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Application Procedure

Institutional Admissions Requirements

The general requirements for admission to graduate study at the university are listed below.

1. The applicant must show official evidence of having earned a baccalaureate degree or its U.S. equivalent from an accredited college or university. If an international transcript does not adequately demonstrate that an applicant has the equivalent of an American bachelor’s or master’s degree, the Office of Graduate Admissions will require such verification by an independent service such as the Center for Educational Documentation (http://www.cedevaluations.com/), Boston, MA (617-338-7171).

2. The degree must have been earned with a satisfactory scholastic average to demonstrate that the applicant has had adequate preparation for the field in which graduate studies are to be undertaken.

3. Certain graduate programs require graduate entrance examinations. The applicant must have obtained a satisfactory score on the appropriate entrance examination if required for admission by the program or department to which admission is sought. The official score report must be submitted; a photocopy of the examinee’s report is unacceptable.

4. The Commonwealth of Massachusetts requires that all full-time graduate students (9 or more credits) must be immunized against measles, mumps, rubella, tetanus, and diphtheria. In addition, all students in programs in the health professions, regardless of age or enrollment status, must show proof of immunization. Students will not be permitted to register for courses at the University unless proof of immunization has been sent directly to the Director of Health Services, University of Massachusetts Lowell, Lowell, MA 01854 978-934-4991.

Departmental Requirements

The rules, regulations, and policies delineated by the University constitute only the minimum requirements for admission, retention, and graduation. Each department may have additional requirements mandated by the unique nature of its programs. It is the responsibility of the graduate student to be aware of the minimum requirements of the University and, in addition, to fulfill the special requirements of the particular program in which he or she is enrolled.

Application Procedure for Graduate Admission

Applicants can apply using the online application.

- Master's & Doctoral Application
- Application Deadline
- Types of Admission
- Graduate Certificate Application Procedure
- Non Degree Status
- Graduate Readmission/Deferral Policy

Master's & Doctoral Application Information

A non-waivable and non-refundable application fee must be received before the application is processed. Each applicant must file the following documents:

1. A completed application form.
2. Official transcripts of all undergraduate and graduate records.
3. Letters of recommendation written by individuals qualified to judge the ability of the applicant to carry on graduate work and research as requested by the department. Refer to the department page to learn about the number of required recommendations.
4. Official scholastic test scores specified for various degree programs at the University (see individual departmental requirements). An applicant who has earned a graduate degree from an accredited university may petition the department graduate coordinator to waive the scholastic test requirements (e.g. GRE).

5. The official score report for an institutionally approved language test for students from countries where English is not the national language. The thresholds for English tests are set by the department.

Institutionally approved English tests: TOEFL, IELTS, Duolingo. All test scores must be official and sent directly by the testing agency.

Graduate Certificate Candidate Application Information

Graduate certificate programs are designed for students holding a baccalaureate degree in a field related to the certificate program. A student who wishes to apply to a certificate program must complete the Graduate Certificate Application, submit the appropriate application fee, and submit an official transcript indicating the conferral of a bachelor’s degree. The graduate record exam (GRE) and letters of recommendation are not required.

A student in a certificate program who wishes to enroll in a master’s or doctoral program is ineligible to receive credit towards a degree until he or she files a formal application and is then admitted as a matriculated student.

The maximum number of graduate credits a student may complete while enrolled in a graduate certificate is 12 credits.

Non-Degree Status

An individual without advanced degree objectives may take courses in certain programs with non-degree status. A student who wishes to take courses as a non-degree student must submit an official transcript indicating the conferral of a bachelor’s degree. A student in non-degree status is ineligible to receive credit towards a degree until he or she files a formal application and is then admitted as a matriculated student.

The maximum number of graduate credits a student may complete with non-degree status is 12 credits.

NOTE: International students are not eligible for non-degree status.

Graduate Readmission/Deferral Policy

1. A matriculated student who formally withdraws in good standing from the university may request readmission within two years by completing only the cover page of the graduate application.

2. A newly accepted student dropped from a
graduate program for failure to register may be re-admitted by submitting a new application cover page and fee within two years of acceptance date.

3. A matriculated student who fails to maintain continuous enrollment and has not formally withdrawn may be readmitted by submitting a new application cover page and fee within two years of being dropped from the program.

