marital or veteran status. If you feel that you have been discriminated against based upon any one of these areas, you must contact Equal Opportunity and Outreach (http://www.uml.edu/equal/). These protections also include retaliation for filing complaints of discrimination. Concerns regarding course offerings, instructor and student attitudes should also be directed to EOO staff.

Students are responsible for adhering to the policies of the University regarding equal and fair treatment.

Undergraduate Classification

Irrespective of the provisions of specific curricula and the number of full-time semesters completed by students, the University determines class standing on the basis of total credits earned (including AFROTC credits) in accordance with the following scales:

<table>
<thead>
<tr>
<th>Class Standing</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman standing</td>
<td>0-23 credits</td>
</tr>
<tr>
<td>Sophomore standing</td>
<td>24-53 credits</td>
</tr>
<tr>
<td>Junior standing</td>
<td>54-83 credits</td>
</tr>
<tr>
<td>Senior standing</td>
<td>84 or more credits</td>
</tr>
</tbody>
</table>

Withdrawal from Courses

W and X are administrative symbols which indicate that a student has been authorized to withdraw from courses, or from the University. These symbols, which are entered upon the student’s permanent record without prejudice, may be authorized only in accordance with established policies of the University. The grade of W signifies voluntary withdrawal from a course. It is initiated by the student and can only be applied prior to the deadline-to-withdraw indicated in the academic calendar, specified on the academic calendar. The grade of X signifies an administrative withdrawal from class. The grade of X is applied by the administration in circumstances where profound impact to academic performance due to a personal or immediate-family medical event, disability, death, or active military service is documented sufficiently. Disciplinary action may also result in administrative withdrawal from classes.

Students may not take more than two withdrawals (W’s) in any given course.

Voluntary Course Withdrawal before the deadline-to-withdraw indicated on the Academic Calendar.

Students who desire to withdraw from courses with notations of W prior to the deadline-to-withdraw specified on the academic calendar may withdraw through ISIS self-service. Students who do not complete the process of withdrawal before the approved deadline will not be assigned course notations of W, will be subject to all instructor course requirements, and will receive final course grades assigned by the course instructors.

Students who voluntarily withdraw from all courses are withdrawn from the University.

Note that withdrawal from a course or courses may have implications for degree progress, veteran’s benefits, health insurance, financial aid, and immigration status. Students are advised to consult their academic advisor as well as officials in appropriate offices prior to withdrawing from any course.

Administrative Course Withdrawal

Course withdrawal, with an assigned course notation of X, after the deadline-to-withdraw specified on the academic calendar for reason of a documented extended illness or critical personal emergency may be allowed and ordinarily requires withdrawal from the University, but partial withdrawal may be authorized if circumstances are warranted.

1. In order to apply for medical withdrawal the ‘Request for Medical Withdrawal Form’ with accompanying documentation from a licensed health service professional, must be submitted to the Office of Health Services. Health information is covered by HIPAA laws and medical information received by Health Services is strictly private and confidential. In consultation with the Office of the Registrar, the Office of Health Services submits recommendations to the Provost’s Office for final review and approval.

2. Administrative withdrawal for non-medical reasons is initiated through an to the Office of the Provost with appropriate, verifiable documentation that corroborates the reason for withdrawal advanced on the petition.

3. Neither complete nor partial withdrawal will be authorized because a student anticipates a low or failing grade in the course (or courses) or because of the presumed effect of a low or failing grade on the student’s cumulative grade-point average.

4. Faculty are notified when the grade of ‘X’ is retroactively applied to a course for which a grade was entered. Typically administrative withdrawal is applied to a whole semester rather than to isolated courses. Medical withdrawals occurring after the approved withdrawal period are not associated with financial reimbursement of tuition or fees.
Withdrawal from University

All students who desire to withdraw from the University are required to:

1. discharge all financial obligations to the University,
2. return all University property, and
3. file a written notification of withdrawal with the Office of the Registrar. Since the date of official withdrawal as recorded by the Office of the Registrar is one basis of any claim for tuition refund, and it may be of importance in determining subsequent legal or student insurance claims, students should process withdrawal papers in person prior to leaving the University.

Students who absent themselves from the University without officially withdrawing will remain on class rosters until they officially withdraw from the University or until the end of the semester. Students who remain on class rosters after the fiftieth class day will be assigned final course grades. The date on which a withdrawal request is filed with the Office of the Registrar is the date on which withdrawal is academically effective and constitutes the basis for final course notations.

The names of students who have withdrawn from the University for any reason are removed from all rolls. Students who have withdrawn must be reinstated. This is accomplished through the Office of the Registrar.

Students who are recipients of benefits from the Veterans Administration may not process withdrawals from the University that violate their declarations of classroom attendance. Recipients of veterans benefits are advised that they must receive course grades when their requests to withdraw from the University have been filed after deadlines of the Veterans Administration for processing changes of declared benefit status or when their dates of withdrawal will conflict with declarations of classroom attendance.

University Withdrawal before Deadline-to- Withdraw specified on Academic Calendar

Students who register for courses and withdraw from the University prior to the first day of classes of a semester are withdrawn without record. Students who register for courses and who withdraw from the University before the deadline-to-withdraw specified on the academic calendar are withdrawn with course notations of W.

University Withdrawal After the Deadline-to- Withdraw specified on the Academic Calendar

A student who withdraws from the University after the Deadline-to-Withdraw specified on the academic calendar must be graded by all course instructors unless the student is authorized to withdraw for documented reasons of extended illness or critical personal emergency.

A student who wishes to withdraw from the University after the deadline-to-withdraw specified on the academic calendar must file an academic petition, together with appropriate documentation specifying the cause for the withdraw, with the Office of the Provost. Following a review of the academic petition and verification of attached documentation, the Office of the Provost may permit the student to withdraw from all courses with course notations of X.

Withdrawal from courses may have implications for degree progress, veteran's benefits, health insurance, financial aid, and immigration status. Students are advised to consult their academic advisor as well as officials in appropriate offices prior to withdrawing from class.

University Withdrawal After the End of the Semester

A student who has unofficially withdrawn from the University (i.e., has ceased attending classes) for reasons of extended illness or critical personal emergency and was unable to officially withdraw from the University before the end of the semester may petition to withdraw from all courses with course notations of X. Such a student must file an academic petition, together with supporting documentation, no later than one calendar month from the beginning of the following semester. This petition must be filed with the Office of the Provost. Following a review of the academic petition and verification of attached documentation, the Office of the Provost will notify the student and the Office of the Registrar of the decision. Faculty are notified when the grade of 'X' is retroactively applied to a course for which a grade was entered.

Readmission

Students who have withdrawn from the University may apply for re-admission through the Office of the Registrar. The form for re-admission may be found at

AFROTC Requirements

Uniforms, equipment, and textbooks required for AFROTC will be supplied. Students in the POC or on scholarship receive a monthly subsistence allowance of $250 to $400. Competitive scholarships are available for academically qualified cadets in the program. Students who successfully complete the POC are commissioned as second lieutenants in the United States Air Force and are required to serve on active duty in the Air Force for a minimum of four years.

University Policies Concerning Aerospace Courses
Both General Military Courses (AS 100 and AS 200) and Professional Officer Courses (AS 300 and AS 400) in Aerospace Studies may be used as undesignated or unrestricted elective courses in a student's baccalaureate program. Grades for all AFROTC courses are applicable to the determination of grade-point averages. Students should consult the regulations of the college in which they are matriculating concerning the number of AFROTC courses which may be included as part of their programs of study. In the event that such elective courses are insufficient to accommodate all the AFROTC courses, students wishing to pursue the AFROTC program will be required to fulfill program requirements on an overload basis. Consequently, AFROTC credit toward graduation requirements will vary from six (minimum to meet AFROTC/University of Massachusetts Lowell contract requirements) to sixteen credits dependent on the student's particular college and degree program. Some colleges allow AFROTC courses to be substituted for technical general electives.

Field Training

AFROTC field training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training, usually between their sophomore and junior years. Students applying for entry into the two-year program must successfully complete six weeks for field training prior to enrollment in the Professional Officer Courses. The major areas of study in the four-week field training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical training. The major areas of study included in the six week field training program are essentially the same as those conducted at four-week field training and in the General Military Course, including leadership laboratory.

Leadership Laboratory

AFROTC field training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training, usually between their sophomore and junior years. Students applying for entry into the two-year program must successfully complete six weeks for field training prior to enrollment in the Professional Officer Courses. The major areas of study in the four-week field training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical training. The major areas of study included in the six week field training program are essentially the same as those conducted at four-week field training and in the General Military Course, including leadership laboratory.

Admission to Upper Division

All BSBA students must apply to be admitted to the upper division program in a concentration of their choice upon completion of the filter courses listed below. Minimum criteria for admission to upper division are an overall grade point average of 2.000/4.000.

- 60.201 Accounting/Financial
- 49.201 Economics I
- 49.211 Statistics I
- 92.122 Management Calculus
- 42.101 College Writing I
- 42.102 College Writing II
- 47.101 General Psychology
- 48.101 Intro to Sociology

For students transferring from another institution, a course deemed equivalent to any of the above courses by the Manning School of Business will be used to meet this requirement.

Application for admission is submitted directly to the Office of the Dean. The application must include: a completed change of major form obtained from the Office of Enrollment Services, the Office of the Dean of the School, or any department in the School.

Admission to the Manning School of Business upper division is guaranteed for transfer students if they have completed an Associate in Science, Business Transfer Option, and the above mentioned courses.

Students who are not eligible to declare a concentration after earning 60 credits but who satisfy University retention requirements may file for intercollegiate transfer within the university. Students who are ineligible to file for intercollegiate transfer or are denied admission to another college following application for intercollegiate transfer are dismissed from the University.

Undergraduate Transfer Rules

The Manning School of Business welcomes transfer students from Massachusetts community colleges and other regionally accredited institutions to the BSBA program. All MSB students including transfer students from other accredited institutions and from other colleges of University of Massachusetts Lowell initially enter the BSBA program as Business Administration students. After completing the filter courses, students apply to be admitted to the upper division and to declare a concentration according to the upper-division admission policies stated in section III. Students entering UMass Lowell with an associate degree may apply to be admitted directly to the upper division. Transfer students who have not earned an associate degree and transfer more than 45 credits toward the BSBA program may apply to be admitted to the MSB upper division after completion of the filter courses. All students must complete at least 60 academic credits in residence at
Transfers from:
- Other Institutions
- Other UMass Lowell Departments
- Other MSB Departments

A. Transfer From Other Institutions

Students transferring to the Manning School of Business from any program not included in the Commonwealth Transfer Compact, with or without an associate degree, must have a cumulative grade point average of at least 2.500/4.000. Students may not transfer any course in which they earned a grade of less than C- (1.700 on a 4.000 scale). Courses at a level below the first MSB requirements, such as algebra or the first semester of a two-semester precalculus sequence, are not transferable. Only Business Courses taken at other AACSB accredited institutions may transfer as upper division (junior and senior level) MSB courses.

Transfer from Massachusetts Community Colleges

Students transferring with an Associate in Science, Business Transfer Option, from a member of the Commonwealth Transfer Compact can transfer all courses up to a maximum of sixty-six (66) credits. Although all transferred courses are listed on the student’s transcript, due to differences in program requirements of different institutions, some courses may not apply to minimum degree requirements of the Manning School of Business. Courses at a level below the first COM requirements, such as algebra or the first semester of a two-semester precalculus sequence, are examples of such courses. However, the student transferring with an associate degree, Business Transfer Option, will be eligible to take upper level courses in the College of Management subject to the stated prerequisites for each course. Courses taught by the School as part of its upper division core that are not acceptable for transfer may be validated by departmental exam. Courses that are equivalent to courses taught by the School in the upper division (junior and senior level) which are not a part of the COM core requirements cannot be used to satisfy the minimum degree requirements of the BSBA degree in the Manning School of Business. Students transferring to the Manning School of Business with an associate degree are prohibited by University policy from pursuing further off-campus study.

B. Intercollegiate Transfer

Intercollegiate transfer students to the Manning School of Business must be in good standing and have completed at least 15 credits at the University of Massachusetts Lowell. Upon acceptance, students will be listed as Business Administration (BA) and will usually be permitted to enroll only in lower division courses.

The transfer request is normally initiated by the students and is submitted to the Manning School of Business. Students must submit a completed change of major form obtained from the Office of Enrollment Services, the Office of the Dean of the School, or any department in the School.

University of Massachusetts Lowell students intending to apply for intercollegiate transfer to the College of Management should do so preferably before completing 60 credits (prior to completing the sophomore year). This will minimize delays in completing their educational objectives since MSB upper division courses are restricted to juniors and seniors in the College of Management with appropriate prerequisites who have been admitted to upper division according to rules stated in Section III of the Policies for Undergraduate Admissions.

The Manning School of Business reserves the right to limit intercollegiate transfer activity if student enrollment capacities are met.

C. Transfer from Other MSB Departments

Once admitted to the Manning School of Business upper division program, students can choose to enroll in any concentration within MSB. Depending on the number of unrestricted electives available in the curriculum of the concentration students are entering and the number of credits completed by the students at the time of transfer, some courses may not be usable in the students’ new program, requiring students to take courses above and beyond the University’s minimum graduation credit requirements. All courses stay on the students’ transcripts at the University and are included in the determination of the cumulative grade point average as specified by University policies. Students shall not be permitted more than two intercollegiate transfers.

Undergraduate Admission Requirements

Students entering the University as freshmen in the Manning School of Business must be registered as Business Administration (BA) if pursuing the BSBA degree. Upon completion of the first semester of the sophomore year, BA students may apply to be admitted to the upper division program and to declare a concentration. The College offers concentrations in Accounting, Finance, Management, Marketing, and Management Information Systems (MIS).

Transfer students may apply for admission to the Manning School of Business according to the transfer rules described in sections II and III below. Business Administration students may apply for admission to upper division MSB programs described in section III.
Special Academic Policies for Undergraduates

The following rules govern the applicability of courses satisfying curriculum requirements in any Manning School of Business concentrations:

A. Students may transfer a course that COM offers in its upper division (junior and senior years) if the course was taken at a school accredited by the AACSB, and a grade of ‘C’ or better was earned.

B. Upper division Manning School of Business courses (300 and 400 level) are restricted to matriculated students who have been admitted to the upper division program and have completed all prescribed prerequisites. Transfer students may not count any courses that require validation or which are not creditable to the MSB concentration towards this requirement.

C. MSB upper division courses are restricted to:
   1. juniors and seniors enrolled in MSB;
   2. juniors and seniors enrolled in another college of the University whose major requires completion of specific business courses; and
   3. special students who meet appropriate prerequisites.

D. An unrestricted (free) elective (designated non-MSB) for MSB students is any course satisfying one of the following criteria:
   1. a 100 or above level course from any college offered in the day program;
   2. a course listed as satisfying a University area distribution requirement;
   3. a course allowed by an approved academic petition.

Any course taken in violation of these rules may not be used to fulfill MSB curriculum requirements regardless of the grade.

Graduation Requirements

In addition to satisfying degree requirements listed in this catalog under “University Academic Policies” and under “Manning School of Business,” MSB majors must also satisfy the following requirements:

A. Residency Requirement

MSB majors must take all required upper division courses in residence in the day programs of MSB. Any exceptions to this (for international study, etc.) must be approved by the appropriate department chairperson and the Dean or her designee prior to enrolling in such courses. No approvals for transfer credit of any required course taken at any other institution will be granted after the course has been completed except as noted above for transfer students.

B. Degree Requirements

In order to qualify for a Bachelor’s Degree offered by the Manning School of Business, undergraduate students must satisfy all course requirements applicable to the major and their area of concentration and must earn a cumulative grade point average of 2.200 at completion of the baccalaureate program.

Policies for Undergraduate Programs

Please review the following:

Withdrawal from a Course

Withdrawal from the University

Withdrawal from a Course

A student finding it necessary to withdraw from a course must do so within the time specified in the graduate ( ). The student’s permanent record will indicate a grade of W for the course(s) from which he or she has withdrawn unless the withdrawal has taken place within the first 10 class days of the semester during which time no record will be kept. (See in this Catalog for information on dropping a course.)

Withdrawal from the University
A student who wishes to withdraw from the University must submit his/her request in writing to the Registrar's Office. This procedure ensures that the student's academic and financial obligations are cleared before leaving the University. If a student officially withdraws from the University by the withdrawal date indicated in the graduate academic calendar, the permanent record will indicate a grade of W. If the student fails to follow the official withdrawal procedure and does not withdraw in good standing, the student will not be permitted readmission to a graduate program at the University except under extenuating circumstances.

All previous application materials will remain on file for a two year period. At any time during this period, a student who has officially withdrawn may request readmission by completing and submitting only the cover page of the graduate application and paying the application fee. After two years, a student must file a new, complete application and submit the appropriate fee to the ( ) in order to be readmitted.

Test

With Massachusetts health care reform, thousands of people who didn’t have health insurance in the past now have insurance but struggle to find primary care doctors. State policies limit what nurses can do and often create barriers to productivity. As a prescriber of medication, Padua knows this too well as she is overwhelmed with paperwork.

"A signature is required for everything I do," she explains. "I td help meet the influx of demand for care but right now nurses are limited as to what they can do in certain states, including Massachusetts," she said.

Test - Policy

Policy content goes here

Policy TEST PAGE

It's my Policy to Test the Testing Environment while Testing others!

Test New Policy DW

Content goes here

Academic Integrity Policy

The integrity of the academic enterprise of any institution of higher education requires honesty in all aspects of its endeavor. Maintaining academic integrity is therefore the responsibility of all faculty, staff, and students at the University of Massachusetts Lowell.

Academic dishonesty is prohibited in all programs of the University. Sanctions may be imposed on any student who has committed an act of academic dishonesty.

Definitions of Academic Dishonesty

Academic dishonesty includes but is not limited to:

Cheating - use, or attempted use, of trickery, artifice, deception, breach of confidence, fraud, or misrepresentation of one's academic work. Submission of the same work in its entirety for credit in two courses without obtaining the permission of the instructors constitutes cheating. Collaborating with others when not explicitly allowed by the instructor constitutes cheating.

Fabrication - falsification or invention of any information or citation in any academic exercise.

Plagiarism - representing, whether intentionally or unintentionally, the words or ideas of another as one's own work in any academic exercise.

Facilitating dishonesty - helping or attempting to help another commit an act of academic dishonesty, including substituting for another in an examination, misrepresenting oneself, or allowing others to represent as their own one's papers, reports, or academic works.

INITIATING CHARGES OF ACADEMIC DISHONESTY

Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. The procedures outlined below are intended to provide the process by which sanction may be imposed if it appears that academic dishonesty has occurred, and by which students may appeal such sanctions.

These procedures apply to all students participating in academic classes and programs, including all graduate, undergraduate, and CSCE programs. The procedures associated with this policy are the only official procedures for making
allegations of, issuing sanctions because of, or appealing charges of academic dishonesty.

Any instructor may initiate charges of academic dishonesty by following the procedures outlined below.