4. A student may request a deferment of enrollment up to one year beyond the date when he or she was scheduled to begin his or her graduate program. If the one-year time period is exceeded, the student must submit a new application and fee. Deferral must be requested before the start of the semester for which the student is accepted.

### Financial Assistance & Assistantships

#### FINANCIAL ASSISTANCE

- Applying for Financial Aid
- Other Types of Assistance

The Solution Center
(https://www.uml.edu/thesolutioncenter/financial-aid/default.aspx)
University Crossing Lobby
220 Pawtucket Street, Suite 131
Lowell, MA 01854
Telephone: 978-934-2000
Office Hours: Monday - Friday: 8:30 a.m. to 5 p.m.

Applying 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 (http://www.FAFSA.ed.gov). It is recommended that students 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.studentaid.ed.gov (https://www.studentaid.ed.gov/sa/fafsa/filling-out/fsaid).

Copies of students and spouses 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 Solution Center website. 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 each semester. (Minimum of six credits for graduate students).
- Cannot be in default or in over payment on a federal student loan.
- Register with the Selective Service, if required (www.sss.gov (http://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).

Types of Financial Aid:

**William D. Ford Federal Direct Subsidized/Unsubsidized Loan Program:** The primary source of financial aid recommended for
graduate students is the William D. Ford Federal Direct
Student Loan Program. This program allows the student to
borrow up to $20,500 per year at a low interest rate in subsidized and/or unsubsidized loans. Eligibility for a
subsidized or unsubsidized direct loan is determined from
the information provided on the FAFSA. A student may receive a
subsidized loan and an unsubsidized loan for the same
enrollment period. A subsidized loan is awarded on the basis of
financial need. A student will not be charged any interest
before repayment begins or during authorized periods of
deferment. 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. For
more information about graduate student aid contact visit the
Solution Center at www.uml.edu/thesolutioncenter
(https://www.uml.edu/thesolutioncenter/financial-
aid/Receiving-Aid/Types-Aid/graduate/loans.aspx).

**William D. Ford Federal Direct PLUS Loan Program:**
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 website (https://studentaid.gov/help-
center/answers/article/federal-direct-loan-program) 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 Solution Center
(https://www.uml.edu/thesolutioncenter/financial-
aid/Forms.aspx). Applications should be returned to the
financial aid for processing. This is a loan that needs to be
repaid by the parent/stepparent.

Other Types of Assistance:

**Federal Professional Nurse Traineeship Grant Program:** Federally funded grant available to graduate nursing students. Award amounts vary and are dependent upon funding. Please contact the School of Nursing for more information.

**Federal Teach Grant:** Federally funded grant available to qualifying graduate education majors enrolled in coursework or plan to complete coursework toward a career in teaching in a high need subject area. Contact the Graduate School of
Education for more information.

**Deans Fellowships:** $2,000 awards granted to eligible, newly
admitted full-time, in-state Masters candidates not receiving a
teaching or research assistantship.

**Provosts Fellowships:** $4,000 awards granted to eligible, newly
admitted full-time, out-of-state and international Masters
candidates not receiving a teaching or research assistantship.

**ASSISTANTSHIPS**

**Teaching and Research Assistantships**
A limited number of teaching and research assistantships are
available for matriculated, full-time (minimum of 9
credits/semester) graduate students. All assistantships are
subject to the agreement between UMass Lowell and
UAW/Graduate Employees Organization. Teaching
assistantships are assigned by the student’s department;
therefore, queries regarding teaching assistantships should be
directed to the departmental graduate coordinator
(https://www.uml.edu/Graduate-Student-
Services/coordinators.aspx) or chairperson (see
www.uml.edu/Grad/coordinators.aspx
(https://www.uml.edu/Graduate-Student-
Services/coordinators.aspx) for a list). Research assistantships
are available through special arrangements with individual
research advisers. Individuals interested in research
assistantships should contact departmental faculty members
concerning the availability of this form of financial aid.

**Qualifying for an Assistantship**
To ensure that assistantships are awarded to the most qualified
individuals, the University has established the following
requirements:

1. No teaching/research assistantship may be awarded to
   a graduate student with incompletes, F’s, or U’s on his or
   her transcript.
2. No teaching/research assistantship may be awarded to
   a graduate student who fails to maintain good academic
   standing (https://www.uml.edu/resources/catalog-
   archive/current/Graduate.pdf) (a grade point average
   under 3.0 on the official transcript). See the Academic
   Standing information at
   www.uml.edu/catalog/graduate/policies/Academic_Stan-
   ding.htm (https://www.uml.edu/resources/catalog-
   archive/current/Graduate.pdf).
3. No University-funded teaching/research assistantship
may awarded to a master’s degree candidate if he/she has completed the total number of credits required for his/her program.

4. Level III teaching/research assistantships may only be awarded to graduate students who have reached doctoral candidacy (i.e. completed all course work, oral/written and language examinations) and are enrolled in dissertation research.

Teaching and Research Assistants are awarded either a semester or a yearly contract. The current negotiated agreement between The University of Massachusetts Lowell Board of Trustees and the Graduate Employee Organization is posted on the Human Resources website. Current stipend levels may be found there as well.

**Graduate Student Assistantships**

A limited number of student assistantships may be available in the departments. Students in this category are paid an hourly rate and are obligated to pay their own tuition and fees. All queries concerning assistantships should be directed to the graduate coordinator (https://www.uml.edu/Graduate-Student-Services/coordinators.aspx) (www.uml.edu/Grad/coordinators.aspx (https://www.uml.edu/Graduate-Student-Services/coordinators.aspx)) in the student’s department.

**Doctoral Programs Offered**

**Listed by Degree Earned**

- Doctor of Education
- Doctor of Engineering
- Doctor of Nursing Practice
- Doctor of Philosophy
- Doctor of Physical Therapy
- Doctor of Science

**Doctor of Education**

- Leadership in Schooling (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Language Arts & Literacy (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Mathematics & Science Education (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

**Doctor of Philosophy**

- Chemical Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Civil Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Computer Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Electrical Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Energy Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

**Doctor of Philosophy in Engineering (Ph.D)**

- Chemical Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Civil Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Computer Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Electrical Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Energy Engineering (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Mechanical Engineering
  - Chemical Engineering
  - Mechanical Engineering/Civil & Environmental Engineering
  - Mechanical Engineering/Energy Engineering
  - Mechanical Engineering/Industrial Engineering
  - Mechanical Engineering/Manufacturing Engineering
  - Mechanical Engineering/Manufacturing Engineering
  - Mechanical Engineering/Manufacturing Engineering
  - Mechanical Engineering/Manufacturing Engineering
  - Mechanical Engineering/Manufacturing Engineering

**Doctor of Nursing Practice (DNP)**

- Nursing

**Doctor of Philosophy (Ph.D.)**

- Applied Psychology and Preventative Science
- Applied Biology (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
Biomedical Science; Developmental & Evolutionary Biology; Quantitative Biology & Biophysics; and Cellular & Molecular Biology
- Biomedical Engineering & Biotechnology (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Chemistry (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf) Biochemistry Environmental Studies Green Chemistry
- Computer Science Computational Mathematics
- Earth System Science (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Marine Sciences & Technology (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Nursing (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Pharmaceutical Science (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Polymer Science Polymer Science/Plastics Engineering

Doctor of Physical Therapy (DPT)
- Physical Therapy

Doctor of Science
- Public Health (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf) Epidemiology

Master’s Programs Offered
Listed by Degree Earned
- Master of Arts
- Master of Business Administration
- Master of Education
- Master of Music
- Master of Public Administration
- Master of Public Health
- Master of Science
- Master of Science in Engineering
- Education Specialist

Master of Arts (MA)
- Community Social Psychology (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Criminal Justice (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- History (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Peace & Conflict Resolution (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Security Studies (https://www.uml.edu/resources/catalog-
Master of Business Administration (MBA)

- General Business
- Accounting
- Business Analytics
- Entrepreneurship
- Finance
- Healthcare
- Information Technology
- International Business
- Managerial Leadership
- Marketing

Master of Education (M.Ed.)