I. Determining Sanctions and Notification of Students

a. When academic dishonesty is suspected, the instructor (complainant) should bring the case to the attention of the complainant's chair and discuss an appropriate course of action/sanction.

b. Possible sanctions include a reduction in grade in an assignment or exam; a zero or failing grade in an assignment or exam; a forced repeat of an assignment or exam; a reduction in grade in a course; a recommendation of a grade of FX (non-deletable failure); recommendation of suspension; or recommendation of dismissal.

c. If a sanction is to be applied, the instructor must notify the student, in writing or orally, of the incident observed and the sanction that will be imposed. Such notification should be made within 10 business days after recognizing the incident.

d. The instructor must maintain a record of the notification.

Notification to the Provost by the Instructor

a. Notification to the Provost by the instructor must occur within 2 business days of informing the student. The instructor must fill out a "Notification of Academic Dishonesty Form" (pdf) available online at the website for the Office of the Registrar at [www.uml.edu/docs/notificationofacademicdishonesty_tcm18-3543.pdf](http://www.uml.edu/docs/notificationofacademicdishonesty_tcm18-3543.pdf) and email or fax this form to the Provost or designee. In lieu of the form, an email with the necessary information will suffice.

b. The Provost or designee will send the student official notification of the sanction via certified mail and include notification of the right to appeal. Such official notification must be sent to the student within 5 business days of receipt of the "Notification of Academic Dishonesty Form."

c. The Provost or designee also informs (in writing) the dean and chair of the complainant's department of the complaint and sanction.

d. The office of the provost will maintain this information and record the sanction. The record will be kept until the student graduates UMass Lowell. If there is a record of multiple complaints the provost or designee may apply more severe sanctions including suspension and dismissal.

If the student does not appeal the charges, the process is complete and the sanction is imposed.

First level of Appeal: Academic Dean

If the student denies responsibility or believes that the sanction is too severe, the student may appeal the sanction to the Academic Dean of the college of the complainant's department or designee in writing, within five business days of receiving notification of the sanction from the office of the provost. During the appeals process the student is expected to continue attending the class in which the sanction has been issued unless prohibited by department policy. The Academic Dean or designee will commence a review of the issues raised in the appeal and forward the decision to the office of the Provost as soon as practicable.

The Provost or designee must notify the student, by certified mail, and other relevant parties of the outcome of the appeal process. If the appeal is sustained on the grounds that the charge is not adequately supported then all records of the incident are destroyed. If the appeal is not sustained then records of the incident are maintained in the office of the provost.

Second level of Appeal: Office of the Provost

The decision reached by the Academic Dean or designee may be appealed to the Provost or designee if the student believes that he or she did not receive due process.

Grounds for Appeal of Due Process

An appeal shall be limited to a review of supporting documents and the process and outcome of the Academic Dean or designee for one or more of the following grounds:

- Bias by the Instructor, Academic Dean, or designee substantially influenced the outcome of the process to the detriment of the student.

- If new, relevant information has come to light that was not available at the time of the hearing by the Academic Dean.

- If unusual procedures were followed or if the procedures outlined herein were not followed, to the detriment of the student.

Appeals may be filed by the student or complainant to the Provost or designee within three business days of receipt of the decision. Such appeals shall be in writing and shall be delivered to the Provost or designee, and must be based on the "Grounds for Appeal" (above). The Provost or designee may decide to uphold the decision of the Academic Dean or designee or convene the Academic Integrity Appeals Board ("Board"). All decisions by the Provost or designee are final and may not be appealed. Such decisions will be made as soon as practicable.
The Provost or designee must notify the student, by certified mail, and other relevant parties of the outcome of the appeal process. If the appeal is sustained on the grounds that due process was not followed then all records of the incident are destroyed. If the appeal is not sustained then records of the incident are maintained in the office of the provost.

**Academic Integrity Appeals Board**

*Membership*: The Academic Integrity Appeals Board is chaired by the Provost or designee. The Provost or designee will vote only in the case of a tie. The Board consists of a minimum of three faculty members chosen by the Provost or designee with no two members selected from the same College and cannot include a faculty member within the department initiating charges of academic dishonesty.

*Right to an Advisor*: A student may elect to be accompanied at all proceedings of the disciplinary process by an advisor of his or her choice. The advisor must be a current member of the faculty, staff, or student body of the University. The role of the advisor in all cases is limited to advising the student during the academic dishonesty proceedings. The advisor may not speak on behalf of the student, or examine or cross-examine a witness, or address the process publicly during proceedings.

*Accommodations for Students with Disabilities*: The University of Massachusetts Lowell is committed to providing appropriate accommodations to students with documented disabilities so that all students have meaningful access to all UMass Lowell programs and services, including the Academic Integrity Process.

All those with disabilities who are involved in the Academic Integrity Process, including accusers and accused students, advisors, and witnesses may seek accommodations for any stage of the Academic Integrity Process. Any student requesting an accommodation must do so far enough in advance to allow the request to be reviewed and an appropriate accommodation identified and implemented.

A request for accommodation can be made to the Director of Disability Services ("Director"), the designated Academic Dean, or the Provost. The requests will be reviewed by the Director, who will apply appropriate legal standards and University policies and procedures to determine what accommodation, if any, is appropriate. The student will be given an opportunity to have an interactive role in the review process (i.e., to discuss the request with the Director, before the Director completes the review). The Director may require the student to provide appropriate documentation from qualified health care professionals to support the request. In addition, the Director may consult, as appropriate, with the Academic Dean or the Provost, or another expert of the Director's choosing. The Director will make a decision in light of the student's particular disabilities and the nature of the Academic Integrity Process, upon reviewing any consultations, relevant documentation and relevant previous accommodations provided to the student. The student will be given an explanation of the Director's determination.

If the student requesting accommodations disagrees with the Director's determination on appropriate accommodations, he may appeal the determination to the Office of ADA Compliance (Office of Equal Opportunity and Outreach) within five working days of the Director's decision.

**Appeal of Provost Sanctions (Suspension or Dismissal)**

Any additional sanctions applied by the Provost following multiple incidents of academic dishonesty must be appealed to an Academic Integrity Appeals Board as described above. The Board will be chaired by a designee of the Provost who has not participated in the process leading to the charges.

The Provost or designee must notify the student, by certified mail, and other relevant parties of the outcome of the appeal process. If the appeal is sustained on the grounds that the charge is not adequately supported then all records of the incident are destroyed. If the appeal is not sustained then records of the incident are maintained in the office of the provost.

**Academic Standing**

*Warning Notice*

*Probation*

*Academic Dismissal and Reinstatement*

*Graduate Fresh Start*

**GPA Minimum**

No more than 6 course credits of grades below a B may be counted toward the master's degree; no more than 9 credits of the same grades may be counted toward the doctorate. **No graduate degree will be awarded to any student whose overall cumulative grade point average falls below 3.0.**

**Academic Standing**

Students on academic warning or academic probation after the Spring semester and who are registered for a Summer I course at the University of Massachusetts Lowell will have the grade for that course included in evaluating the academic standing. The academic standing will be adjusted to include the grade(s) received during Summer I session.

The consequences of the academic standing of warning or suspension will not apply for students completing degree requirements for that semester.
Warning Notice

Any graduate student whose semester grade point average (GPA) falls below 3.0 will automatically receive a warning notice which will also be sent to the graduate coordinator, and filed with the student's record in the Registrar's Office. The student will be strongly advised to meet with the graduate coordinator or his/her designee within 30 days of receipt of the warning notice and develop an academic plan to bring his or her GPA to a level above 3.0.

Probation

Any graduate student whose semester GPA falls below 3.0 for a second time, will automatically receive a letter of probation from the Vice Provost for Graduate Education. Copies of the letter will be sent to the graduate coordinator, chairperson, college dean, and also placed on file with the student's record in the Registrar's Office. Within 30 days, the department graduate committee, chaired by the graduate coordinator or his/her designee, will meet with the student and decide whether to recommend loss of degree candidacy. Such a decision or other course of action will be fully documented in writing with copies sent to the chairperson, and college dean. A recommendation of loss of degree candidacy and dismissal are subject to the approval of the college dean.

Academic Dismissal and Reinstatement

Any student whose semester GPA falls below 3.0 for a third time, and whose cumulative GPA is below 3.0, will automatically be dismissed from his or her graduate program and the University. Reinstatement will be considered if the student provides a detailed justification and academic plan concerning how he or she will correct this academic deficiency. The plan must be attached to a Graduate Academic Petition and approved by the graduate coordinator, chairperson, the college dean, and the Vice Provost for Graduate Education or his/her designee. If any of the above individuals disapproves of the reinstatement, the dismissal will remain in effect and no subsequent appeals will be considered.

Independent of the warning/probation/dismissal system, the dean of the college where the student's degree program resides may at any time examine the performance of any student not meeting the academic standard expected of graduate students within that college and recommend to the appropriate graduate committee a course of action including dismissal.

For the procedure for formal adjudication of any academic issues (non-misconduct) which may arise, please see University Appeals Process Regarding Academic (non-misconduct) Issues of Graduate Students.

Graduate Fresh Start

Master and Doctoral degree candidates and non-degree students who have been absent from the University for four years or longer may be readmitted under the program Graduate Fresh Start. If admitted into a degree granting program, under the terms of Graduate Fresh Start, a returning graduate student will be treated as if s/he were a new student. A maximum of two courses (six credits) at the 500 level or higher completed during earlier periods of enrollment with grades of "B" or better may, with the approval of the degree granting department, be transferred into the degree program. These courses must be transferred via an academic petition and will be accepted toward graduation but not included in the cumulative grade point average (GPA). Thesis and dissertation research credits are ineligible for transfer. Courses completed during earlier periods of enrollment with grades below "B" are not eligible for transfer. A student may be readmitted under the Graduate Fresh Start program only once at the graduate level.

Students who wish to be considered for the Graduate Fresh Start Program must follow the normal procedures for admission to the University and file a at . Academic Petitions for transfer credits must be approved by the appropriate graduate coordinator and/or department chair of the degree granting department, and must be filed with the University Registrar. In addition, the student must submit a personal statement which addresses personal and professional growth during the period of time in which the student was absent from the University which supports the student's potential for academic success. If admitted, credits and GPA start at zero. Transfer courses may count towards the degree, but are not included in the GPA.

All courses taken and grades achieved during earlier periods of enrollment will appear on the transcript along with a notation that they are not included in the cumulative grade point average. Once this change is made to the academic record, the change can NOT be reversed.

Acceptance of Foreign or American Master's Degree toward Doctoral Requirements

Students accepted into a doctoral program who hold a master's degree in the same or a closely related discipline from a U.S. or foreign academic institution will have their transcripts and supporting documentation reviewed by the department graduate committee.

The committee may choose one of the following actions:

1. Approve all coursework and thesis for the master's degree up to the total number of credits granted by the University of Massachusetts Lowell department for its master's degree, and thereby require the student to complete only "beyond the master's" course/thesis credits for the doctorate.
2. Accept the U.S. or foreign master's degree, but because of deficiencies in the student's master's program, require a limited number of graduate courses to be added to the total credits required for doctoral degree completion "beyond
3. Require that a student with a U.S. or foreign master's degree obtain a University of Massachusetts Lowell master's degree before proceeding to the doctorate.

All coursework for U.S. or foreign master's degrees considered for approval by the department must be at a grade level of B or better. Official, documented verification of the degree awarded must also be provided.

Commencement

Commencement

Conferring of Degrees

Academic Honors

Replacement Diploma

Commencement

Graduation exercises are held once a year at the end of the spring semester. Students who have completed degree requirements during the previous summer term or fall semester are permitted to attend commencement exercises, and their names are listed in the commencement booklet. Attending commencement exercises is not compulsory. An individual who wishes to receive a diploma by mail must notify his/her college dean and file a corrected address through student self service if he or she anticipates moving from a previously reported permanent address.

Conferring of Degrees

Diplomas are awarded three times a year:
1. In June for students completing degree requirements during the spring semester.
2. In October for students completing degree requirements during the summer term.
3. In February for students completing degree requirements during the fall semester.

Individuals who wish to submit verification of degree completion to employers or to graduate schools during the period between the end of their final grading period and the awarding of diplomas may obtain a letter of completion from the Registrar's Office.

Academic Honors

Due to the many fields and diversity of study at UMass Lowell, academic honors for graduate students are discipline-based and vary within respective colleges. Honors for graduate students are not listed on transcripts.

Replacement Diploma

Replacement diplomas may be ordered through University Alumni Relations for an additional fee.

Course Credit

Maximum Semester Credit Limit
Graduate Credit for Undergraduate Courses
Undergraduate Credit for Graduate Courses

Maximum Semester Credit Limit

The usual course load for full-time graduate students is 9 credits/semester. Depending upon the program requirements and abilities of the student, individuals may carry more than 9 credits each semester. However, the absolute maximum number of total credits (combined undergraduate and graduate) for which a graduate student will be allowed to register is 18 credits/semester. The maximum number of thesis or dissertation credits for which a student may enroll in any semester is nine credits.

Graduate Credit for Undergraduate Courses

UMass Lowell courses at the 400 level are designed for seniors but under certain circumstances may be taken by graduate students for graduate credit. A maximum of 6 credits of 400 level courses may be used for credit toward the graduate degree with the permission of the degree granting department. Three hundred level courses and below are never counted toward a graduate degree. If a graduate student takes certain undergraduate courses to make up for background deficiencies or to satisfy language requirements, the course credit hours are not used as part of the graduate degree program but will appear on the graduate transcript.

Undergraduate Credit for Graduate Courses
A qualified junior or senior may take a course at the 500 level for undergraduate credit in accordance with the policy and procedures of the department or college in which the course is offered. The grade received in any such course is used in calculating the undergraduate's cumulative grade point average. Counting of graduate credits for both the bachelor's and master's degrees is subject to departmental requirements.

At no time may grades computed in an undergraduate GPA be used toward a graduate GPA.

Course Designations

Course Numbering System
Continuing Graduate Research
Course Prefixes
Audit

Maximum Semester Credit Limit

The usual course load for full-time graduate students is 9 credits/semester. Depending upon the program requirements and abilities of the student, individuals may carry more than 9 credits each semester. However, the absolute maximum number of total credits (combined undergraduate and graduate) for which a graduate student will be allowed to register is 18 credits/semester. The maximum number of thesis or dissertation credits for which a student may enroll in any given semester is nine credits.

Course Numbering System and Designation:

400-499 - Undergraduate courses usually designed for juniors or seniors; no more than six credits may be taken for graduate credit with the permission of the graduate coordinator.
500-599 - Courses for graduate credit, but which may be taken by advanced undergraduates with the advisor's permission.
600-699 - Graduate courses which are open only to graduate students.
700-799 - Seminars, special topic courses, projects, or thesis research for advanced candidates in master's and doctoral degree programs.

Each course offering is designated by a two-digit prefix and a three-digit course number (e.g., 81.529).

Continuing Graduate Research

Once a student has completed the required number of credits for master's or doctoral thesis/dissertation research with grades of PR or S (see summary of degree credit requirements), he or she will not be allowed to sign up for additional thesis/dissertation research credits. Instead, if required for teaching/research assistantships or immigration/visa purposes, the student may enroll in 3, 6, or 9 credits of Continuing Graduate Research designated _ _ _ 763, 766, or 769 _ _ _ where the first two blanks represent the departmental designation, 3, 6, and 9 indicate the respective number of credits, and the last three blanks are the standard numbers which code to a particular faculty member in the department.

The two digit college prefix identifies a college department and/or special area. The three-digit course number identifies the course level.

Course Prefixes

Each college department and/or special subject area has been assigned an identifying two digit number within the numerical ranges specified as follows:

Education - 01-09
Engineering - 10-18 & 20-28
Health - 19 & 29-39
Humanities/Social Sciences, Fine Arts - 40-59, 70-79
Management - 60-69
Science and Math - 80-99
Biomedical Engineering - IB
Marine Science - IM

Audit

A graduate student may, upon approval of the advisor and the instructor, register for a course on an audit basis, but must pay the full amount of tuition and fees. An audit student is not required to take tests or the final examination. A change in registration from audit to credit or credit to audit must be done during the add/drop period. Under no circumstances can a course taken for audit be given credit at a later date.

Equal and Fair Treatment
Under federal and state laws, all students are protected from discrimination based on race, color, religion, national origin, disability, gender, (including sexual harassment), age, sexual orientation, marital or veteran status. If you feel that you have been discriminated against based upon any one of these areas, you must contact Equal Opportunity and Outreach (EOO). These protections also include retaliation for filing complaints of discrimination. Concerns regarding course offerings, instructor and student attitudes should also be directed to EOO staff at 978-934-3565.

Students are responsible for adhering to the polices of the University regarding equal and fair treatment.

General Regulations for Graduate Students

Each University student is subject to two sets of academic regulations - those of the University as a whole, which are cited in this section, and the academic rules of the college and program in which he or she is enrolled. The academic rules of colleges and programs are listed in sections devoted to college programs.

In registering for courses, each student assumes full responsibility for knowledge of and compliance with the definitions, regulations, and procedures for the University, as set forth in this publication. Moreover, in accepting admission to the University, each student assumes responsibility for knowledge of and compliance with the definitions, regulations, and procedures of the University pertaining to his or her student status as set forth in the appropriate UML publications.

Students who have questions about the interpretation or application of University academic policy should consult the dean of their college or the Vice Provost for Graduate Education.

Graduate Grading Policies

Grading System

Grad Grade Exclusion
Grades for Projects, Theses/Dissertations and Seminars
Incompletes
Course Listing on the Graduate Transcript
Audited Courses

Grading System

The grading system uses grades:
A+(4.0), A(4.0), A-(3.7)
B+(3.3), B(3.0), B-(2.7)
C+(2.3), C(2.0)
F(0.0).

The following special grades are also used:
INC (Incomplete),
S (Satisfactory, B or better),
U (Unsatisfactory) for projects, theses/dissertations, and seminars only
AU (Audit)
W (Withdrawal from a course or from the University)
X (Withdrawal because of illness or personal emergency)
Y (Administrative dismissal),
Q (Never attended but did not withdraw. This grade requires a letter from the instructor to the University Registrar stating the student never attended the class.)
PR (In Progress for theses or dissertations)
NC (No credit for theses or dissertations where no progress has been made).

A student registering for research will do so each semester up to the total number recommended. No graduate degree will be awarded to a student whose cumulative average for course work in his or her program is below 3.0. Some programs may require a higher grade point average for graduation. The cumulative grade point average is computed from all graduate level courses taken for a grade at the University of Massachusetts Lowell.

Grade Exclusion

A request may be submitted to omit a specific course (grade and credits) from the GPA for matriculated students. Such a request must be presented on an Academic Petition, provide detailed justification for the specific action, and certify that the action has been approved by a majority of the departmental graduate committee. Only one grade exclusion in total, including a grade for a repeated course, will be permitted for each degree sought by the student as recommended by the departmental graduate committee. However, the official transcript will list grades for all undergraduate and graduate courses taken at the University with the notation that the grade and credits are excluded from the GPA. Grade substitutions are not permitted.