- Curriculum & Instruction
- Autism Studies
- Education: Initial Certification
- Math Education, beyond initial
- Educational Administration
- Bioinformatics
- Reading & Language
- Teacher of Reading
- Non-licensure

Master of Music (MM)

- Music Education
- Community Music
- Sound Recording Technology

Master of Public Administration (MPA)

- Public Administration
- Human Service Management
- Public Humanities and the Arts
- Justice Administration

Master of Public Health (MPH)

- Public Health
- Dietetics
- Epidemiology
- Healthcare Management
- Nutrition
- Social and Behavioral Sciences

Master of Science (MS)

- Accounting
- Applied Biomedical Sciences
- Autism Studies
- Biological Sciences
- Biomedical Engineering & Biotechnology
- Business Analytics
- Chemistry
- Computer Science
- Co-op Option in Engineering
• Engineering Management
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

• Entrepreneurship

• Environmental Studies
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Atmospheric Sciences

  Sciences
  Environmental Engineering Sciences

• Finance

• Health Information Management
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Health Informatics

• Information Technology

• Marine Sciences & Technology
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Coast & Ocean Administration
  Science/Technology (PSM)

• Mathematics
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Applied & Computational Mathematics
  Industrial Mathematics (PSM)
  Mathematics for Teachers
  Probability & Statistics

• Nursing
  Adult / Gerontological Nursing
  Family Health Nursing

• Pharmaceutical Science
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

• Physics
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

• Public Health
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

• Radiological Science & Protection
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Radiological Science and Protection (PSM)
  Medical Physics

• Security Studies
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  CBRNE Security Critical

Infrastructure Protection Cybersecurity

Master of Science in Engineering (M.S.E.)

• Chemical Engineering
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Leadership

• Civil Engineering
  Leadership
  Environmental Geotechnology
  Structural Transportation

• Computer Engineering
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Leadership
  Optics

• Electrical Engineering
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Leadership
  Nuclear Solar

• Mechanical Engineering
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Leadership

• Plastics Engineering
  Leadership
  Coatings & Adhesives
  Fibers & Composites
  Synthetic Fibers

Education Specialist (EdS)

• Administration, Planning & Policy
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

• Curriculum & Instruction
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Education of Diverse Populations

• Reading & Language
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

Bachelor's to Master's Programs
Earn Two Degrees in as Little as Five Years

- Eligibility
- Course Credits
- How to Transition
- Francis College of Engineering Expanded Bachelor’s to Master’s Policy

NOTE: A course with a Pass/No Credit election cannot be applied to the university’s Bachelor’s to Master’s Program.

In order to encourage outstanding UMass Lowell undergraduate degree students to continue their studies towards an advanced degree, qualified students may transition to the Bachelor’s to Master’s Degree Option (Bachelor’s to Master’s programs include the Fast Track to Teaching and Plus 1 programs.)

This option carries distinct benefits. No graduate application is required for UMass Lowell’s Bachelor’s to Master’s programs. In addition, many departments offer course credit benefits. (For detailed information regarding specific course credit benefits, please see the Graduate Coordinator in the respective masters degree granting department.)

The transcripts of the students who declare their intention to transition to master’s programs will be reviewed by the graduate coordinator to ensure the GPA and prerequisite requirements are met. Students should also provide one letter of recommendation to support their transition to the master’s program. Refer to the Bachelor’s to Master’s (https://www.uml.edu/Academics/undergraduate-programs/bachelors-masters.aspx) page for more information.

Eligibility

Any UMass Lowell undergraduate junior or senior with a grade point average of 3.0 or better may apply to a Masters degree program at UMass Lowell under the Accelerated Bachelors to Masters Degree Option. However, to be accepted into this option the following minimum conditions must be met (individual departments may have more stringent requirements):

1. The student must have a cumulative grade point average of 3.0 or above at the time the baccalaureate degree is conferred in order to maintain eligibility for this option.
2. The student must apply for and receive his/her baccalaureate degree before matriculating into the graduate program.
3. Once accepted, a student is expected to begin his/her graduate studies in the semester immediately following conferral of the baccalaureate degree unless the student submits a written request for deferral. A student is allowed to defer for a maximum of one year from the date of acceptance. For example, if accepted for the Spring 2020 semester, an individual can defer to either the Fall 2020 or Spring 2021 semesters. A student defers acceptance by submitting a written request to the Office of Graduate Admissions (mailto:Graduate_Admissions@uml.edu). All deferral requests must specify which semester the student wishes to enroll. Students who are confirmed to transition to the Bachelor’s to Masters Degree Option who opts not to enroll in at least one course within the graduate department to which they have been accepted in the semester immediately following conferral of the bachelors degree and who does not submit a deferral request forfeits his/her rights to benefits under this program.
   Should the student decide to begin his/her studies at a later time he/she will be required to the graduate program and submit all required admission materials.