Grades for Projects, Theses/Dissertations and Seminars
Projects (Enrollment Restricted to Matriculated Graduate Students):

Only one of three grade designations will be allowed for projects:
- S for projects completed at a satisfactory level
- U for unsatisfactory completion of a project (no credit toward degree requirements)
- INC Incomplete

Theses/Dissertations (Enrollment Restricted to Matriculated Graduate Students):

PR will be given for thesis/dissertation research if the student has made satisfactory progress during the semester.
NC will be given if the student has made no progress during the semester on thesis/dissertation research.
U Unsatisfactory (no credit toward degree requirements)

After successful defense of the thesis/dissertation, a grade of “S” (Satisfactory) will be given for all semesters of the thesis/dissertation research. Only the Registrar’s Office can issue this grade.

Seminars:

- S - Satisfactory
- U - Unsatisfactory (no credit toward degree requirements)
- INC - Incomplete

Under no circumstances will letter grades (A, B+, etc.) be allowed for projects, theses/dissertations, or seminars.

Incompletes

If, because of unusual circumstances, a student is unable to meet all the requirements of the course by the end of a semester, the grade of Incomplete (INC) may be given. Responsibility for making arrangements with an instructor to complete all outstanding coursework rests entirely with the student, who must complete all outstanding coursework by the date listed on the (). Under no circumstances will a student be allowed to graduate with incomplete(s) on his or her transcript.

Prior to completion of the missing work, the incomplete will not be computed into the grade point average (GPA). If the student completes the missing work within the specified period, the instructor must evaluate the work and turn in a grade change form to the Registrar’s Office before the deadline for instructors to submit final grades for incomplete courses as specified on the (). However, if the student does not complete the missing work by the specified date and no grade change form is submitted by the instructor, the student's grade will automatically change to a grade of "F" and be computed into the GPA.

Course Listing on the Graduate Transcript

All graduate courses for which a student registers (including repeated courses) are listed on the transcript and are used to calculate the student's grade point average whether or not they are taken to fulfill degree requirements. In addition, undergraduate courses which a student takes to fulfill prerequisite requirements before or during matriculation in a graduate program, or courses taken for personal enrichment, will also be listed on the transcript.

Audited Courses

A graduate student may, upon approval of the advisor and the instructor, register for a course on an audit basis, but must pay the full amount of tuition and fees. An audit student is not required to take tests or the final examination. A change in registration from audit to credit or credit to audit must be done during the add/drop period. Under no circumstances can a course taken for audit be given credit at a later date.

Graduate Clearance

Applying for graduation is a two step process for graduate students.

First, the student must file a with the Registrar’s Office. The Registrar’s Office will mail the Graduate Clearance Form to students.

When the student receives the "Graduation Clearance" form, it must be completed, approved by all appropriate faculty and submitted to the Registrar’s Office by the date listed in the Graduate Academic Calendar.

The registrar's office will verify course credit credit, grade and GPA requirements, and submission of thesis/dissertation (if applicable) prior to the awarding the degree.

Additional Requirements for Students Completing a Thesis or Dissertation

All students who are completing a thesis or dissertation must also submit one clean copy (NOT the original) of the signature page for the thesis or dissertation. The signature page must be signed and dated by the thesis/dissertation advisor and all committee members. Copies of the Thesis or Dissertation must be submitted to the Library for binding and microfilming by the deadline dates listed for degree clearance. In addition, doctoral students are required to submit a completed "Survey of Earned Doctorates" at the time of earned doctorates. Unless the Registrar’s Office receives the completed signature page which verifies that a student has successfully defended the thesis/dissertation on or before the "last day to submit clearance forms" in the Graduate Academic Calendar and confirms that the thesis/dissertation has been submitted to the library, the
Graduate Grade Appeal Process for Students

The instructor of the class is the primary authority with respect to a student's proficiency and final grade in that course. A student who believes that his or her final grade reflects an erroneous, capricious, arbitrary, or prejudiced academic evaluation may appeal the grade. The academic judgment used in determining the merits of the grade to be awarded shall not be reviewable. This process does not apply to cases of academic dishonesty, which are adjudicated through the "academic dishonesty process."

1. The student may file an appeal of his or her complaint, in writing, to the instructor within 30 days after a final grade is posted to the student's record. The instructor must respond within 14 days of receiving the appeal.
2. If the student remains dissatisfied by the decision of the instructor under step (1), he or she may, within 14 days after formal receipt of the instructor's final decision, appeal, in writing, to the chairperson of the program (or the Dean of the College if the instructor is the chairperson) in which the course or other exercise or activity is offered. The chairperson must respond within 14 days of receiving the appeal. The decision may be: (a) that the appeal be dismissed; (b) if there is demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the chairperson will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or (c) that another appropriate remedy be administered.
3. If no satisfactory resolution is reached in step (2) then the student or the instructor may appeal, in writing, to the Dean of the College within 14 days after formal receipt of the chairperson's final decision.
4. The Dean, after discussion with the appropriate parties, may resolve the grievance by agreement or render a decision within 21 days of receipt of the written appeal. The decision may be: (a) that the appeal be dismissed; (b) if the student provides demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the Dean will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or (c) that another appropriate remedy be administered.
5. The decision of the Dean is final and not subject to additional appeal by either student or instructor. The appeals process ends at this step.
6. The Department chair or his/her designee is responsible for keeping a record of the appeal on file in accordance with University Records Retention Policy.

Registration and Enrollment Policies

Continuous Registration
Dropping Classes and Refund Policy
Changes in Registration
Change of Program

Continuous Registration

In order to maintain continuity of enrollment, a matriculated student must register each fall and spring until the program of study is complete and the degree has been earned. A graduate student who plans to receive his/her graduate degree in the summer term (awarded in October) must register during the previous summer session in order to maintain continuous matriculation.

If for any reason a student is not registered for a course (because of a leave of absence or because the thesis or dissertation has been successfully defended, but the final manuscript has not been submitted to the library), the student must register for CM.601.201 (Continued Matriculation) in order to maintain continuous registration. Since students are not allowed to register if they have outstanding financial obligations to the university, it will be necessary for them to clear their financial record in order to register for Continued Matriculation.

Continued Matriculation does not entitle a student to any use of university facilities, services or resources, but only maintains an active record and provides for appropriate mailings. Students who are engaged in academic work necessary to complete their thesis or dissertation, participate in a required full time internship or curricular practical training, or otherwise engage in or make use of University facilities or other resources must register for a minimum of 1 credit. (Note: Specific internship/CPT requirements will vary by department and students may be required to register for 3, 6, or 9 credits depending upon their program of study.)

The rules regarding the Statute of Limitations for the completion of master's and doctoral degrees still apply to students registered for Continued Matriculation.

All international students on F-1 or J-1 visas must register as full-time students (9 credits) each semester until their degree requirements are completed. Any variance from this policy must be approved by the International Student and Scholars Office.

A student who fails to maintain continuous matriculation loses the status of a degree candidate and must reapply to the () for readmission and for renewal of candidacy.

Dropping Classes and Refund Policy

Graduate students may drop courses during the first ten days of classes and receive a refund. No refund will be given after
these time periods. To formally withdraw from a course during this period, or thereafter, the student must drop the course through self service (). If the student fails to officially drop a course, he or she will remain enrolled and be required to pay for tuition and fees. In addition, if the student does not drop a course and does not attend classes, he or she will receive an "F" on the official transcript.

Changes in Registration

Courses may be added or dropped through self-service in (). In addition, students may change from audit to credit or from credit to audit during this period. Courses dropped during the first 10 academic days will not appear on the student's permanent record. No new courses may be added and no course may be changed from audit to credit after the tenth academic day. Thereafter, a student wishing to drop courses must do so by the date indicated in the Graduate Academic Calendar (). No refund of tuition and fees is allowed after the tenth day of the semester. The grade for these courses will appear as W on the student's record.

Change of Program

A graduate student wishing to change departments or transfer to a doctoral program upon completion of his or her master's degree must follow the steps listed below:

1. No transfers will be considered until the student has been in the original department in which he or she was accepted for at least one semester.
2. All sections of a new application sheet must be completed.
3. If so desired, the student may request that all test scores, letters of recommendation, etc., in his or her original file be used as part of his or her new application package.
4. The student must specify on the application form when his or her master's degree will be completed and when he or she will actually begin doctoral studies (for students applying to a doctoral program).
5. A check made payable to University of Massachusetts Lowell to cover the application fee must be included, or payment must be made by credit card when applying online.

Right of Access to Student Records

Access
University Student Records
Release of Student Records
Release Exclusions
Additional Information

Access

The Family Educational Rights and Privacy Act of 1974 (FERPA) grants any student currently in attendance, or any former student, the right of access to inspect or review his or her educational files, records, or data. Students who wish to inspect their records must file a Right of Access form with the office or department in which the desired record is kept. Right of Access forms are available in the Office of Student Services or through student self service. Wherever practicable, within ten days of receipt of the Right of Access form, the office or department will notify the student as to the date, time, and location when the desired record will be available for inspection. If a student believes that circumstances effectively prevent inspecting and reviewing the records at the designated date, time and location, he or she may request alternative inspection arrangements or copies of the records instead, subject to a fee for copies. The Dean of Students or the Dean’s designee will consider the request.

University Student Records

The University maintains the following general records on students:

Admission File - -

Permanent Academic Records - -

Financial Aid Records - -

Health Records - -

Account and Payment Records - -

Campus Conduct Records - -

The file of each student must contain a record of all non-University affiliated individuals or organizations requesting access to information in the file, plus statements that specify the legitimate educational purposes for which access was requested.

Except as otherwise permitted under FERPA, information or records concerning individual students may not be released to any individual or agency without the student’s written permission. Any request for such information received without such written permission will not be honored and will be returned with a request for a written release from the student.
Release of Student Records

FERPA allows release of a student's education records without the student's written permission under certain circumstances, including the following:

1. To personnel of the University, i.e., faculty, administrators, or staff for legitimate educational purposes only.
2. To officials of other institutions in which the student seeks admission or intends to enroll, provided that the student is notified of the release.
3. To federal or state officials in connection with the audit and evaluation of programs funded by federal or state governments, with the enforcement of legal requirements that relate to such programs, or in connection with the student's application for or receipt of financial aid.
4. To accrediting organizations in order to carry out their accrediting functions.
5. To parents who claim the student as a dependent on their IRS statement.
6. In connection with an emergency, to appropriate persons if revealing such information is necessary to protect the health or safety of the student or other persons.
7. In response pursuant to a validly issued subpoena, subject to advance notification of the student unless such notice is prohibited by court order.
8. As otherwise permitted under or consistent with FERPA.

The following data are considered informational in nature and may be released without the permission of the student, at the discretion of the University: student's name, major, acknowledgement of a student's participation in officially recognized activities and sports, weight and height of members of athletic teams, date(s) of attendance; degrees, certificates, awards received; the most recent previous educational agency or institution attended by the student and appointment as a Resident Assistant or Community Development Assistant. For graduate students who are teaching credit courses, work department, office address, and employment category are also defined as directory information.

Release Exclusions

Any student who wishes to have some or all of his or her directory information excluded from release by the University without prior permission must complete the appropriate selections available thru . ()

Additional Information

Any student who believes that his or her records are inaccurate or misleading may request a hearing with the Dean of Students to discuss the contents of such records and whether or not they need to be changed. Additional information on procedures or policies relating to University compliance with the Family Rights and Privacy Act can be obtained from the Office of Student Services or the Registrar's Office.

Statute of Limitations (Time Limit for Degree Completion)

A graduate degree, at either the master's or doctoral level, implies a significant mastery of a discipline within a specified time period. A well designed curriculum is not a mere collection of classes that add up to a set number of credits. It is, rather, a coherent selection of courses with an overall educational achievement that is greater than the sum of its parts. However, this coherence is lost if the program is completed over a long time span.

Master's degree requirements must be completed within a five-year period from the semester of admission. For those master's programs requiring 45 or more credits, the time limit is six years.

The doctoral degree must be completed within an eight-year period beginning with the semester of admission as fully matriculated or matriculated with conditions.

A student may obtain an extension of one year by filing an () signed by his or her coordinator, department chair, and college dean, and which is then submitted to the Registrar's Office.

Time Extension Appeal Procedure

In exceptional cases, an additional extension may be granted by the Graduate Policy and Affairs Committee (GPAC). In this case, the student must submit an (), a letter of explanation accompanied by a detailed schedule for degree completion, and a letter from the student's coordinator or thesis advisor in support of the request.

Test - Policy

Policy content goes here

Test New Policy DW

Content goes here

test
Withdrawal from a Course

A student finding it necessary to withdraw from a course must do so within the time specified in the graduate catalog. The student's permanent record will indicate a grade of W for the course(s) from which he or she has withdrawn unless the withdrawal has taken place within the first 10 class days of the semester during which time no record will be kept. (See in this Catalog for information on dropping a course.)

Withdrawal from the University

A student who wishes to withdraw from the University must submit his/her request in writing to the Registrar's Office. This procedure ensures that the student's academic and financial obligations are cleared before leaving the University. If a student officially withdraws from the University by the withdrawal date indicated in the graduate academic calendar, the permanent record will indicate a grade of W. If the student fails to follow the official withdrawal procedure and does not withdraw in good standing, the student will not be permitted readmission to a graduate program at the University except under extenuating circumstances.

All previous application materials will remain on file for a two year period. At any time during this period, a student who has officially withdrawn may request readmission by completing and submitting only the cover page of the graduate application and paying the application fee. After two years, a student must file a new, complete application and submit the appropriate fee to the Registrar's Office in order to be readmitted.

Test

With Massachusetts health care reform, thousands of people who didn't have health insurance in the past now have insurance but struggle to find primary care doctors. State policies limit what nurses can do and often create barriers to productivity. As a prescriber of medication, Padua knows this too well as she is overwhelmed with paperwork.

"A signature is required for everything I do," she explains. "I'd help meet the influx of demand for care but right now nurses are limited as to what they can do in certain states, including Massachusetts," she said.

Policy TEST PAGE

It's my Policy to Test the Testing Environment while Testing others!

Transcripts

In order to obtain a transcript, a student may print an unofficial transcript or order an official copy through self-service in the Registrar's Office. If ISIS is not available, a transcript may be ordered by filling out a form and submitting it to the University of Massachusetts Lowell Registrar's Office at 883 Broadway Street, Lowell, MA 01854.

Course Listing on the Graduate Transcript

All graduate courses for which a student registers (including repeated courses) are listed on the transcript and are used to calculate the student's grade point average whether or not they are taken to fulfill degree requirements. In addition, undergraduate courses which a student takes to fulfill prerequisite requirements before or during matriculation in a graduate program, or courses taken for personal enrichment, will also be listed on the transcript.

Transfer Credit

The following are minimal guidelines for transfer of credit. Individual departments are free to impose more stringent requirements. Only courses completed elsewhere within five years prior to the date of admission to a graduate degree program at the University of Massachusetts Lowell may be considered by the faculty of the department for transfer in accordance with the following regulations.

1. A maximum total of 12 graduate credits earned with a grade of B or better taken at another accredited institution may be transferred to a master's degree program (see individual programs for further restrictions, if any). A maximum of 24 credits with a grade of B or better may be transferred to a doctoral program. The limits of 12 credits toward a master's and 24 toward a doctoral degree do not apply to any credits earned at UMass Lowell by students while in a non-degree or undergraduate BA/MA or BS/MS status, provided the courses were taken within the department offering the master's or doctoral degree.

2. Grades of C or better for courses taken at UMass Lowell when the student held non-degree status may also be transferred (by Academic Petition) into a degree program. However, the 6 and 9 credits with grades below a B (graduation limit) for master's and doctoral degrees, respectively, (see Retention Policy) and calculation of the
cumulative grade point average based on all graduate courses taken at the University (see Academic Grades) remain in effect.

3. An official transcript and description of the course(s) must be submitted with the written request.

4. The courses presented must be from an accredited U.S. or Canadian institution authorized to grant graduate degrees.

5. The courses presented for a master's degree must not have been used in earning another master's degree.

6. The courses presented must be appropriate to the degree program for which the applicant is applying.

7. The courses presented must be graduate level.

8. Transfer credit may not be granted for research seminars, clinical courses, practica, internships, or special projects.

9. Transfer credit from another U.S. or Canadian institution must not exceed equivalent course credit (typically 3) at UMass Lowell, and will be based on UMass Lowell's standard of 37.5 semester contact hours being equal to 3 credits. One and two course credit transfers will also be considered providing they are proportional to the 37.5 semester contact hour standard.

10. Students who wish to transfer credit must file (within the first semester of matriculation) the Academic Petition form available from the Registrar's Office.

11. With the approval of the department, a maximum of 6 credits of 400 level courses taken at the University of Massachusetts Lowell with grades of C or better, not used for the baccalaureate degree, may be considered for transfer and counted toward the graduate degree.

University Appeals Process Regarding Academic (Non-Grade Appeal and Non-Misconduct) Issues

The underlying purpose of the University's appeals procedure is to guarantee due process and to protect the rights of both students and faculty in graduate programs.

The following procedure provides a mechanism for formal adjudication of any academic issues (non-misconduct and not related to grade appeal) which may arise. (For information regarding the process for grade appeals, see the Graduate Grade Appeal Process.)

Responsibility for initiation of each of the steps belongs to the appellant.

Step 1. If an informal discussion between the student and the instructor or individual with whom the student has a conflict does not resolve the issue, the resolution of an academic appeal of a student should begin within the department. The first step in the resolution of a problem or disagreement should be a discussion between the instructor, the student, and his/her faculty advisor or the coordinator of the program.

Step 2. If the matter cannot be resolved after such a discussion, a formal appeal, in writing and containing the pertinent facts, should be presented by the student to the chairperson/head of the department within two months of the occurrence that precipitated the appeal. Any appeal made outside this time period shall not be considered by any University body. The chairperson of the department will appoint committee composed of faculty members in the department. Within seven working days, this committee shall convene and discuss the appeal with the student and the instructor, coordinator, or individual with whom the student has a conflict. The student may be accompanied by his or her advisor or a faculty representative during the discussion of the appeal. The committee, by a majority vote after deliberations with only members of the committee present, shall render a decision within five working days and notify the appropriate parties in writing with the rationale for the decision included in the notification.

Step 3. If the decision of the departmental committee is not satisfactory to all parties, the appeal may be forwarded to the College Dean within two weeks of the decision of the departmental committee. The Dean will appoint a college committee composed of area coordinators of all graduate programs within the college or a suitable committee of faculty. The committee will be chaired by the college dean, or his/her designee. Within seven working days, the committee shall convene and discuss the appeal with the student. At this level the student may request to be present at the committee meetings, that discussions or proceedings be tape recorded, and that a transcript be prepared from the tape. The request for a recording must be made at the time the appeal is made to the college committee. The college committee shall render a decision by majority vote after deliberations with only members of the college committee present within five working days and notify the appropriate parties in writing with the rationale for the decision included in the notification.