Course Credits

The graduate degree granting department may allow course credit benefits; however, the following requirements apply:

1. Any graduate courses taken by a baccalaureate degree student that are credited towards the Masters degree must have been obtained with a grade of B or better.
2. A graduate level course used to fulfill both an undergraduate degree requirement and a undergraduate minor requirement is also eligible to be used in the Master’s, but only up to the maximum number allowed for the specific Master’s degree.
3. Only courses of 5000 level or higher may count toward the Masters degree.
4. Transfer credit is not accepted for graduate certificates.
   The Bachelor’s to Master’s program benefits do not include credits toward a graduate certificate.
5. As defined by the graduate degree granting department, a maximum of 12 graduate credits (5000 level or above) may be used for the masters degree as follows:
- Up to 12 credits may be transferred provided these graduate credits were taken in excess of the university minimum of 120 baccalaureate degree credits, or,
- for programs requiring fewer than 33 credits, a maximum of up to six credits of graduate (5000 level or higher) courses may be used by a student in the Accelerated Bachelor’s to Master’s Degree Option for both the graduate and undergraduate degrees; or,
- for programs requiring 33-35 credits, at the discretion of the affected department, a maximum of up to nine credits of graduate (5000 level or higher) courses may be used by a student in the Accelerated Bachelor’s to Master’s Degree Option for both the graduate and undergraduate degrees; or,
- for programs requiring 36 or more credits, at the discretion of the affected department, a maximum of up to twelve credits of graduate (5000 level or higher) courses may be used by a student in the Accelerated Bachelors to Masters Degree Option for both the graduate and undergraduate degrees.

6. Students must petition to have specific courses (5000 level or above) taken during their undergraduate career apply towards their graduate degree via an Academic Petition.

7. A course with a Pass/No Credit election cannot be applied to the University’s Bachelor’s to Master’s Program.

Francis College of Engineering Expanded Bachelor’s to Master’s Policy

The Francis College of Engineering participates in the UMass Lowell Bachelors to Masters Program and expands this benefit to applicants from other ABET-accredited engineering programs. All applicants from ABET-accredited institutions who meet the UMass Lowell BS/MS admissions criteria may transfer (double count) eligible graduate-level credits taken for the completion of their undergraduate degree program at their home institution to their UMass Lowell (UML) masters degree program. The maximum number of credits to be transferred will be the same as are allowed by UMass Lowell Francis students who graduate from the College of Engineering. Additionally, all Bachelors to Masters rules and regulations, including minimum grade requirements, must be met.

Eligibility

Applicants for this expanded program must have a minimum undergraduate cumulative GPA of 3.0 in appropriate engineering majors from other ABET-accredited institutions. As with current admissions policy in Engineering, the GRE may be waived for applicants meeting these criteria (minimum GPA from ABET-accredited engineering program).

Double Counting

Consistent with the current transfer policy, only graduate courses with grades of B or better may transfer. Also consistent with current policy, each department decides whether a course from another institution may or may not fulfill a departmental program requirement.

How to Transition to Bachelor’s to Master’s Programs

Undergraduate students are requested to apply to transition by submitting the application for transition found on the Undergraduate Bachelor’s to Master’s page (https://www.uml.edu/Academics/undergraduate-programs/bachelors-masters.aspx). Students normally apply to transition in the second semester of their third year as an undergraduate (up until the last day of classes in their final semester before graduation).
Zuckerberg College of Health Sciences

The graduate programs of the Zuckerberg College of Health Sciences at UMass Lowell prepare health care providers with specialized knowledge and skills for the roles of practitioner, leader and researcher.

View the faculty in the College of Health Sciences (https://www.uml.edu/Health-Sciences/faculty/default.aspx).

Graduate Programs Offered

Certificates:

- Clinical Pathology
- Health Informatics
- Health Service Management
- Pharmaceutical Science
- Public Health Studies
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

Master of Public Health

- Public Health (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

Master of Science (MS) - degree awarded in the following fields:

- Applied Biomedical Sciences
- Health Information Management
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

  Concentrations: Health Informatics, Health Service Management
- Nursing

Doctor of Physical Therapy (DPT)

Doctor of Philosophy (PH.D.) - degree awarded in the following field:

- Nursing (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- Pharmaceutical Science (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

Doctorate in Nursing Practice (DNP) Program

Doctor of Science (SC.D.) - degree awarded in the following field:

- Public Health (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

  Options: Epidemiology, Occupational and Environmental Hygiene
Department of Biomedical & Nutritional Sciences

The UMass Lowell Department of Biomedical and Nutritional Sciences offers the following graduate programs:

- Master of Science in Applied Biomedical Sciences
- Master of Science in Pharmaceutical Science (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
  Option: Professional Science Master’s in Pharmaceutical Science
- Graduate Certificates: Clinical Pathology, Nutritional Sciences, Pharmaceutical Science, Public Health Laboratory Sciences
- Bachelor’s-Master’s Program

Program Philosophy

The Master of Science degree program in Biomedical Sciences provides medical technologists and individuals with medical, biological or biochemical backgrounds with specialized knowledge in the clinical sciences. The mission of the program is to allow individuals to expand their understanding of the clinical sciences and be able to apply state-of-the-art research techniques to the advancement of diagnostic technology. Knowledge of such skills will permit upward mobility into entry level supervisor positions and dissemination of clinical information in educational settings. Students may choose from concentrations in research, clinical administration, health informatics, nutritional sciences and public health laboratory sciences.

Faculty in the Department of Biomedical and Nutritional Sciences have extensive research track records. Many are recognized nationally and internationally as experts in their fields and participate in professional organizations, holding office at local and national levels. Department faculty are successful in obtaining research funding and are very productive in publishing their research findings in peer-reviewed scientific journals.

Program Overview

The Master of Science program is typically completed in two years, however, students may choose to progress through the program on a part-time basis. The Bachelor’s-Master’s program in one additional year beyond the B.S. degree. The program integrates management components from the Health Management and Policy Program, and environmental health components from the department of Work and Environment. Students take a required core of five courses and then select five program concentration courses from among the areas of research, nutritional sciences, clinical administration, health informatics and public health laboratory sciences. Students may also select a Professional Science Masters combining business courses and business internship. Online graduate certificate programs allow gradual transition from a work setting into this academic program. Students may continue on into programs such as Ph.D. in Biomedical Engineering and Biotechnology (participant in UMass system-wide graduate degree program) or the Ph.D. in Chemistry, Biochemistry Option (in collaboration with Chemistry Department).

Admission Requirements

1. A baccalaureate degree from an accredited university or college with a recommended GPA of 3.0 or better.
2. Sound preparation in the biological or clinical sciences with a chemistry background for the research concentration.
3. A minimum official score on for the Graduate Record Examination Aptitude Test (GRE) of 151 verbal and 157 quantitative. GRE’s are required unless the student has completed a previous American Masters degree. For students who graduated from a university in a country where English is not the official language. TOEFL scores should be at least 550 (paper-based), 213 (computer-based), or 79 (internet-based). The GRE is not required for the certificate programs.
4. For the Clinical Administration concentration: clinical certification is required.
5. For the Clinical Research concentration, sound preparation in the biological or clinical sciences is required, to include successful completion of a course in biochemistry or equivalent.
6. Three letters of recommendation pertaining to academic ability and professional performance unless the applicant is already a student in the undergraduate program and applying into the Bachelor’s-Master’s Program.
7. Students will also be asked to submit a personal statement and a resume.
Program Requirements

The student must possess basic statistical and computer skills prior to admission, or may complete without credit within the graduate program of study, an introductory course in computers and a course in statistics prior to the third semester. Skill level can be determined through discussion with the Graduate Coordinator.