Step 4. If the decision of the college committee is not satisfactory to all parties, the appeal may be forwarded to the Graduate Policy and Affairs Committee (GPAC) within ten working days after the decision of the college committee. The committee shall convene within 10 working days after the GPAC chairperson has received a written request for a hearing from the appellant, and discuss the appeal with the student and faculty advisor or representative. A request for recording and preparing a transcript of the discussions with the student present may be made at the time of appeal. The committee shall render a written decision within five working days and notify the appropriate parties. The decision of the Graduate Policy and Affairs Committee shall be final, and the information accumulated during the appeal procedure shall be forwarded to the Provost to be kept on file. If any decision involving the awarding of a degree is made and the official deadline for graduation exercises has passed during the appeal, the degree date will reflect the initiation of the appeal.

The above time periods define working days as days when classes are in session for the fall and spring semesters. Efforts will be made to honor the same time periods during intercession and June - August although some flexibility must be accepted by the appellant because of potential difficulties in assembling committee members during these periods.
The GPAC chairperson may modify the Step 4 hearing time framework at his/her discretion to coincide with regularly scheduled GPAC meetings. In either of the above cases, the appellant must be notified in writing by the hearing officer (along with an explanation) of any modification of the hearing time schedule. The chairperson may recommend that final voting/discussion of Step 4 cases be done in Executive Session with only committee members present.

University Disciplinary Procedures for Graduate Students

Academic Dishonesty -

Administrative Dismissal from the University

Administrative dismissal may be invoked when a student fails to comply, after due notice, with an administrative regulation of the University. Examples of some conditions which justify administrative dismissal are listed in the Undergraduate Catalog and apply to all students, undergraduate and graduate.

Non-Academic Misconduct

Improper conduct or behavior of graduate students is subject to the University of Massachusetts Lowell Student Conduct Code and Judicial Process (www.uml.edu/student-services/DOS_Documents/Student%20Conduct%20Code%20&%20Discipline%20Process.pdf). Copies of this document may be obtained from the Dean of Students Office.

Withdrawal Policies

Withdrawal from a Course

Withdrawal from the University

Withdrawal from a Course

A student finding it necessary to withdraw from a course must do so within the time specified in the graduate catalog. The student’s permanent record will indicate a grade of W for the course(s) from which he or she has withdrawn unless the withdrawal has taken place within the first 10 class days of the semester during which time no record will be kept. (See in this Catalog for information on dropping a course.)

Withdrawal from the University

A student who wishes to withdraw from the University must submit his/her request in writing to the Registrar’s Office. This procedure ensures that the student’s academic and financial obligations are cleared before leaving the University. If a student officially withdraws from the University by the withdrawal date indicated in the graduate academic calendar, the permanent record will indicate a grade of W. If the student fails to follow the official withdrawal procedure and does not withdraw in good standing, the student will not be permitted readmission to a graduate program at the University except under extenuating circumstances.

All previous application materials will remain on file for a two year period. At any time during this period, a student who has officially withdrawn may request readmission by completing and submitting only the cover page of the graduate application and paying the application fee. After two years, a student must file a new, complete application and submit the appropriate fee to the ( ) in order to be readmitted.

Admission to Upper Division

All BSBA students must apply to be admitted to the upper division program in a concentration of their choice upon completion of the filter courses listed below. Minimum criteria for admission to upper division are an overall grade point average of 2.00/4.00.

- 60.201 Accounting/Financial
- 49.201 Economics I
- 49.211 Statistics I
- 92.122 Management Calculus
- 42.101 College Writing I
- 42.102 College Writing II
- 47.101 General Psychology
- 48.101 Intro to Sociology

For students transferring from another institution, a course deemed equivalent to any of the above courses by the Manning School of Business will be used to meet this requirement.

Application for admission is submitted directly to the Office of the Dean. The application must include: a completed change of major form obtained from the Office of Enrollment Services, the Office of the Dean of the School, or any department in the School.
Admission to the Manning School of Business upper division is guaranteed for transfer students if they have completed an Associate in Science, Business Transfer Option, and the above mentioned courses.

Students who are not eligible to declare a concentration after earning 60 credits but who satisfy University retention requirements may file for intercollegiate transfer within the university. Students who are ineligible to file for intercollegiate transfer or are denied admission to another college following application for intercollegiate transfer are dismissed from the University.

Graduation Requirements

In addition to satisfying degree requirements listed in this catalog under "University Academic Policies" and under "Manning School of Business," MSB majors must also satisfy the following requirements:

A. Residency Requirement

MSB majors must take all required upper division courses in residence in the day programs of MSB. Any exceptions to this (for international study, etc.) must be approved by the appropriate department chairperson and the Dean or her designee prior to enrolling in such courses. No approvals for transfer credit of any required course taken at any other institution will be granted after the course has been completed except as noted above for transfer students.

B. Degree Requirements

In order to qualify for a Bachelor's Degree offered by the Manning School of Business, undergraduate students must satisfy all course requirements applicable to the major and their area of concentration and must earn a cumulative grade point average of 2.200 at completion of the baccalaureate program.

Policies for Undergraduate Programs

Please review the following:

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Special Academic Policies for Undergraduates

The following rules govern the applicability of courses satisfying curriculum requirements in any Manning School of Business concentrations:

A. Students may transfer a course that COM offers in its upper division (junior and senior years) if the course was taken at a school accredited by the AACSB, and a grade of ‘C’ or better was earned.

B. Upper division Manning School of Business courses (300 and 400 level) are restricted to matriculated students who have been admitted to the upper division program and have completed all prescribed prerequisites. Transfer students may not count any courses that require validation or which are not creditable to the MSB concentration towards this requirement.

C. MSB upper division courses are restricted to:
   1. juniors and seniors enrolled in MSB;
   2. juniors and seniors enrolled in another college of the University whose major requires completion of specific business courses; and
   3. special students who meet appropriate prerequisites.

D. An unrestricted (free) elective (designated non-MSB) for MSB students is any course satisfying one of the following criteria:
   1. a 100 or above level course from any college offered in the day program;
   2. a course listed as satisfying a University area distribution requirement;
   3. a course allowed by an approved academic petition.

Any course taken in violation of these rules may not be used to fulfill MSB curriculum requirements regardless of the grade

Undergraduate Admission Requirements

Students entering the University as freshmen in the Manning School of Business must be registered as Business Administration (BA) if pursuing the BSBA degree. Upon completion of the first semester of the sophomore year, BA students may apply to be admitted to the upper division program and to declare a concentration. The College offers concentrations in Accounting, Finance, Management, Marketing, and Management Information Systems (MIS).
Transfer students may apply for admission to the Manning School of Business according to the transfer rules described in sections II and III below. Business Administration students may apply for admission to upper division MSB programs described in section III.

**Undergraduate Transfer Rules**

The Manning School of Business welcomes transfer students from Massachusetts community colleges and other regionally accredited institutions to the BSBA program. All MSB students including transfer students from other accredited institutions and from other colleges of University of Massachusetts Lowell initially enter the BSBA program as Business Administration students. After completing the filter courses, students apply to be admitted to the upper division and to declare a concentration according to the upper-division admission policies stated in section III. Students entering UMass Lowell with an associate degree may apply to be admitted directly to the upper division. Transfer students who have not earned an associate degree and transfer more than 45 credits toward the BSBA program may apply to be admitted to the MSB upper division after completion of the filter courses. All students must complete at least 60 academic credits in residence at University of Massachusetts Lowell subject to exceptions specified in this catalogue.

Transfers from:

- Other Institutions
- Other UMass Lowell Departments
- Other MSB Departments

**A. Transfer From Other Institutions**

Students transferring to the Manning School of Business from any program not included in the Commonwealth Transfer Compact, with or without an associate degree, must have a cumulative grade point average of at least 2.500/4.000. Students may not transfer any course in which they earned a grade of less than C- (1.700 on a 4.000 scale). Courses at a level below the first MSB requirements, such as algebra or the first semester of a two semester precalculus sequence, are not transferable. Only Business Courses taken at other AACSB accredited institutions may transfer as upper division (junior and senior level) MSB courses.

**Transfer from Massachusetts Community Colleges**

Students transferring with an Associate in Science, Business Transfer Option, from a member of the Commonwealth Transfer Compact can transfer all courses up to a maximum of sixty-six (66) credits. Although all transferred courses are listed on the student’s transcript, due to differences in program requirements of different institutions, some courses may not apply to minimum degree requirements of the Manning School of Business. Courses at a level below the first COM requirements, such as algebra or the first semester of a two-semester precalculus sequence, are examples of such courses. However, the student transferring with an associate degree, Business Transfer Option, will be eligible to take upper level courses in the College of Management subject to the stated prerequisites for each course. Courses taught by the School as part of its upper division core that are not acceptable for transfer may be validated by departmental exam. Courses that are equivalent to courses taught by the School in the upper division (junior and senior level) which are not a part of the COM core requirements cannot be used to satisfy the minimum degree requirements of the BSBA degree in the Manning School of Business. Students transferring to the Manning School of Business with an associate degree are prohibited by University policy from pursuing further off-campus study.

**B. Intercollegiate Transfer**

Intercollegiate transfer students to the Manning School of Business must be in good standing and have completed at least 15 credits at the University of Massachusetts Lowell. Upon acceptance, students will be listed as Business Administration (BA) and will usually be permitted to enroll only in lower division courses.

The transfer request is normally initiated by the students and is submitted to the Manning School of Business. Students must submit a completed change of major form obtained from the Office of Enrollment Services, the Office of the Dean of the School, or any department in the School.

University of Massachusetts Lowell students intending to apply for intercollegiate transfer to the College of Management should do so preferably before completing 60 credits (prior to completing the sophomore year). This will minimize delays in completing their educational objectives since MSB upper division courses are restricted to juniors and seniors in the College of Management with appropriate prerequisites who have been admitted to upper division according to rules stated in Section III of the Policies for Undergraduate Admissions.

The Manning School of Business reserves the right to limit intercollegiate transfer activity if student enrollment capacities are met.

**C. Transfer from Other MSB Departments**

Once admitted to the Manning School of Business upper division program, students can choose to enroll in any concentration within MSB. Depending on the number of unrestricted electives available in the curriculum of the concentration students are entering and the number of credits completed by the students at the time of transfer, some courses may not be usable in the students’ new program, requiring students to take courses above and beyond the University’s minimum
graduation credit requirements. All courses stay on the students' transcripts at the University and are included in the determination of the cumulative grade point average as specified by University policies. Students shall not be permitted more than two intercollegiate transfers.

AFROTC Requirements

Uniforms, equipment, and textbooks required for AFROTC will be supplied. Students in the POC or on scholarship receive a monthly subsistence allowance of $250 to $400. Competitive scholarships are available for academically qualified cadets in the program. Students who successfully complete the POC are commissioned as second lieutenants in the United States Air Force and are required to serve on active duty in the Air Force for a minimum of four years.

Field Training

AFROTC field training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training, usually between their sophomore and junior years. Students applying for entry into the two-year program must successfully complete six weeks for field training prior to enrollment in the Professional Officer Courses. The major areas of study in the four-week field training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical training. The major areas of study included in the six week field training program are essentially the same as those conducted at four-week field training and in the General Military Course, including leadership laboratory.

Leadership Laboratory

AFROTC field training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training, usually between their sophomore and junior years. Students applying for entry into the two-year program must successfully complete six weeks for field training prior to enrollment in the Professional Officer Courses. The major areas of study in the four-week field training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical training. The major areas of study included in the six week field training program are essentially the same as those conducted at four-week field training and in the General Military Course, including leadership laboratory.

University Policies Concerning Aerospace Courses

Both General Military Courses (AS 100 and AS 200) and Professional Officer Courses (AS 300 and AS 400) in Aerospace Studies may be used as undesignated or unrestricted elective courses in a student's baccalaureate program. Grades for all AFROTC courses are applicable to the determination of grade-point averages. Students should consult the regulations of the college in which they are matriculating concerning the number of AFROTC courses which may be included as part of their programs of study. In the event that such elective courses are insufficient to accommodate all the AFROTC courses, students wishing to pursue the AFROTC program will be required to fulfill program requirements on an overload basis. Consequently, AFROTC credit toward graduation requirements will vary from six (minimum to meet AFROTC/University of Massachusetts Lowell contract requirements) to sixteen credits dependent on the student's particular college and degree program. Some colleges allow AFROTC courses to be substituted for technical general electives.

Academic Honors

Academic honors are of three types: University honors, honors in major fields, and dean's list (semester honors). Undergraduate students may qualify for University honors and the dean's list. Honors in major fields are available at the option of the major departments.

University Honors

The University recognizes baccalaureate graduates who have attained exceptional scholastic distinction. To be eligible for such recognition a student must achieve a minimum grade point average of 3.25 for all courses completed at the University and must have earned a minimum of 60 credits from the University of Massachusetts Lowell. A total of nine (9) credits of departmental exam and/or courses graded "S" may be used toward the 60 credits needed to be considered for University Honors. Credits taken on a Pass/Fail basis may not be counted toward the 60 credit requirement.

Three levels of distinction are noted at commencement:

Summa Cum Laude 3.85 - 4.0
Magna Cum Laude 3.500 - 3.849
Cum Laude 3.250 - 3.499

University honors are officially entered on the permanent record of students.

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Academic honors are of three types: University honors, honors in major fields, and dean's list (semester honors). Undergraduate students may qualify for University honors and the dean's list. Honors in major fields are available at the option of the major departments.

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Three levels of distinction are noted at commencement:

Summa Cum Laude 3.85 - 4.0
Magna Cum Laude 3.500 - 3.849
Cum Laude 3.250 - 3.499

University honors are officially entered on the permanent record of students.
In addition to honors awarded by the University, honors in major fields may be awarded by the colleges in which students are enrolled or (in the case of Continuing Studies students) by the colleges that exercise academic jurisdiction over the program in which they are enrolled. Recommendations for such honors are made by the faculty of the student's major department (or by interdisciplinary committees that exercise academic jurisdiction over the student's major studies) for outstanding achievement in the major field. In order to qualify for such honors, the student must fulfill the following requirements:

- complete a minimum of 24 credits in the major field at the University of Massachusetts Lowell;
- fulfill any honors requirement specified by colleges, departments, or interdisciplinary committees in the major field;
- achieve a certain grade-point average as specified below.

**High Honors**

4.00 in all courses that are taken in the major field at the University of Massachusetts Lowell.

**Honors**

3.50 to 3.99 in all courses that are taken in the major field at the University of Massachusetts Lowell with no course grade in such courses less than B.

Honors in the major field are not noted on the permanent records of students.

**Dean's List (Semester Honors)**

At the end of the fall and spring semesters, the dean of each college issues a list of undergraduate students who have achieved distinguished semester records. The dean's list recognizes students who have completed full-time programs (at least 12 credits of which must have been qualitatively graded) with a minimum gpa of 3.25, no grade less than C, and with no grades of INC (Incomplete). (Please note that students who are approved through Disability Services for a reduced course load in accordance with the American Disabilities Act (ADAAA) will be exempt from the 12 credit minimum).

**University Honors Program**

Undergraduate students enrolled in the University Honors Program who complete all program requirements graduate as Commonwealth Honors Program Scholars.

**Academic Integrity**

The integrity of the academic enterprise of any institution of higher education requires honesty in all aspects of its endeavor. Maintaining academic integrity is therefore the responsibility of all faculty, staff, and students at the University of Massachusetts Lowell.

Academic dishonesty is prohibited in all programs of the University. Sanctions may be imposed on any student who has committed an act of academic dishonesty.

**Definitions of Academic Dishonesty**

Academic dishonesty includes but is not limited to:

- **Cheating** - use, or attempted use, of trickery, artifice, deception, breach of confidence, fraud, or misrepresentation of one's academic work. Submission of the same work in its entirety for credit in two courses without obtaining the permission of the instructors constitutes cheating. Collaborating with others when not explicitly allowed by the instructor constitutes cheating.

- **Fabrication** - falsification or invention of any information or citation in any academic exercise.

- **Plagiarism** - representing, whether intentionally or unintentionally, the words or ideas of another as one's own work in any academic exercise.

- **Facilitating dishonesty** - helping or attempting to help another commit an act of academic dishonesty, including substituting for another in an examination, misrepresenting oneself, or allowing others to represent as their own one's papers, reports, or academic works.

**INITIATING CHARGES OF ACADEMIC DISHONESTY**

Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. The procedures outlined below are intended to provide the process by which sanction may be imposed if it appears that academic dishonesty has occurred, and by which students may appeal such sanctions.

These procedures apply to all students participating in academic classes and programs, including all graduate, undergraduate, and CSCE programs. The procedures associated with this policy are the only official procedures for making allegations of, issuing sanctions because of, or appealing charges of academic dishonesty.

Any instructor may initiate charges of academic dishonesty by following the procedures outlined below.
I. Determining Sanctions and Notification of Students

a. When academic dishonesty is suspected, the instructor (complainant) should bring the case to the attention of the complainant’s chair and discuss an appropriate course of action/sanction.

b. Possible sanctions include a reduction in grade in an assignment or exam; a zero or failing grade in an assignment or exam; a forced repeat of an assignment or exam; a reduction in grade in a course; a recommendation of a grade of FX (non-deletable failure); recommendation of suspension; or recommendation of dismissal.

c. If a sanction is to be applied, the instructor must notify the student, in writing or orally, of the incident observed and the sanction that will be imposed. Such notification should be made within a reasonable period, not more than 14 days after recognizing the incident.

d. The instructor must maintain a record of the notification.

Notification to the Provost by the Instructor

a. Notification to the Provost by the instructor must occur within a reasonable period, not more than 10 days after informing the student. The instructor must fill out a "Notification of Academic Dishonesty Form" (pdf) available online on Office of the Registrar's website at www.uml.edu/docs/notificationofacademicdishonesty_tcm18-3543.pdf and email or fax this form to the Provost or designee. In lieu of the form, an email with the necessary information will suffice.

b. The Provost or designee will send the student official notification of the sanction via certified and electronic mail and include notification of the right to appeal. Such official notification must be sent to the student within a "reasonable" time frame, not to exceed 21 days of receipt of the "Notification of Academic Dishonesty Form."

c. The Provost or designee also informs (in writing) the dean and chair of the complainant's department of the complaint and sanction.

d. The Office of the Provost will maintain this information and record the sanction. The record will be kept until the student graduates the University of Massachusetts Lowell. If there is a record of multiple complaints the provost or designee may apply more severe sanctions including suspension and dismissal.

If the student does not appeal the charges, the process is complete and the sanction is imposed.

First level of Appeal: Academic Dean

If the student denies responsibility or believes that the sanction is too severe, the student may appeal the sanction to the Academic Dean of the college of the complainant’s department or designee in writing, within 7 days of receiving notification of the sanction from the office of the provost. During the appeals process the student is expected to continue attending the class in which the sanction has been issued unless prohibited by department policy. The Academic Dean or designee will commence a review of the issues raised in the appeal and forward the decision to the office of the Provost as soon as practicable.

The Provost or designee must notify the student, by certified and electronic mail, and other relevant parties of the outcome of the appeal process. If the appeal is sustained on the grounds that the charge is not adequately supported then all records of the incident are destroyed. If the appeal is not sustained then records of the incident are maintained in the Office of the Provost.

Second level of Appeal: Office of the Provost

The decision reached by the Academic Dean or designee may be appealed to the Provost or designee if the student believes that he or she did not receive due process.

Grounds for Appeal of Due Process

An appeal shall be limited to a review of supporting documents and the process and outcome of the Academic Dean or designee for one or more of the following grounds:

- Bias by the Instructor, Academic Dean, or designee substantially influenced the outcome of the process to the detriment of the student.
- New, relevant information has come to light that was not available at the time of the hearing by the Academic Dean.
- Unusual procedures were followed or if the procedures outlined herein were not followed, to the detriment of the student.

Appeals may be filed by the student or complainant to the Provost or designee within 7 days of receipt of the decision. Such appeals shall be in writing and shall be delivered to the Provost or designee, and must be based on the "Grounds for Appeal" (above). The Provost or designee may decide to uphold the decision of the Academic Dean or designee or convene the Academic Integrity Appeals Board ("Board"). All decisions by the Provost or designee are final and may not be appealed. Such decisions will be made as soon as practicable.

The Provost or designee must notify the student, by certified and electronic mail, and other relevant parties of the outcome of the appeal process. If the appeal is sustained on the grounds that due process was not followed then all records of the incident are destroyed. If the appeal is not sustained then records of the incident are maintained in the Office of the Provost.

Academic Integrity Appeals Board
Membership: The Academic Integrity Appeals Board is chaired by the Provost or designee. The Provost or designee will vote only in the case of a tie. The Board consists of a minimum of three faculty members chosen by the Provost or designee with no two members selected from the same College and cannot include a faculty member within the department initiating charges of academic dishonesty.

Right to an Advisor: A student may elect to be accompanied at all proceedings of the disciplinary process by an advisor of his or her choice. The advisor must be a current member of the faculty, staff, or student body of the University. The role of the advisor in all cases is limited to advising the student during the academic dishonesty proceedings. The advisor may not speak on behalf of the student, or examine or cross-examine a witness, or address the process publicly during proceedings.

Accommodations for Students with Disabilities: The University of Massachusetts Lowell is committed to providing appropriate accommodations to students with documented disabilities so that all students have meaningful access to all University of Massachusetts Lowell programs and services, including the Academic Integrity Process.

All those with disabilities who are involved in the Academic Integrity Process, including accusers and accused students, advisors, and witnesses may seek accommodations for any stage of the Academic Integrity Process. Any student requesting an accommodation must do so far enough in advance to allow the request to be reviewed and an appropriate accommodation identified and implemented.

A request for accommodation can be made to the Director of Disability Services ("Director"), the designated Academic Dean, or the Provost. The requests will be reviewed by the Director, who will apply appropriate legal standards and University policies and procedures to determine what accommodation, if any, is appropriate. The student will be given an opportunity to have an interactive role in the review process (i.e., to discuss the request with the Director, before the Director completes the review). The Director may require the student to provide appropriate documentation from qualified health care professionals to support the request. In addition, the Director may consult, as appropriate, with the Academic Dean or the Provost, or another expert of the Director's choosing. The Director will make a decision in light of the student's particular disabilities and the nature of the Academic Integrity Process, upon reviewing any consultations, relevant documentation and relevant previous accommodations provided to the student. The student will be given an explanation of the Director's determination.

If the student requesting accommodations disagrees with the Director's determination on appropriate accommodations, he may appeal the determination to the Office of ADA Compliance (Office of Equal Opportunity and Outreach) within 7 days of the Director's decision.

Appeal of Provost Sanctions (Suspension or Dismissal)

Any additional sanctions applied by the Provost following multiple incidents of academic dishonesty must be appealed to an Academic Integrity Appeals Board as described above. The Board will be chaired by a designee of the Provost who has not participated in the process leading to the charges.

The Provost or designee must notify the student, by certified and electronic mail, and other relevant parties of the outcome of the appeal process. If the appeal is sustained on the grounds that the charge is not adequately supported then all records of the incident are destroyed. If the appeal is not sustained then records of the incident are maintained in the Office of the Provost.

Academic Policies

Each University student is subject to two sets of academic regulations—those of the University as a whole, which are cited in this section, and the academic rules of the college and program in which he or she is enrolled. The academic rules of colleges and programs are listed in sections devoted to college programs.

In registering for courses, each student assumes full responsibility for knowledge of and compliance with the definitions, regulations, and procedures for the University, as set forth in this publication. Moreover, in accepting admission to the University, each student assumes responsibility for knowledge of and compliance with the definitions, regulations, and procedures of the University pertaining to his or her student status as set forth in the appropriate University of Massachusetts Lowell publications.

Students who have questions about the interpretation or application of University academic policy should consult the dean of their college or the Office of the Provost.

Academic Standing

Academic standing and eligibility for a degree are determined by the quality of the student's course work.

Determination of Academic Standing
Appeal of Suspension
Academic Probation
Extended Academic Probation
Academic Dismissal
Fresh Start Program
Determination of Academic Standing

To ascertain the student’s academic standing, the University uses a point system, each qualitative grade having an equivalent numerical value.

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<td>A-</td>
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Quality points are computed by multiplying the number of course credits by the numerical value of the qualitative grade assigned. For instance, a three-credit course with a grade of B+ would carry 9.900 quality points (3 x 3.300). Grade-point averages and cumulative grade-point averages are obtained by dividing the number of quality points earned by the number of credit hours attempted.

Specified grade-point averages are computed solely on the basis of those courses attempted at the University of Massachusetts Lowell which have been qualitatively evaluated with the following letter grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.

Academic Standing

Students who are on Academic Warning or Academic Suspension after the Fall semester and are registered for a Winter Intersession course at the University of Massachusetts Lowell will have the grade for that course included in evaluation of their Academic Standing. The Academic Standing will be adjusted to include the grade received during Winter Intersession.

Students who are on Academic Warning or Academic Suspension after the Spring semester and are registered for Summer 1 classes offered May through June at the University of Massachusetts Lowell will have the grade(s) for those courses included in evaluation of their Academic Standing. The Academic Standing will be adjusted to include the grade received during the Summer 1 session.

The consequences of the academic standing of warning or suspension will not apply for students satisfying all degree requirements that semester.

All students are required to maintain at least a 2.000 average throughout their academic career. Academic records are evaluated at the end of each semester. No student, however, will be academically suspended without having at least one semester of academic warning.

The academic status of a student is one of the following categories:

Satisfactory Academic Standing

A student whose semester grade-point average is at least 2.000 and whose cumulative grade-point average is at least 2.000 is in Satisfactory Academic Standing.

Academic Warning

Beginning with the Fall 2011 semester, a first-semester freshmen whose grade point average (GPA) falls below 2.0 will not be placed on Academic Warning but will be notified that he or she is considered to be academically at risk and strongly advised to seek help through appropriate University Resources. After the first semester at the University the student will be subject to the following Academic Standings:

A student whose semester GPA is below 2.000 is placed on Academic Warning. A student on warning is still considered to be in acceptable academic standing, and may register for the following semester and participate in campus and athletic activities. Certain campus programs and activities may choose to prohibit the participation of students on Academic Warning. At the end of the student’s warning semester the student's cumulative grade point average must equal or exceed 2.000 to continue in Satisfactory Academic Standing.

Academic Suspension:

A student who was on Academic Warning at the end of the previous semester and whose cumulative GPA falls below 2.000 is placed on Academic Suspension. A student who is on Suspension may not enroll in the succeeding semester, and therefore may not represent the University in athletic programs nor participate in campus activities.

Academic Dismissal:
A student who was on Academic Suspension at the end of the previous semester and whose cumulative GPA at the end of the probationary semester is below 2.000 is automatically dismissed from the University.

**Appeal of Suspension**

A suspended student may submit a written appeal to the College Dean requesting permission to continue enrollment for an additional semester as academic probation. If permission to continue is granted, the program of study that must be undertaken and the minimum semester grade-point average that must be attained during the additional semester of academic warning will be made explicit.

Entering freshmen and transfer students who are permitted to initiate their University studies with summer school day courses should note that credits attempted in University summer sessions are included in grade-point averages. Subsequent to preliminary evaluations for retention purposes, the records of all students (including probationary students) are evaluated at the end of each semester.

Grades earned during summer session or winter intersession may be used to change a student's academic status prior to the beginning of the following semester. A student who has been suspended is prohibited from enrolling in any credit-bearing program of the University, including credit courses offered by continuing studies, in summer sessions, or in winter intersession. If a suspended student chooses to enroll in another accredited degree-granting institution, earns credit at that institution, and subsequently seeks to return to the University of Massachusetts Lowell, such credit may or may not be accepted in transfer at the University of Massachusetts Lowell, depending upon the specific circumstances.

Students who enroll in University summer school and/or continuing studies courses after they have been notified by the Office of the Registrar that they are suspended from the University for unsatisfactory academic standing are in defiance of University regulations. Grades received by such students will not be credited to University baccalaureate programs, even if the students are subsequently reinstated as probationary students or achieve satisfactory academic standing after reinstatement.

**Academic Probation**

A student who has been suspended from the University is entitled to apply to the suspension hearing office for immediate readmission as a probationary student in accordance with procedures enumerated under the admission policy heading Probationary Readmission.

Students who have been suspended and decide to remain un-enrolled for four semesters or more must apply for readmission on probation through the Office of the Registrar whenever they decide that they are prepared to undertake such a probationary period. The student will receive a letter that specifies the conditions of their probation, and the semester average that they must achieve during their probationary semester in order to achieve satisfactory academic standing.

Probationary students are prohibited from holding student offices or running for elective office and from representing the University in athletic or other activities.

A student who achieves the required minimum semester grade-point average during his or her probation is automatically reinstated as a student in satisfactory academic standing.

**Extended Academic Probation**

Students whose academic performance during a probation semester has significantly improved, but whose cumulative grade average is still slightly below 2.0, may apply to the suspension hearing office for an extended period of probation. Students who are granted such extensions will be notified in writing prior to the beginning of classes for the following semester that they have been granted an additional semester to achieve satisfactory academic standing.

Students who fail to achieve satisfactory academic standing and are not granted extensions of their probation by the Provost and students who are granted such extensions and fail to achieve satisfactory academic standing are dismissed from the University.

Students readmitted on probation should not withdraw from any course unless they withdraw from the University for emergency or medical reasons. A probationary student who withdraws from any course may thus be unable to satisfy the conditions of his or her probation and may be dismissed from the University at the end of the current semester of enrollment.

Probationary students who receive course evaluations of INC (incomplete) and who fail to make up their work prior to the beginning of the next semester are advised that they may not qualify for extension of their probation and may not register for or attend University courses (including continuing studies courses) until such time as a final determination of their status has been made. Probationary students who have received permission from the suspension hearing office to extend their make-up period should understand that such extension does not waive the requirement for a final determination of academic standing that is based upon grades for all probationary courses.

**Academic Dismissal**

Students on academic probation who fail to achieve satisfactory academic standing during their probationary semester and are not granted extensions of their probation by the suspension hearing office and students who are granted such extensions and fail to achieve satisfactory academic standing are dismissed from the University and are subsequently barred from
attending both day and evening courses.

While on dismissal, students are not allowed to make progress toward a University degree. Students who have enrolled in University summer school and/or continuing education courses after they have been notified by the Office of the Registrar that they are dismissed for unsatisfactory academic standing are in defiance of University regulations. Grades received by such students will not be credited to University baccalaureate programs even if the students are subsequently reinstated as probationary students or achieve satisfactory academic standing after reinstatement.

The University recognizes that dismissal from the institution for reasons of academic failure need not be permanent. Under the following circumstances readmission is possible.

Freshman and sophomore students [attempted less than 60 credits] who have been academically dismissed may qualify for readmission to the university as follows: 1) under the provisions of the Massachusetts Transfer Compact after completion of an associate's degree at a Massachusetts Community College; and 2) after a lapse of two years, under the provisions of the Fresh Start program.

Students of junior or senior standing at the time of dismissal may reapply to the University after an absence of at least two years, under the provisions of the Fresh Start program.

The procedure for readmission of academically dismissed students begins with filing an application with the Office of the Registrar. The final decision to readmit an academically dismissed student rests with the dean of the college in which the student was enrolled at the time of dismissal from the University.

**Fresh Start Program**

Students who have been absent from the University for two years or longer may be readmitted under the terms of the Fresh Start program. Under this program, a returning student will be treated as if he or she were a transfer student. Courses completed during earlier periods of enrollment with grades of C or above will be accepted toward graduation but will not be included in the cumulative average. Courses completed during earlier periods of enrollment with grades below C will not be counted toward graduation or included in the cumulative average.

A maximum of 75 earlier the University of Massachusetts Lowell transfer credits will be accepted toward graduation, and after readmission under Fresh Start the student must earn a minimum of 45 credits in residence at the University of Massachusetts Lowell in a matriculated program of study.

Courses taken in the academic major during earlier periods of enrollment must be approved by the major department before those courses can be counted toward the requirements of the major. (This provision is especially important in majors that undergo regular curriculum revision).

Students may opt to use the Fresh Start Program only once in their career at the University of Massachusetts Lowell.

**Administrative Dismissal**

A student may be administratively dismissed from the University through cancellation of registration for due cause, through suspension or expulsion for academic dishonesty (cf. Academic Dishonesty, Cheating and Plagiarism), and through disciplinary procedures for violations of good conduct. For information concerning procedures that govern violations of campus conduct contact the Dean of Students.

Administrative dismissal may be invoked when a student fails to comply, after due notice, with an administrative regulation of the University. Official notification of an administrative dismissal is noted on the permanent record card by the symbol X, which is entered for each course carried by the dismissed student.

Reinstatement of a student who has been administratively dismissed may be made only by application for readmission with the Office of the Registrar and only when the condition that has necessitated administrative dismissal can be ameliorated to the satisfaction of University officials. Examples of some conditions that may justify administrative dismissal are:

- forgery or fraudulent use of University records, documents, or forms; unauthorized entry into University records (including computerized records);
- non-payment of tuition, board, room charges, student fees, library fines, overdue University loans, and other official University fiscal obligations;
- failure to comply with a duly authorized administrative order relating to the safety of persons or the protection of University property;
- failure to submit required health forms to University Health Services.

**Attendance Policies**

Although the University does not require class attendance as a matter of institutional policy, course instructors may establish required attendance in their courses and specify penalties for student violations of such attendance requirements. Colleges also have this option and sometimes have adopted attendance policies for introductory courses and special learning situations.

**Instructor Attendance Policies**
At the beginning of each course, the instructor will inform students of any specific attendance regulations which apply.

**Attendance Requirements of the Veterans Administration**

In compliance with the requirements of the Veterans Administration (VA), all recipients of Veterans benefits, including eligible children of veterans, must certify their attendance at the University, under penalty of perjury through directions received with the students benefits.

**Absence of Students for Religious Beliefs**

Chapter 375, Acts of 1975 of the Commonwealth of Massachusetts, requires recognition of student religious beliefs as noted.

"Any student...who is unable, because of his religious beliefs, to attend classes or to participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or study or work requirements, and shall be provided with an opportunity to make up such examination, study, or work requirement which he may have missed because of such absence on a particular day; provided, however, that such make up examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said student such opportunity. No adverse or prejudicial effects shall result to any student because of his availing himself of the provisions of this section."

Students should inform the course instructor in writing of the day(s) when they will be absent. This should be done as early as possible in the semester and always prior to the day(s) the student will be absent for religious reasons.

**Bachelor's Degrees**

Undergraduate programs that are offered by the University of Massachusetts Lowell lead to one of the following degrees: Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Liberal Arts, Bachelor of Science, Bachelor of Music, Bachelor of Science in Business Administration, Bachelor of Science in Industrial Management, Bachelor of Science in Engineering, Bachelor of Science in Engineering Technology, and Bachelor of Science in Industrial Technology. The complete list of bachelor's degrees can be found at

**Commencement**

Graduation exercises are held once a year at the end of the spring semester. Undergraduates who have completed degree requirements during the previous summer term or fall semester are permitted to attend commencement exercises, and their names are listed in the commencement booklet. Attending commencement exercises is not compulsory, but all seniors are required to pay the specified graduation fee, which covers the cost of the diploma, academic attire, and incidental graduation expenses. An individual who wishes to receive a diploma by mail must notify their college dean and file their corrected address through student self service if he or she anticipates moving from a previously reported permanent address.

**Conferring of Degrees**

Diplomas are awarded three times a year: 1) in June for students completing degree requirements during the spring semester, 2) in October for students completing degree requirements during the summer term, and 3) in February for students completing degree requirements during the fall semester. Individuals who wish to submit verification of degree completion to employers or to graduate schools during the period between the end of their final grading period and the awarding of diplomas may obtain a letter of completion from their college dean. Duplicate diplomas are not issued for any reason.

**Course Descriptions**

Each course offering is designated by a two-digit or 2-4 alpha designated prefix and a three-digit course number. The digit or alpha designated prefix identifies a college department and/or special area. The three-digit course number identifies the course level.

Each college department and/or special subject area has been assigned an identifying digit or alpha designation. View the (on the Office of the Registrar's website.

**Course Numbers**

A course number consists of the three digits that follow the course/department prefix (for example, 92.131). Courses numbered 001-099 are pre-freshman and special undergraduate courses and do not carry baccalaureate degree credit. Those numbered 100-299 are lower-division undergraduate courses and those numbered 300-499 are upper-division undergraduate courses. The 400 level courses are generally limited to juniors and seniors majoring in a field but are open, with permission, to other advanced undergraduates and to graduate students.

Directed studies courses and practicum experience courses are generally limited by departmental policy to students
majoring in the area in which such courses are offered.

Courses numbered 500-599 are graduate courses open to upper division undergraduates with the consent of instructors and chairpersons. Courses numbered 600 and above are graduate courses open only to graduate students.

Course Restrictions

Special course pre-requisites, co-requisites, and enrollment restrictions are indicated at the end of the course description. A course listed as a pre-requisite must have been completed and passed prior to taking the course for which the pre-requisite is specified.

A course listed as a co-requisite must be taken during the same semester as the course for which the co-requisite is specified. Subject to college or department policy to the contrary, exceptions may be granted by the designated department chair.

Courses that carry such notations as "open for majors only" and "sophomore status required" are restricted to the specified students. Courses that carry the notation "permission of instructor" require instructor's approval. Approved students will be given permission numbers to enroll through self-service.

Courses at the 100-300 levels that do not carry pre-requisite, co-requisite, and enrollment restrictions are open for election by all students unless general restrictions have been listed under the department or course area heading, or unless policy of the college or department in which the student is matriculated prohibits such registration.

Course Equivalency Examinations

The University recognizes two types of course equivalency for which credit is awarded. These are 1) College Level Examination Program (CLEP) examinations, and 2) departmental examinations. Restrictions, where applicable, are noted below.

Subject to specified policies of academic departments, unusually qualified degree candidates are given the opportunity to demonstrate their special competencies and receive University credit for such competencies through established course equivalency procedures without having to fulfill classroom or faculty course requirements.

Students may demonstrate their special competencies through subject examinations of the CLEP and through departmental equivalency examinations. Credits granted through course equivalency procedures are so noted on the student's permanent record. However, no grades for equivalency examinations are recorded and examination credit so granted is not included in grade-point averages.