Master of Science in Applied Biomedical Sciences

Master of Science in Applied Biomedical Sciences

Master's Certificate Options
Pharmaceutical Sciences
Public Health Studies
Health Informatics
Pathology

Master of Science in Applied Biomedical Sciences

The UMass Lowell Department of Biomedical and Nutritional Sciences offers a Master of Science in Applied Biomedical Sciences.

After the requirements, see the

STEM Electives

Degree Requirements

The Master of Science degree program in Applied Biomedical Sciences requires the successful completion of a minimum of 30 semester hours of graduate level courses. These include 23 credit hours of core courses and 7 approved elective credits. Students may petition to transfer up to 12 graduate course credits of related content from other programs, and this requires approval by the department graduate coordinator and or department graduate faculty committee.

Part-Time Study

Students are allowed to matriculate on a part-time basis (taking one or two courses) and most professionally employed students that pursue the M.S. degree in Applied Biomedical Sciences do so. Most classes meet once per week and are scheduled in the evening or online for student convenience.

Bachelor's-Master's Program

Undergraduate students in this program move through the master’s program at an accelerated rate by taking two 500-level courses during their senior year and count those credits toward both their undergraduate and graduate degrees. Student apply during their Junior year.

Program of Studies

Core Curriculum

The core curriculum includes the following courses (23 credits) and must be taken by each program student:

- HSCI.5500 (https://www.uml.edu/catalog/courses/HSCI/5500) Clinical Pathophysiology (3cr)
- MLSC.5500 (https://www.uml.edu/catalog/courses/MLSC/5500) Foundations of Biomedical Research (3cr)
- MLSC.5750 (https://www.uml.edu/catalog/courses/MLSC/5750) Emerging Topics in Clinical Chemistry (3cr)
- MLSC.6000 (https://www.uml.edu/catalog/courses/MLSC/6000) Biomarker Discovery &Applications (3cr)
- MLSC.6001 (https://www.uml.edu/catalog/courses/MLSC/6001) Biomarker Discovery &Applications Lab (1cr)
- MLSC.6100 (https://www.uml.edu/catalog/courses/MLSC/6100) Clinical Toxicology (3cr)
- MLSC.6101 (https://www.uml.edu/catalog/courses/MLSC/6101) Clinical Toxicology Lab (1cr)
- MLSC.6130 (https://www.uml.edu/catalog/courses/MLSC/6130) Infectious Diseases (3cr)
- MLSC.7330 (https://www.uml.edu/catalog/courses/MLSC/7330) Graduate Project (3cr)

STEM Electives

At least one approved elective must be from the list below. The other electives may be from this list, or may be another graduate course from the Department of Biomedical and Nutritional Sciences. Courses not listed below may be used as electives with prior approval of the graduate coordinator. Courses offered fully online noted with an asterisk(*).

BNS Electives:
- MLSC.5120 (https://www.uml.edu/catalog/courses/MLSC/5120) Medical Bacteriology
- MLSC.5310 (https://www.uml.edu/catalog/courses/MLSC/5310) Clinical Immunohematology
- MLSC.6150 (https://www.uml.edu/catalog/courses/MLSC/6150) Medical Mycology and Parasitology
- NUTR.5720 (https://www.uml.edu/catalog/courses/NUTR/5720)
completed a minimum of 6.0 credits of PLUS courses, 3) attained an overall minimum GPA of 3.0 and 4) department permission.

All Professional Internships require department faculty supervision. Students should register for MLSC.7700 during the final semester of internship participation.

**Master's program Certificate option:**

Students can earn a certificate in Public Health Studies, Health Informatics, Pharmaceutical Sciences or Clinical Pathology while earning a Master's degree in Clinical Laboratory Sciences by opting for elective courses needed for the certificate**. The following are the elective courses that meet certificate and Applied Biomedical Sciences Master's degree requirements:

**Pharmaceutical Sciences Certificate:**

**Required Courses:**

- PHRM.6100 Principles of Pharmaceutical Sciences
- PHRM.6400 Pharmaceutical Analysis
- PHRM.6410 Drug Delivery
- PHRM.6600 Pharmacokinetics & Drug Metabolism