The purpose of course equivalency procedures is to provide credit for existing competencies — that is, those competencies which students possess prior to their applications for equivalency credit and prior to their registration for a University course.

Students may not receive credit for a specific proficiency examination if they have registered at the University in the same course for which the examination covers, if they have previously received a University grade either for that course or a course in sequence above the course for which they wish to take an examination, or if they have previously attempted an equivalent course at another institution. Credit for general examinations of CLEP may not be granted to students after their admission to the University as matriculating students. University departments reserve the right to refuse to grant by examination for those courses which are presented by a student for his or her major(s) and to deny recognition of previously granted credit for students who, prior to their declaration of major field, have received equivalency credit in their subsequently declared major.

Subject to the additional limitations of the college and program in which the student is enrolled, the maximum number of credits that a matriculating student may earn through course equivalency procedures is 30 semester credits. Students who have transferred to the University may not apply for equivalency credit in excess of a number determined by subtracting all course equivalency and transfer credits accepted by the University from the maximum of 90 total credits permitted for both transfer and equivalency credit. Nor may transfer students present equivalency credits in fulfillment of the major field residency requirement of 15 credits in University courses.

Course Requirements

Within the policies listed below, faculty members are permitted to establish their examination and course requirements.

Course Examination Policies

Final examinations are required for all undergraduate courses of the University unless exemptions have been granted by the department chairperson and the dean of the college. Exemption requests must be made by the end of the first month of the semester. Final examinations may not be given at a place or time other than those which have been specified by the Student Records Office.

There shall be no final examinations other than those administered during the final examination period. No hour examination shall be administered during the last five academic days of the semester unless exemption has been allowed by the college dean. Final take-home examinations may be submitted to instructors during the final examination period only. Take-home
examinations may be submitted only on the day and time at which the Student Records Office has scheduled the final examination for the course in question.

**Instructor Course Requirements**

By the end of the first full week of classes, instructors must distribute a written statement of requirements, pre-requisites and co-requisites for each course and section to all students and to the department chairperson. This statement must include a specification of the number and types of course evaluations to be employed throughout the semester (including approximate date and nature of the first evaluation), special requirements for completing assignments and taking examinations, and a definition of course attendance policy.

A minimum of three evaluations of student progress (written or oral examinations, written reports, recitations, laboratory techniques and reports, jury or performance evaluations) should be made in each course, with at least one evaluation being required during each half semester. Upon the request of a student, an instructor is required to provide a statement of the student’s course progress.

Appeals of grades or grading policies arising from alleged violations of established or published policies must follow procedures cited under the heading Grading Policies. The terms “grade” and “grading policy” refer 1) to all grades awarded, 2) to the computation of grades examinations including final examinations, tests, quizzes, papers, essays, laboratory reports, practicum experiences, and any other kind of academic activity for which a grade of any kind is awarded, and 3) the final course grade which is submitted to the Student Records Office.

**Declaration or Change of Major**

- Declaration of Major
- Declaration of Second Major
- Dual Degree Programs
- Change of Major
- Change of Major within College of Enrollment
- Change of Major with Intercollegiate Transfer

**Declaration of Major**

Students who have declared a major at the time of their admission to the University are officially enrolled in the college in which their designated major is offered and are referred by the college dean to the chairperson of the designated major for assignment of a faculty advisor.

Although the University does not require students to declare their major fields until they have achieved 60 semester credits, an early decision by students will greatly facilitate the selection of appropriate prerequisite courses for major fields.

Students enrolled in the College of Fine Arts, Humanities and Social Sciences are strongly encouraged to declare their major fields by the end of the freshman year. Students contemplating majors in chemistry or environmental sciences should initiate prerequisite course work immediately upon entrance to the College of Fine Arts, Humanities and Social Sciences and should make a declaration of major at this time or prior to the end of their freshman year.

Students in the College of Health Sciences should not delay declaration of major beyond their freshman year.

Additional course work beyond the minimum degree requirement and extension of the normal four-year period of study may be expected when individuals declare a major later than recommended above.

Students who make no declaration of major prior to the end of their sophomore year are listed as undeclared students for their first two years. Individuals who wish to designate a major which is offered by the college in which they are enrolled as undeclared students must secure the signature of the appropriate department chairperson (or the chairperson of the committee which exercises jurisdiction over an interdepartmental major) on a declaration of major form and must file the completed form with the Office of the Registrar. Individuals who wish to designate a major which is not offered by the college in which they are enrolled as undeclared students must file an approved form for intercollegiate transfer and declaration of major with the Office of the Registrar. This form requires the signatures of the dean of the college to which the student transfers and the appropriate department chairperson.

Undeclared students are advised that openings may be limited or unavailable in some programs and that different admission criteria may be applied to program or college applicants when staffing or facilities render it necessary to establish limits upon enrollments.

Students seeking professional advice regarding selections of majors, second majors, and minors should consult a college dean or a faculty advisor.

**Declaration of Second Major**

Students who wish to declare a second major should consult with their college dean to determine if a second major can be completed within specified degree requirements or will require additional study beyond the minimum degree requirements and extension of the regular period of baccalaureate study. Students who wish to declare a second major in the college in which they are enrolled as degree candidates ordinarily may do so by filing an approved declaration of second major with
the Office of the Registrar. Students who wish to declare such a major in another college of the University may do so only when regulations of that college and the college in which they are enrolled as degree candidates both permit. Such declarations require the approval of both college deans. Students who are permitted to carry two majors are assigned an advisor in each major department.

Individuals who are matriculating for the Bachelor of Arts degree may not count more than 72 credits in their two academic majors combined toward the minimum degree requirement of 120 credits. Students who present more than 72 credits in the two majors combined may not present less than 48 semester credits outside the two major fields in satisfying the minimum degree requirement of 120 credits. Accordingly, students who present more than 72 credits in the two majors combined must present a number of credits beyond the minimum degree requirement of 120 credits that equals the number of credits by which they exceed the combined major credit maximum.

Except as noted under the heading Dual Degree Program, students who elect academic majors in more than one college are candidates for one degree only; and they are considered to be degree candidates in the college of their initial major unless they indicate to the contrary by filing for intercollegiate transfer at the time they make a declaration of second major. Accordingly, a student who pursues academic majors in two colleges is subject to all degree requirements as specified by the college of his or her initial academic major and is subject only to major course requirements (including collateral and prerequisite courses for the major) as specified by the department of his or her second academic major. Individuals who pursue double majors within different degree programs will receive the degree that is designated for their initial academic major unless they also filed for intercollegiate transfer when they filed their declaration of second academic major.

Professional programs in business administration, engineering, health education, clinical laboratory sciences, nursing, exercise physiology, industrial management, industrial technology and Bachelor of Music programs may be designated as degree majors only. Although students in these programs may be permitted to pursue a second major in an academic field offered by another college, they are subject to all degree requirements are specified by the college for their professional major.

Dual Degree Programs

Students who wish to pursue a dual degree program must establish simultaneous matriculation in both programs and designate their candidacy for two degrees. The curricula for dual degree programs are approved by participating college faculties and must be completed as prescribed. It is therefore imperative that a student who wishes to pursue an approved dual degree program obtain a copy of the specified curriculum that enumerates the specific semester-by-semester course requirements. Students interested in this program must receive authorization from all relevant chairs and deans. The minimum credits to receive two degrees is 150.

Change of Major

Once students have begun a program of major studies, they may change their major field only by filing an approved change of major form with the Office of the Registrar. Students who make substantial changes in their plans of study after the beginning of their sophomore year, regardless of major, may find it difficult to complete degree requirements within the normal four-year period of study.

Change of Major within College of Enrollment

Students who wish to change their declaration of major within the college in which they are enrolled as degree candidates are required to file an approved change of major form with the Office of the Registrar. This form requires the approval of the chairperson of the major department to which the student desires to transfer and should be filed by November 1 for spring semester transfer and by April 1 for fall semester transfer to insure proper advising during the periods of fall and spring registration. Filing after the recommended dates may be permitted by the chairperson of the department with jurisdiction over the new major.

Change of Major with Intercollegiate Transfer

Students desiring to transfer from a baccalaureate continuing studies program to a baccalaureate day program, to transfer from a baccalaureate day program to a baccalaureate continuing studies program, must complete appropriate paperwork in the Admission Office.

An individual seeking an intercollegiate transfer must file a change of major form with the chairperson and dean having jurisdiction over the program to which transfer is desired. Following endorsement by both the chairperson and the dean, this form must be filed with the Office of the Registrar. Individuals petitioning for intercollegiate transfer are required to satisfy and maintain the admission requirements of their desired college and program.

Individuals seeking transfer from one college to another are advised that openings may be limited or unavailable in some programs, that different admission criteria may be applied to program or college applicants when staffing or facilities render it necessary to establish limits on enrollments, and that the completion of degree requirements within the customary four-year period may not be possible since the correction of deficiencies cannot always be accommodated within the schedule of course offerings.

The official date of intercollegiate transfer is the first day of the semester following approval of a student’s application. Since course registration may be conducted prior to the official date of transfer, students should make immediate arrangements for advising with the dean of the college to which they will transfer. Subsequent to approval of a student’s application for transfer...
and prior to the official date of transfer, the college dean will review the academic record of the student to determine the applicability of previously completed courses to the requirements of the college and, if appropriate, to the new major.

**Departmental Examinations**

Students who are interested in taking departmental examinations may obtain applications for such examinations from the Office of the Registrar at any time during the fall and spring semesters, but they must initiate the application process in sufficient time to permit the completion of examinations and the processing of examination results prior to the final deadline for filing course grades during the semester in which they are examined. Applications for departmental course-equivalency examinations are filed with the chairperson of the student’s major department, the chairperson of the department in which the examination is to be administered, and the faculty examiner.

Students may not repeat departmental equivalency examinations and, except for documented medical reasons or personal emergencies, they may not reapply for such examinations in the event that they fail to keep an examination appointment.

Examinations must be wholly or substantially written unless the nature of the course makes more appropriate an oral or performance examination. Departments may authorize instructors to administer end-of-semester examinations that are scheduled during the final examination period when such examinations are adequate measures of total course requirements. After the student has completed an authorized examination, the faculty examiner must file his or her recommendation for course credit with the Office of the Registrar by the final deadline for filing semester grades.

**General Degree Requirements**

To qualify for University degrees, baccalaureate candidates are required to obtain a minimum of 2.000 (C) average in their total course of study; to present a minimum of 120 semester credits; to fulfill the minimum residency requirement; to satisfy the regulations and academic standards of the colleges that exercise jurisdiction over the degree for which they are matriculating; to complete all curriculum requirements specified by the college in which they are enrolled and department(s) in which they are majoring; and to complete the University general education requirements.

**General Education Requirements**

For students who enrolled in September, 2000 and subsequently...

**Residency Requirements**

Please note that all credits transferred may not be used to satisfy requirements in your program of study.

All candidates for baccalaureate degrees, must meet the residency requirement by completing a minimum of 60 semester credits at the University of Massachusetts Lowell except as indicated below. The following residency options apply, as specified, to candidates for baccalaureate degrees:

1. Complete three years at the University of Massachusetts Lowell, earning not less than 90 credits, and an approved junior or senior year program at another accredited baccalaureate institution, earning not more than 30 semester credits or the number of semester credits specified for juniors or seniors by those prescribed courses of study that are listed in this catalogue.

2. Complete an associate’s degree at a Massachusetts community college under the provisions of the Mass Transfer agreement and complete the last two years at the University, earning not less than 60 credits at the University of Massachusetts Lowell. An exception to this residency requirement, not to exceed 15 credits, may be granted by the Department Chair of the major field with the approval of the College Dean at the time of initial matriculation at the University of Massachusetts Lowell.

3. Complete up to the first two years in an accredited two-year institution, earning not more than 60 semester credits with grades of C- (1.700 on a 4.000 scale) or better, and the remaining years in the University, earning not less than 60 semester credits. An exception to this residency requirement, not to exceed 15 credits, may be granted by the Department Chair of the major field with the approval of the College Dean at the time of initial matriculation at the University of Massachusetts Lowell.

4. Complete up to the first three years of a baccalaureate program in an accredited four-year institution, earning not more than 90 semester credits, with grades of C- (1.700 on a 4.000 scale) or better, and the remaining year(s) in full-time study in University classes, earning not less than 30 credits.

An individual who has been admitted to day courses of the University as a non-matriculating (special) student is not considered a student in residence. If subsequently admitted as a matriculating student, such an individual must petition the college dean for recognition of non-matriculated courses. Up to 15 credits of non-matriculated day courses may be recognized for application to the minimum residency requirements of 30 semester credits of University courses.

**Off Campus Study**
Once students have matriculated at the University of Massachusetts Lowell, they are expected to complete their coursework at the University of Massachusetts Lowell. Such coursework may also include credits earned through approved study-abroad programs. In some cases, in order to clear a deficiency or to remain on track for graduation, a student may seek permission for off-campus study to take a course at another accredited institution. Even when authorization for off-campus study is granted, all students are required to fulfill their University of Massachusetts Lowell residency requirements.

Matriculating students in satisfactory academic standing may be permitted to apply off-campus courses to their degree programs when they comply with established procedures. Students wishing to apply credits earned off-campus must obtain approval prior to off-campus enrollment, through an (pdf) form () available in the Office of the Registrar.

Off-campus courses may be taken in regionally accredited institutions only, and ordinarily should be taken at baccalaureate colleges or universities. Permission to pursue off-campus courses in regionally accredited associate degree institutions may be granted to students only for courses which are to be presented for lower-division requirements of University of Massachusetts Lowell curricula and provided that such courses do not lead to a violation of the University Residency Requirements. All off-campus courses must be taken under the regular grading system and may not be taken on a pass-no credit (pass/fail) basis.

To view the list of courses approved by departments for transfer into the University of Massachusetts Lowell, visit the Transfer Dictionary on the Registrar’s Office website.

**University Restrictions Concerning Off-Campus Study**

Students are not permitted to pursue off-campus courses until an initial evaluation of their academic progress at the University has been made. Students who have transferred to the University with 60 or more semester credits, or who have been admitted from another institution with a baccalaureate degree to pursue a second bachelor’s degree, are not permitted to pursue off-campus studies. Students who combine University courses with off-campus courses during the regular academic year are subject to University restrictions on semester course loads.

**Residency Requirement for Major Fields**

Baccalaureate degree candidates must complete at least 15 semester credits within the academic department(s) in which they are majoring for each major presented for a degree. Upon the approval of the appropriate college dean, the course requirement of 15 credits within the major department may be satisfied through satisfactory completion of courses in the University of Massachusetts Lowell Continuing Studies Division.

**Residency Requirement for Active Duty Service Members, their Spouse and College-age Children**

The University of Massachusetts Lowell will limit academic residency to twenty-five percent (30 credits for bachelors degree, 15 credits for associates degree) or less of the degree requirement for all degrees for active-duty servicemembers and their adult family members (spouse and college-age children). In addition, there are no “final year” or “final semester” residency requirements for active-duty servicemembers and their family members. Academic residency can be completed at any time while active-duty servicemembers and their family members are enrolled. Reservist and National Guardsmen on active-duty are covered in the same manner.

**Dual Degree Program**

Students who wish to pursue a dual degree program must establish simultaneous matriculation in both programs and designate their candidacy for two degrees. The curricula for dual degree programs are approved by participating college faculties and must be completed as prescribed. It is therefore imperative that a student who wishes to pursue an approved dual degree program obtain a copy of the specified curriculum that enumerates the specific semester-by-semester course requirements. Students interested in this program must receive authorization from all relevant chairs and deans. The minimum credits to receive two degrees is 150.

**Grading Policies**

The following qualitative letter grades are employed by faculty members to characterize the quality of a student’s work in a course:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Superior Work: Highest Quality</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td>High Honors Quality</td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>High Quality</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>Basic Honors Quality</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td>Below Honors Quality</td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Above Satisfactory Quality</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td>Below Satisfactory Quality</td>
<td>1.7</td>
</tr>
</tbody>
</table>
In addition to the above qualitative letter grades, the following symbols are used to designate special enrollment provisions or course statuses and do not affect the student’s academic average:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>Audit</td>
</tr>
<tr>
<td>W</td>
<td>Withdrawn</td>
</tr>
<tr>
<td>CR</td>
<td>Credit Only</td>
</tr>
<tr>
<td>INC</td>
<td>Incomplete</td>
</tr>
<tr>
<td>W</td>
<td>Voluntary withdrawal (before deadline-to-withdraw indicated on academic calendar)</td>
</tr>
<tr>
<td>X</td>
<td>Administrative withdrawal</td>
</tr>
<tr>
<td>NC</td>
<td>No credit</td>
</tr>
<tr>
<td>P</td>
<td>Satisfactory Grade C- or Above</td>
</tr>
<tr>
<td>S</td>
<td>Satisfactory Grade C or Above</td>
</tr>
<tr>
<td>U</td>
<td>Unsatisfactory Failed</td>
</tr>
<tr>
<td>T</td>
<td>Transfer Credit</td>
</tr>
<tr>
<td>Y</td>
<td>Administrative Dismissal</td>
</tr>
</tbody>
</table>

**Midterm Grades**

Midterm grades are not official and do no factor into grade point average and credits earned. Midterm grades do not appear on transcripts. The grade is submitted by the faculty to inform the student of their current grade status.

All grades listed above may be used for midterm grading along with the following two grades:

- IDF In Danger of Failing
- FN Fail Never Attended

**Pass-No Credit Course Registration**

Students may elect to register on a pass-no credit basis for a maximum of four unrestricted elective courses. A student may not change his or her enrollment status from letter grade to pass-no credit or from pass-no credit to letter grade after the established deadline for adding a course.

A pass-no credit course cannot be presented in fulfillment of University general education requirements, major programs, minor programs, or specifically designated courses (collateral requirements) of an established curriculum. A grade of P indicates that a student’s performance merits an evaluation of C- or better. NC indicates that a course has been failed but that such failure is without prejudice to the student’s cumulative average. Although appropriate credits are granted to students when grades of P have been assigned, these credits are not qualitatively weighted and hence do not affect a student’s academic average. The entry NC will not keep an otherwise qualified student from dean’s list recognition.

**Satisfactory- Unsatisfactory Course Registration**

Certain courses (e.g., practicum experiences, advanced seminars, and directed studies) may be graded as satisfactory or unsatisfactory. A grade of S indicates that a student’s performance merits an evaluation of C or better. A grade of U indicates a course evaluation of less than C. Although appropriate credits are granted to students when grades of S have been assigned, these credits are not qualitatively weighted and hence do not affect a student’s academic average. A grade of U indicates that attempted course credits have not been granted and is awarded without prejudice to a student’s cumulative average.

**Incomplete Courses**

The symbol INC (incomplete) is a temporary notation which is assigned for incomplete work in courses when the records of students justify the expectation that they will obtain a passing grade but for emergency reasons they have missed a minor part of the course requirement. Any missed final examination or other final course evaluation requires a student explanation within 48 hours so the instructor can file the proper course notation with the Office of the Registrar.

A student who has evidenced an unsatisfactory course record, who has failed to complete a major portion of an instructor’s course requirements, or who fails to provide an instructor with a satisfactory reason for absence from a final examination or final course evaluation within the specified 48 hour period may not be assigned the letter symbol INC.

Responsibility for making arrangements with an instructor to complete all outstanding course work rests entirely with the student, who must complete all course work by the final week of classes for the succeeding semester.
At the end of the official make-up period (or, in the event of a substantiated student emergency, at the end of an extended make-up period), the Office of the Registrar will convert the temporary notation of INC to the appropriate permanent symbol. This permanent notation will be one of the following: 1) a letter grade which is filed by an instructor at the end of the make-up period to designate the final course standing of a student who has made up incomplete course requirements, 2) course work not completed by the final week of classes for the succeeding semester will convert to a grade of F, or 3) the letter symbol of X, which the dean of the college in which the student is enrolled as a degree candidate may authorize to designate that a student has withdrawn from the University after the end of the semester for documented medical or personal emergency (cf. University Withdrawal After the End of the Semester).

Limited extensions of the make-up period may be granted to students for serious medical reasons and for documented personal emergencies. Requests for such extensions are approved by the dean of the college in which students are enrolled as degree candidates and must be filed no later than one calendar week preceding the established deadline for instructors to submit final grades for incomplete courses.

Audited Courses

A student may enroll in credit courses as an auditor with appropriate approval. Forms and instructions for registration as an auditor may be obtained from the Office of the Registrar. No charge is levied on full-time students for audited courses. No credit or grade will be recorded for an audited course, but the symbol AU will be listed on the permanent record. A change from audit to credit status, or from credit status to audit, may not be made after the deadline for adding a course (10th class day).

Students who have audited a course subsequently may not earn credit in the same course through tests of the College Level Examination Program or through other authorized examination procedures for course challenge.

Grade Changes

At the end of each semester, grades are available to students via their self service account in ISIS. All course grades become a part of the student’s official record upon instructor assignment and may not be changed except as specifically provided by University procedures. Corrections of grade-point averages automatically are authorized when grade reports are corrected by instructors and when specific courses are deleted from grade-point averages under provisions of University regulations governing repeated courses and course deletions.

Changes of grades other than the filing of grades for incomplete courses require the endorsement of the appropriate college dean. Grade changes may not be made on a student’s permanent record after the deadlines cited in the academic calendar unless such changes have been authorized by appropriate college deans.

Course Grade Appeal Policy

The instructor of the class is the primary authority with respect to a student’s proficiency and final grade in that course. A student who believes that his or her final grade reflects an erroneous, capricious, arbitrary, or prejudiced academic evaluation may appeal the grade. The academic judgment used in determining the merits of the grade to be awarded shall not be reviewable. This process does not apply to cases of academic dishonesty, which are adjudicated through the “academic dishonesty process.”

1. The student may file an appeal of his or her complaint, in writing, to the instructor within 30 days after a final grade is posted to the student’s record. The instructor must respond within 14 days of receiving the appeal.
2. If the student remains dissatisfied by the decision of the instructor under step (1), he or she may, within 14 days after formal receipt of the instructor's final decision, appeal, in writing, to the chairperson of the program (or the Dean of the College if the instructor is the chairperson) in which the course or other exercise or activity is offered. The chairperson must respond within 14 days of receiving the appeal. The decision may be: (a) that the appeal be dismissed; (b) if there is demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the chairperson will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or (c) that another appropriate remedy be administered.
3. If no satisfactory resolution is reached in step (2) then the student or the instructor may appeal, in writing, to the Dean of the College within 14 days after formal receipt of the chairperson's final decision.
4. The Dean, after discussion with the appropriate parties, may resolve the grievance by agreement or render a decision within 21 days of receipt of the written appeal. The decision may be: (a) that the appeal be dismissed; (b) if the student provides demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the Dean will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or (c) that another appropriate remedy be administered.
5. The decision of the Dean is final and not subject to additional appeal by either student or instructor. The appeals process ends at this step.
6. Department chairs are responsible for keeping a record of the appeal on file in the department until the student is no longer a student.

Language Requirements

Students enrolled in Bachelor of Arts programs in the social sciences and humanities (with the exception of Economics) are required to demonstrate intermediate level proficiency in a foreign language. Students with documented learning disabilities may be allowed to fulfill the language requirement through an alternate set of courses. Such students should file appropriate
documentation with the office of Disability Services, at which time they will receive information on their alternative requirement.

For information on test scores that may be applied to the foreign language requirement, please consult .

**Major Field Requirements**

Candidates for the Bachelor of Arts degree may not be required to take more than 45 credits in their major fields. Candidates for the Bachelor of Science degree may not be required to take more than 60 credits in their major fields. However, candidates for either degree may elect to take additional courses in the major beyond the specified maximum providing that such additional courses are not presented for the minimum degree requirement of 120 credits.

Credits for each course may be counted only once in a student’s program of studies. A course which is specified as a requirement for both a student’s major and minor will satisfy both requirements, as stated, but course credits may not be counted more than once and may be applied to one category of a student’s program of studies only. Individual departments may have a more restrictive policy.

**Maximum Period of Bachelor’s Degree Study**

Depending on the nature of the subject and discipline, courses taken by a student may become obsolete for curricula of the University when they have been completed over a period of time that exceeds the customary period for bachelor’s degree study. Accordingly, University departments reserve the right to delete courses from a student’s program of study when such courses have been determined to be obsolete for the curriculum in which the student is enrolled.

**Minor Area Requirements**

The requirements for minors are established by University departments or by interdisciplinary committees. No minor program may consist of less than 18 semester credits in the minor field or more than 24 semester credits. At least six credits must be completed at the upper-division course level for all minor studies. Students are advised that an aggregation of courses that totals 18 or more credits may not constitute a minor field. Specific options for minor programs depend on the major field which a student has elected to pursue and the collateral course requirements specified by major departments. Individuals interested in electing a minor program should consult the relevant section for curriculum requirements and prerequisites.

Credits for each course may be counted only once in a student’s program of studies. A course which is specified as a requirement for both a student’s major and minor will satisfy both requirements, as stated, but course credits may not be counted more than once and may be applied to one category of a student’s program of studies only. Individual departments may have a more restrictive policy.

Students in the College of Fine Arts, Humanities, and Social Sciences should consult additional College policies on minors at the FAHSS Policies and Requirements section of the catalog.

(http://www.uml.edu/Academics/minors.aspx)

**Off-Campus Study**

Once students have matriculated at the University of Massachusetts Lowell, they are expected to complete their coursework at the University of Massachusetts Lowell. Such coursework may include credits earned through approved study-abroad programs. In some cases, in order to clear a deficiency or to remain on track for graduation, a student may seek permission for off-campus study to take a course at another accredited institution. Even when authorization for off-campus study is granted, all students are required to fulfill their University of Massachusetts Lowell residency requirements.

Students wishing to apply credits earned off-campus must obtain approval prior to off-campus enrollment, through an Authorization of Off-Campus Courses form available in the Office of the Registrar.

Off-campus courses may be taken in regionally accredited institutions only, and ordinarily should be taken at baccalaureate colleges or universities. Permission to pursue off-campus courses in regionally accredited associate degree institutions may be granted to students for courses that are to be presented for lower-division requirements of University of Massachusetts Lowell curricula provided that such courses do not lead to a violation of the University Residency Requirements. All off-campus courses must be taken under the regular grading system and may not be taken on a pass-no credit (pass/fail) basis.

To view the list of courses approved by departments for transfer into the University of Massachusetts Lowell, visit the Office of the Registrar’s website (http://www.uml.edu/registrar/transfer/).

**University Restrictions Concerning Off-Campus Study**

Students are not permitted to pursue off-campus courses until an initial evaluation of their academic progress at the University has been made. Students must comply with current . Students who combine University courses with off-campus courses during the regular academic year are subject to University restrictions on semester course loads.
Full-Time Off-Campus Study

Off-campus courses may be authorized on a full-time basis for those students who have completed (or who will complete prior to graduation) three years of full-time study at the University of Massachusetts Lowell (earning no fewer than 90 semester credits) and who wish to pursue a year abroad or who wish to complete a year as visiting students at another baccalaureate institution while completing a University of Massachusetts Lowell degree. Prior to departure, students planning to undertake full-time off-campus study should present to the dean of the college of their enrollment an academic petition that seeks authorization of the proposed course of study. Following a review of the petition and of the proposed course of study, the dean will endorse the petition, informing both the student and the Office of the Registrar of the acceptability of the course of study to the student’s degree program.

Since some colleges of the University do not permit full-time off-campus study, students should ascertain the policy of their college before pursuing arrangements with other institutions. Students who wish to pursue full-time off-campus studies are advised that they must satisfy academic and residency requirements concerning courses in the major field (cf. General Degree Requirements: Residency Requirements)

Online & Continuing Education

Subject to University residency requirements and college regulations, the following categories of day students may be permitted to register for continuing studies courses at the University of Massachusetts Lowell and to have such courses credited to baccalaureate day programs:

1. individuals who have been admitted to day colleges for baccalaureate study;
2. individuals in satisfactory academic standing who are currently matriculating in day colleges of the University;* 
3. previously matriculated students in day colleges who withdrew from the University while in satisfactory academic standing, and who have been readmitted to programs in which they were previously enrolled;
4. full-time undergraduate day school student tuition and fees do not cover courses offered by Online & Continuing Education. Full-time undergraduate students who register for OCE courses will be charged OCE tuition and fees as specified on the OCE website (a minimum $900 per course);
5. In addition to the OCE tuition and fees, all students registered for OCE courses are charged a non-refundable $30 OCE registration fee.

Individuals are warned that departments reserve the right to deny baccalaureate credit for the University of Massachusetts Lowell continuing studies courses which have been taken in violation of University residency requirements, curriculum requirements of their baccalaureate day programs, and/or special college regulations. Students who have been suspended or dismissed from day programs of the University are prohibited from enrolling in any program of the University. Students who combine University day courses with continuing education courses during the regular academic year are subject to all restrictions concerning semester course loads (cf. Registration and Course Enrollment Policies).

*Students on Academic Warning are permitted to register for continuing studies, winter intersession, and summer school courses; students who have been suspended are prohibited from enrolling in any course offered by the University.

For further information visit Online & Continuing Education.

Programs of Study and Declaration of Intent to Graduate

All students are required to file with their advisor a copy of their final semester course registrations (including notification of course withdrawal) and an accurate account of courses taken, grades received, and changes of designated programs of study. Deadlines for conferring with faculty advisors concerning the completion of degree requirements and for filing final programs of study and declarations of intent to graduate with college deans are specified in the University calendar.

Each college has adopted a program of studies form that best reflects the nature of its degree programs. Forms employed by the College of Fine Arts, Humanities and Social Sciences and the College of Health Sciences have been standardized and designate three areas: University general education requirements, major requirements, and collateral programs (second majors, minors, and unrestricted elective courses).

Credits for each course may be counted only once in a student’s program of studies. A course which is specified as a requirement for both a student’s major and minor will satisfy both requirements, as stated, but course credits may not be counted more than once and may be applied to only one category of a student’s program of studies only. Individual departments may have a more restrictive policy.

At the end of the semester following the filing of a declaration of intent to graduate, the college dean verifies course completions and required cumulative and major averages. The names of students who have satisfied all degree requirements are then forwarded to the appropriate college faculty for endorsement and, finally, to the Office of the Provost, which orders appropriate diplomas for conferral at graduation. Students who unofficially complete all degree requirements and fail to file either a declaration of intent to graduate or a program of studies will not be recommended to the Office of the Provost and conferral of the degree will be delayed until an approved declaration has been filed.

Registration and Course Enrollment Policies

Students are required to register for courses during periods which are officially designated for registration unless they have
been authorized to make other arrangements by the dean of the college in which they are matriculated. Non-matriculated students are permitted to enroll for course loads only as specified by their conditions of admission and must comply with the policies (below) concerning semester course loads and reduced load status.

**Semester Registration**

**Semester Course Loads**

**Deadline for Changes of Course Enrollment Status**

**Semester Registration**

First time students are strongly encouraged to register in person. Returning students are required to register during the designated registration periods. They have satisfied the registration requirement when they have paid the required tuition and fees and have complied with the course drop and add process.

Students who pre-register for courses for which they subsequently fail to satisfy prerequisites must initiate changes of registration during the add-drop period. Students are not enrolled in classes for which they are not properly registered.

Student schedules are available through the university’s self-service website (). Students who believe that errors have been made in their registrations should consult with the Office of the Registrar prior to the deadline for adding courses. Students who do not check their schedule and, accordingly, fail to correct scheduling errors by established deadlines may not expect to have University regulations waived for their benefit.

**Course Additions**

Students who wish to add a course during the first five days of classes may do so in person at the Office of the Registrar or through self-service.

**Dropped Courses**

A student who wishes to drop a course may do so in person at the Office of the Registrar or through student self-service during the first ten days of classes.*

There are only two cases for which a drop is not necessary:

1. if the course is cancelled by the University; or
2. if courses (or sections) carry no credit and will not appear on their transcript

*Courses dropped during the first ten days of classes will not show on the permanent record. Courses dropped from the eleventh to the fiftieth day of class will be assigned a grade of W and will appear on the permanent record.

**Courses Cancelled by the University**

Students are not required to drop courses or sections that are cancelled by the University. If students wish to replace a cancelled course with another, they must follow the procedures above for course additions.

**Semester Course Loads**

The typical course load expectation for full-time students is 15 credits. Professional curricula may specify credits in excess of this number, in which case such specifications are regarded as regular course loads.

**Maximum Credit Loads**

Students may enroll for course loads in excess of 15 credits but are advised that course loads in excess of the number of credits specified by recommended courses of study may not be in their academic interests when their grade-point averages are less than 3.000.

Unless specified as part of an established course of study, course loads in excess of 15 credits are recommended for enrichment purposes only and should be taken as no-credit courses. In any event, a student is prohibited from registering for course loads in excess of 20 credits unless such loads are required by established University curricula or unless special permission has been granted by the dean of the college in which the student has established matriculation.

Students who are enrolled in curricula which do not require a semester course load in excess of 20 credits and who wish to obtain permission to carry such an overload must file an academic petition with the dean of the college in which they have established matriculation. Students who register for course loads in excess of 20 credits (including continuing studies courses) without the prior authorization of the dean of the college in which they have established matriculation will not receive credit for more than 20 credits per semester, and the college dean will determine which course(s) shall receive the administrative symbol of Y. Permission to carry course loads in excess of stated maxima will be denied when resources of a college or program render it necessary to establish limitations on course enrollments.

**Minimum Credit Loads**

Matriculating students are classified as full-time when they carry the course credit load in University day programs that is...
specified by their curricula. Full-time students are required to register for a minimum of 12 credits of day courses each semester. Please note that students who are approved through Disability Services for a reduced course load in accordance with the American Disabilities Act (ADAAA) will be exempt from the 12 credit minimum to be considered full time.

**Part-time Enrollment**

A student enrolled on a part-time basis is charged by the credit hour for tuition and all applicable fees.

Students enrolled on a part-time basis should understand that part-time enrollment may have an impact on financial aid and on eligibility for insurance through non-University agencies. Students who enroll for fewer than six credits may be required to begin repayment of student loans. Varsity athletes and international students on I-20 permits must enroll for a minimum of 12 credits per semester and may not be part-time students.

**Deadline for Changes of Course Enrollment Status**

The last day for students to add a course is the fifth day of class of the semester. To change sections within a course, and to change enrollment status from audit to credit or from credit to audit and from pass-no credit to letter grade or from letter grade to pass-no credit is the tenth class day of the semester. The last day for dropping a course with a course notation of W is the fiftieth class day of the semester. Students dropping a course during this time are charged full tuition and fees.

**Repeated Coursework/Course Deletions**

**Repeated Coursework/Course Deletions**

Course repetition is permitted only in accordance with the policies cited below, the provisions of which are applicable only to courses taken at the University of Massachusetts Lowell and consequently do not apply to off-campus courses.

A course substitution is not permitted under the provisions of this regulation unless a course has been dropped as a University offering and an alternate course has been authorized as a suitable substitution by the chairperson of the department that offered the course. Once a student has reached the credit limitations cited below, no further courses may be replaced for the purpose of grade substitution, nor may a student who has used the maximum number of course repetitions for the purpose of grade substitution petition to revoke one or more of these substitutions in order to permit course repetition and grade substitution in an additional course or courses.

**Grade Substitution/Deletion Rule**

Students who entered the University of Massachusetts Lowell as freshmen or transfer to the University of Massachusetts Lowell with fewer than 60 semester credits are permitted a maximum of 15 semester credits for course repetitions/deletions to remove grades of C- or below earned in previously completed courses from their cumulative grade-point averages. Transfer students who enter the University with 60 or more credits are permitted a maximum of 7 semester credits of course repetitions for this purpose. The number of actual course repetitions permitted for any student depends on the number of credits allocated to the courses that he or she wishes to repeat.

**Administrative Requirements**

**Repetition of Passed Courses**

Except for courses of a professional nature, which regulations of a particular college may designate as being non-repeatable, students may repeat a course previously passed with a grade of C-, D+, or D within the provisions of the grade substitution rule cited above. When a course previously passed has been repeated within the provisions of this regulation, the cumulative grade-point average is appropriately corrected for the semester in which the course is repeated. If the grade for the repeated course is lower than the original grade in the course, the lower grade may be deleted under the provisions of the grade deletion rule (see above). Credit is never granted twice for a course that has been passed and subsequently taken again and passed for a second time.

**Repetition of Failed Courses**

Except for courses of a professional nature, which regulations of a particular college may designate as non-repeatable, students may substitute passing grades for repeated failed courses in the computation of cumulative grade-point averages. Except for non-repeatable courses, students must repeat all required courses which they have failed. Courses in which F grades have been received must be repeated and passed before students may take courses for which those failed are prerequisites.

A course which is failed but is not required for a student's program need not be repeated, but other course work must be taken when a student's total degree program will fall short of the specified credit hours for degree requirements. Unless a failed course is repeated within the deadlines for grade substitution, cited above, both the original failing grade and the repeated course grade are counted in computing grade-point averages. Although the provisions of the grade substitution rule and the requirements for maintaining satisfactory academic standing may indirectly limit the number of failed courses which a student may repeat, no formal limitation is placed upon the number of failed courses that may be repeated.

**Repetition of Transferred Courses**
When competence is demonstrably inadequate, a student who has been granted transfer credit (and on this basis has been assigned to advanced courses for which the transferred course is a prerequisite) may be advised to repeat such transferred work at the University or to take a more elementary course than that which has been transferred.

Permission to repeat a transferred course is granted upon filing an academic petition form with the dean of the college. Since credit may not be granted more than once for the completion of any course, a condition for filing such a petition is the simultaneous filing of a request to revoke recognition of the previously transferred course.

Right of Access to Student Records

The Family Educational Rights and Privacy Act of 1974 (FERPA) grants any student currently in attendance, or any former student, the right of access to inspect or review his or her educational files, records, or data. Students who wish to inspect their records must file a Right of Access form with the office or department in which the desired record is kept. Right of Access forms are available in the Office of Student Services or through student self service. Wherever practicable, within ten days of receipt of the Right of Access form, the office or department will notify the student as to the date, time, and location when the desired record will be available for inspection. If a student believes that circumstances effectively prevent inspecting and reviewing the records at the designated date, time and location, he or she may request alternative inspection arrangements or copies of the records instead, subject to a fee for copies. The Dean of Students or the Dean’s designee will consider the request.

The University maintains the following general records on students:

- Admission File
- Admissions Office
- Permanent Academic Records
- Office of the Registrar
- Financial Aid Records
- Financial Aid Office
- Health Records
- Health Services Office
- Account and Payment Records
- Business Office
- Campus Conduct Records
- Dean of Students Office
- Academic Dishonesty
- Office of the Provost

The file of each student must contain a record of all non-University affiliated individuals or organizations requesting access to information in the file, plus statements that specify the legitimate educational purposes for which access was requested.

Except as otherwise permitted under FERPA, information or records concerning individual students may not be released to any individual or agency without the student’s written permission. Any request for such information received without such written permission will not be honored and will be returned with a request for a written release from the student.

FERPA allows release of a student’s education records without the student’s written permission under certain circumstances, including the following:

1. to personnel of the University, i.e., faculty, administrators, or staff for legitimate educational purposes only;
2. to officials of other institutions in which the student seeks admission or intends to enroll, provided that the student is notified of the release;
3. to federal or state officials in connection with the audit and evaluation of programs funded by federal or state governments, with the enforcement of legal requirements that relate to such programs, or in connection with the student’s application for or receipt of financial aid;
4. to accrediting organizations in order to carry out their accrediting functions;
5. to parents who claim the student as a dependent on their IRS statement;
6. to in connection with an emergency, to appropriate persons if revealing such information is necessary to protect the health or safety of the student or other persons;
7. in response to pursuant to a validly issued subpoena, subject to advance notification of the student unless such notice is prohibited by court order; and
8. as otherwise permitted under or consistent with FERPA.

The following data are considered informational in nature and may be released without permission of the student, at the discretion of the University: student’s name, major, acknowledgement of a student’s participation in officially recognized activities and sports, weight and height of members of athletic teams, date(s) of attendance; degrees, certificates, awards received; the most recent previous educational agency or institution attended by the student and appointment as a Resident Assistant or Community Development Assistant. For graduate students who are teaching credit courses, work department, office address, and employment category are also defined as directory information.

Any student who wishes to have some or all of his or her directory information excluded from release by the University without prior permission must complete the appropriate selections available thru student self service.

Any student who believes that his or her records are inaccurate or misleading may request a hearing with the Dean of
Students to discuss the contents of such records and whether or not they need to be changed. Additional information on procedures or policies relating to University compliance with the Family Rights and Privacy Act can be obtained from the Office of Student Services or the Registrar's Office.

Student Complaints

Student Complaints Arising from Grades and Grading Policy of a Faculty Member

Faculty members are expected, as a matter of right and professional standards, to recalculate any grade in which a computational error is alleged or suspected, provided that the student challenges the grade before the deadlines established by the policy on grade appeals ( ). Generally speaking grades may only be challenged when a faculty member is alleged to have violated University, college, or departmental academic regulations and policies, or to have violated the faculty member's own grading policy, as determined from the published course requirements for the course or section in question.

Complaints Concerning Classroom Matters Exclusive of Grades and Grading Policy

Students confronting classroom problems that are a source of legitimate concern are entitled to have their complaints heard and resolved according to the procedures specified below.

Classroom problems may include, but are not limited to, the following examples (but note that questions concerning grades and grading policies are reserved to the process specified above):

1. faculty failure to observe University policy and/or regulations, such as violating the regulation against scheduling examinations during the last week of the semester;
2. changing class schedules without the permission of the department chairperson and the college dean, or rescheduling final examinations (including setting a due date for take-home examinations) to a time and place other than that established by the Student Records Office;
3. terminating semester classes prior to the date specified by the University calendar;
4. failing to fulfill instructional obligations (such as unjustified cancellation of classes, frequent absenteeism, and lateness);
5. failing to provide and distribute a written statement of course requirements within the first 10 days of classes, which is mandated for all instructors;
6. failing to adhere to the written statement of course requirements; and
7. failing to post office hours or to maintain such hours.

Students normally should seek to resolve problems by discussion with the faculty member. If this is not feasible or if, after discussion, the matter cannot be resolved, the student must inform the faculty member in writing that he or she will initiate a formal complaint. This complaint must be in writing and addressed jointly to the chairperson of the department and the dean of the college in which the alleged problem and/or violation occurred.

After discussing the problem with the student and the faculty member, the chairperson and the dean determine whether the complaint is valid. (Should the subject of a formal complaint be a department chairperson, the review and determination will be made by the dean and the chairperson of another department.) Copies of the complaint, together with the written decision of the chairperson and the dean, will be sent to the student, the faculty member, the Provost, and the President of the MSP.

Formal complaints about classroom problems shall be initiated before the last day of semester examinations in the semester during which the violation is alleged to have occurred. The determination of the chairperson and the dean must be made within ten working days following receipt of the student complaint and, if unchallenged by the MSP, it is final.

Equal and Fair Treatment

Under federal and state laws, all students are protected from discrimination based on race, color, religion, national origin, disability, gender, (including sexual harassment), age, sexual orientation, marital or veteran status. If you feel that you have been discriminated against based upon any one of these areas, you must contact Equal Opportunity and Outreach (http://www.uml.edu/equal/). These protections also include retaliation for filing complaints of discrimination. Concerns regarding course offerings, instructor and student attitudes should also be directed to EOO staff.

Students are responsible for adhering to the policies of the University regarding equal and fair treatment.

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Eric's Policy

Content goes here.

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Undergraduate Classification

Irrespective of the provisions of specific curricula and the number of full-time semesters completed by students, the University determines class standing on the basis of total credits earned (including AFROTC credits) in accordance with the following scales:

- Freshman standing 0-24 credits
- Sophomore standing 25-54 credits
- Junior standing 55-84 credits
- Senior standing 85 or more credits

Withdrawal from Courses

W and X are administrative symbols which indicate that a student has been authorized to withdraw from courses, or from the University. These symbols, which are entered upon the student's permanent record without prejudice, may be authorized only in accordance with established policies of the University. The grade of W signifies voluntary withdrawal from a course. It is initiated by the student and can only be applied prior to the deadline-to-withdraw indicated in the academic calendar, specified on the academic calendar. The grade of X signifies an administrative withdrawal from class. The grade of X is applied by the administration in circumstances where profound impact to academic performance due to a personal or immediate-family medical event, disability, death, or active military service is documented sufficiently. Disciplinary action may also result in administrative withdrawal from classes.

Students may not take more than two withdrawals (W's) in any given course.

Voluntary Course Withdrawal before the deadline-to-withdraw indicated on the Academic Calendar.

Students who desire to withdraw from courses with notations of W prior to the deadline-to-withdraw specified on the academic calendar may withdraw through ISIS self-service. Students who do not complete the process of withdrawal before the approved deadline will not be assigned course notations of W, will be subject to all instructor course requirements, and will receive final course grades assigned by the course instructors.

Students who voluntarily withdraw from all courses are withdrawn from the University.

Note that withdrawal from a course or courses may have implications for degree progress, veteran's benefits, health insurance, financial aid, and immigration status. Students are advised to consult their academic advisor as well as officials in appropriate offices prior to withdrawing from any course.

Administrative Course Withdrawal

Course withdrawal, with an assigned course notation of X, after the deadline-to-withdraw specified on the academic calendar for reason of a documented extended illness or critical personal emergency may be allowed and ordinarily requires withdrawal from the University, but partial withdrawal may be authorized if circumstances are warranted.

1. In order to apply for medical withdrawal the 'Request for Medical Withdrawal Form' with accompanying documentation from a licensed health service professional, must be submitted to the Office of Health Services. Health information is
covered by HIPAA laws and medical information received by Health Services is strictly private and confidential. In consultation with the Office of the Registrar, the Office of Health Services submits recommendations to the Provost’s Office for final review and approval.

2. Administrative withdrawal for non-medical reasons is initiated through an to the Office of the Provost with appropriate, verifiable documentation that corroborates the reason for withdrawal advanced on the petition.

3. Neither complete nor partial withdrawal will be authorized because a student anticipates a low or failing grade in the course (or courses) or because of the presumed effect of a low or failing grade on the student’s cumulative grade-point average.

4. Faculty are notified when the grade of ‘X’ is retroactively applied to a course for which a grade was entered. Typically administrative withdrawal is applied to a whole semester rather than to isolated courses. Medical withdrawals occurring after the approved withdrawal period are not associated with financial reimbursement of tuition or fees.

Withdrawal from University

All students who desire to withdraw from the University are required to:

1. discharge all financial obligations to the University,
2. return all University property, and
3. file a written notification of withdrawal with the Office of the Registrar. Since the date of official withdrawal as recorded by the Office of the Registrar is one basis of any claim for tuition refund, and it may be of importance in determining subsequent legal or student insurance claims, students should process withdrawal papers in person prior to leaving the University.

Students who absent themselves from the University without officially withdrawing will remain on class rosters until they officially withdraw from the University or until the end of the semester. Students who remain on class rosters after the fifteenth class day will be assigned final course grades. The date on which a withdrawal request is filed with the Office of the Registrar is the date on which withdrawal is academically effective and constitutes the basis for final course notations.

The names of students who have withdrawn from the University for any reason are removed from all rolls. Students who have withdrawn must be reinstated. This is accomplished through the Office of the Registrar.

Students who are recipients of benefits from the Veterans Administration may not process withdrawals from the University that violate their declarations of classroom attendance. Recipients of veterans benefits are advised that they must receive course grades when their requests to withdraw from the University have been filed after deadlines of the Veterans Administration for processing changes of declared benefit status or when their dates of withdrawal will conflict with declarations of classroom attendance.

University Withdrawal before Deadline-to-Withdraw specified on Academic Calendar

Students who register for courses and withdraw from the University prior to the first day of classes of a semester are withdrawn without record. Students who register for courses and who withdraw from the University before the deadline-to-withdraw specified on the academic calendar are withdrawn with course notations of W.

University Withdrawal After the Deadline-to-Withdraw specified on the Academic Calendar

A student who withdraws from the University after the Deadline-to-Withdraw specified on the academic calendar must be graded by all course instructors unless the student is authorized to withdraw for documented reasons of extended illness or critical personal emergency.

A student who wishes to withdraw from the University after the deadline-to-withdraw specified on the academic calendar must file an academic petition, together with appropriate documentation specifying the cause for the withdrawal, with the Office of the Provost. Following a review of the academic petition and verification of attached documentation, the Office of the Provost may permit the student to withdraw from all courses with course notations of X.

Withdrawal from courses may have implications for degree progress, veteran’s benefits, health insurance, financial aid, and immigration status. Students are advised to consult their academic advisor as well as officials in appropriate offices prior to withdrawing from class.

University Withdrawal After the End of the Semester

A student who has unofficially withdrawn from the University (i.e., has ceased attending classes) for reasons of extended illness or critical personal emergency and was unable to officially withdraw from the University before the end of the semester may petition to withdraw from all courses with course notations of X. Such a student must file an academic petition, together with supporting documentation, no later than one calendar month from the beginning of the following semester. This petition must be filed with the Office of the Provost. Following a review of the academic petition and verification of attached documentation, the Office of the Provost will notify the student and the Office of the Registrar of the decision. Faculty are notified when the grade of ‘X’ is retroactively applied to a course for which a grade was entered.

Readmission

Students who have withdrawn from the University may apply for re-admission through the Office of the Registrar. The form for
Pass-No Credit Course Registration

Students may elect to register on a pass-no credit basis for a maximum of four unrestricted elective courses. A student may not change his or her enrollment status from letter grade to pass-no credit or from pass-no credit to letter grade after the established deadline for adding a course.

A pass-no credit course cannot be presented in fulfillment of University general education requirements, major programs, minor programs, or specifically designated courses (collateral requirements) of an established curriculum. A grade of P indicates that a student’s performance merits an evaluation of C- or better. NC indicates that a course has been failed, but that such failure is without prejudice to the student’s cumulative average. Although appropriate credits are granted to students when grades of P have been assigned, these credits are not qualitatively weighted and hence do not affect a student’s academic average. A grade of U indicates that attempted course credits have not been granted and is awarded without prejudice to a student’s cumulative average.

Incomplete Courses

The symbol INC (incomplete) is a temporary notation which is assigned for incomplete work in courses when the records of students justify the expectation that they will obtain a passing grade, but for emergency reasons they have missed a minor part of the course requirement. Any missed final examination or other final course evaluation requires a student explanation within 48 hours so the instructor can file the proper course notation with the Office of the Registrar.

A student who has evidenced an unsatisfactory course record, who has failed to complete a major portion of an instructor’s course requirements, or who fails to provide an instructor with a satisfactory reason for absence from a final examination or final course evaluation within the specified 48 hour period may not be assigned the letter symbol INC.

Responsibility for making arrangements with an instructor to complete all outstanding course work rests entirely with the student, who must complete all course work by the final week of classes for the succeeding semester.

At the end of the official make-up period (or, in the event of a substantiated student emergency, at the end of an extended make-up period), the Office of the Registrar will convert the temporary notation of INC to the appropriate permanent symbol. This permanent notation will be one of the following: 1) a letter grade which is filed by an instructor at the end of the make-up period to designate the final course standing of a student who has made up incomplete course requirements, 2) course work not completed by the final week of classes for the succeeding semester will convert to a grade of F, or 3) the letter symbol of X, which the dean of the college in which the student is enrolled as a degree candidate may authorize to designate that a student has withdrawn from the University after the end of the semester for documented medical or personal emergency (cf. University Withdrawal After the End of the Semester).

Limited extensions of the make-up period may be granted to students for serious medical reasons and for documented personal emergencies. Requests for such extensions are approved by the dean of the college in which students are enrolled as degree candidates and must be filed no later than one calendar week preceding the established deadline for instructors to submit final grades for incomplete courses.

Audited Courses

A student may enroll in credit courses as an auditor with appropriate approval. Forms and instructions for registration as an auditor may be obtained from the Office of the Registrar. No charge is levied on full-time students for audited courses. A grade of AU indicates that a course has been audited, but that the symbol AU will be listed on the permanent record. A change from audit to credit status, or from credit status to audit, may not be made after the deadline for adding a course (10th class day).

Students who have audited a course subsequently may not earn credit in the same course through tests of the College Level Examination Program or through other authorized examination procedures for course challenge.

Grade Changes

At the end of each semester, grades are available to students via their self service account in ISIS. All course grades become a part of the student’s official record upon instructor assignment and may not be changed except as specifically provided by University procedures. Corrections of grade-point averages automatically are authorized when grade reports are corrected by instructors and when specific courses are deleted from grade-point averages under provisions of University regulations governing repeated courses and course deletions.
Course Grade Appeal Policy

The instructor of the class is the primary authority with respect to a student’s proficiency and final grade in that course. A student who believes that his or her final grade reflects an erroneous, capricious, arbitrary, or prejudiced academic evaluation may appeal the grade. The academic judgment used in determining the merits of the grade to be awarded shall not be reviewable. This process does not apply to cases of academic dishonesty, which are adjudicated through the “academic dishonesty process.”

1. The student may file an appeal of his or her complaint, in writing, to the instructor within 30 days after a final grade is posted to the student’s record. The instructor must respond within 14 days of receiving the appeal.

2. If the student remains dissatisfied by the decision of the instructor under step (1), he or she may, within 14 days after formal receipt of the instructor’s final decision, appeal, in writing, to the chairperson of the program (or the Dean of the College if the instructor is the chairperson) in which the course or other exercise or activity is offered. The chairperson must respond within 14 days of receiving the appeal. The decision may be:
   - (a) that the appeal be dismissed;
   - (b) if there is demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the chairperson will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or
   - (c) that another appropriate remedy be administered.

3. If no satisfactory resolution is reached in step (2) then the student or the instructor may appeal, in writing, to the Dean of the College within 14 days after formal receipt of the chairperson's final decision.

4. The Dean, after discussion with the appropriate parties, may resolve the grievance by agreement or render a decision within 21 days of receipt of the written appeal. The decision may be:
   - (a) that the appeal be dismissed;
   - (b) if the student provides demonstrable evidence of an erroneous, arbitrary, capricious, or prejudiced academic evaluation, then the Dean will recommend appropriate remedies that a grade be changed or the student be allowed an opportunity to retake an examination or other exercise; or
   - (c) that another appropriate remedy be administered.

5. The decision of the Dean is final and not subject to additional appeal by either student or instructor. The appeals process ends at this step.

6. Department chairs are responsible for keeping a record of the appeal on file in the department until the student is no longer a student.

Athletic Academic Policy

UMass Lowell Policy on Scheduling of Games and Practices

Preamble

The University of Massachusetts Lowell, first and foremost, is dedicated to the promotion of learning and scholarship, and to meeting the public need for educated citizens. The University achieves that goal by completing its three-fold mission of teaching, research, and public service. UML also values the role played by athletics in the life of the community. Student-athletes are representatives of the University in intercollegiate competition, and their athletic and academic excellence brings credit to UML. The University recognizes that student-athletes must balance the demands of their sport with the academic obligations they assume when they enter an institution of higher learning. The following policy is designed to acknowledge that challenge, and to assist the student athletes, as well as faculty members, coaches, and administrators, in managing conflicts that could arise between the legitimate demands of both academics and athletics.

Policy on Games During Academic Semester

1. UML student-athletes have the responsibility of notifying each of their instructors before the end of the period for adding classes about any possible conflict between scheduled class meetings, exams, or assignment due dates, and scheduled athletic contests, especially those involving travel off campus. Such notification shall be in writing or by electronic mail, and shall include specific information about the dates the student will not be in class, nor available for an exam. Student-athletes are responsible for completing all reading, and acquiring all lecture notes and other material introduced in the class during their absence.

2. UML faculty are requested to be flexible and offer reasonable accommodations for student-athletes whose schedule of intercollegiate athletic contests requires them to be absent from class, or miss scheduled quizzes, exams, or assignment due dates. The specific accommodation offered shall be determined by the faculty member, but might include make-up quizzes, alternate due dates, or rescheduling of exams. The faculty member retains the right to make the final determination about course scheduling, academic requirements, and assignment due dates. However, given that student-athletes represent the University when participating in competition away from campus, absence by a student-athlete resulting from his/her travel to, or participation in a regularly-scheduled intercollegiate athletic contest, about which the faculty member has been properly notified, shall not incur an academic penalty (i.e., lower grade), even when a portion of the grade in a course is based on attendance. This policy shall not apply to laboratory sections or clinical sections.
3. Except for absences resulting from travel to, or participation in regularly-scheduled intercollegiate athletic contests about which the instructor has been properly notified, UML student-athletes shall have the responsibility of attending class, sitting for exams, and meeting assignment due dates on the same schedule as other students enrolled in the same course, and may be penalized for absences other than those resulting from such travel or participation. 

Passed by the UMass Lowell Faculty Senate 4/6/2014.