**Public Health Studies Certificate**

**Required Course:**

- PUBH.5750 Epidemiology & Biostatistics

**Elective Courses:**

- PUBH.5061 Environmental Health
• PUBH.5070
(https://www.uml.edu/catalog/courses/PUBH/5070)
Leadership & Management in Public Health
• PUBH.5770
(https://www.uml.edu/catalog/courses/PUBH/5770)
Biostatistics for Health Data

Health Informatics Certificate

Required Courses:
• PUBH.5310
(https://www.uml.edu/catalog/courses/PUBH/5310)
Health Informatics
• PUBH.6070
(https://www.uml.edu/catalog/courses/PUBH/6070)
Healthcare Information Systems

Elective Courses:
• PUBH.6350
(https://www.uml.edu/catalog/courses/PUBH/6350)
Healthcare Project Management
• PUBH.6390
(https://www.uml.edu/catalog/courses/PUBH/6390)
Electronic Health Systems

Certificate in Pathology

Required Course:
• HSCI.5500
(https://www.uml.edu/catalog/courses/HSCI/5500)
Clinical Pathophysiology* (Fall, Spring & Summer)

Electives:
• MLSC.5120
(https://www.uml.edu/catalog/courses/MLSC/5120)
Medical Bacteriology
• MLSC.5310
(https://www.uml.edu/catalog/courses/MLSC/5310)
Clinical Immunohematology
• MLSC.5500
(https://www.uml.edu/catalog/courses/MLSC/5500)
Foundations in Biomedical
• MLSC.5750
(https://www.uml.edu/catalog/courses/MLSC/5750)
Emerging Topics in Clinical Chemistry
• MLSC.6000
(https://www.uml.edu/catalog/courses/MLSC/6000)
Biomarker Discovery & Applications
• MLSC.6100
(https://www.uml.edu/catalog/courses/MLSC/6100)
Clinical Toxicology
• MLSC.6130
(https://www.uml.edu/catalog/courses/MLSC/6130)
Infectious Disease*
• MLSC.6150
(https://www.uml.edu/catalog/courses/MLSC/6150)
Medical Mycology & Parasitology
• NUTR.5720
(https://www.uml.edu/catalog/courses/NUTR/5720)
Nutrigenetics
• PUBH.5140
(https://www.uml.edu/catalog/courses/PUBH/5140)
Healthcare Management*
• PUBH.6070
(https://www.uml.edu/catalog/courses/PUBH/6070)
Healthcare Information Systems*
• PUBH.6350
(https://www.uml.edu/catalog/courses/PUBH/6350)
Healthcare Project Management*

Students may select 3 courses from this list. Only one of the courses may be from the Department of Public Health (PUBH). Other electives may be substituted with prior approval from the Graduate Coordinator.

**To qualify for a Certificate, Students must complete and application with Graduate Admissions (https://sa-webapp-prd.erp.umasscs.net/ps/webapp/EMPLOYEE/SA/c/UM_ADM_MENU_FL.UM_ADM_LOGIN_FL.GBL?institution=UMLOW&Campaign=DEFAULT&CenterGRAD&CareerGRAD&CenterGRAD&Campaign=DEFAULT&.

Graduate Certificates in Biomedical & Nutritional Sciences
The UMass Lowell Department of Biomedical and Nutritional Sciences offers the following graduate certificate programs:

- Clinical Pathology
- Pharmaceutical Sciences

**CLINICAL PATHOLOGY**

To apply, visit [graduate admissions](https://www.uml.edu/Grad/Graduate-Applicants/default.aspx)

**Contact:** Suzanne Moore, D.V.M (mailto:suzanne_moore@uml.edu), 978-934-6264

Clinical Pathology combines the theoretical and technical knowledge of human anatomy and physiology, clinical chemistry, genetics, immunology, microbiology, hematology, histocompatibility, cellular pathology and other fields as they pertain to the diagnosis, monitoring and prevention of disease.

The Certificate in Clinical Pathology requires 12 credits. There is one required course and 3 electives, to be selected from the approved list. Courses available fully online are noted below with an asterisk (*).

**Prerequisites:**
- Baccalaureate degree from an accredited institution with a minimum GPA of 3.00
- Completion of undergraduate coursework in junior-level biochemistry receiving a grade of C or better.

**Required Courses:**

- **HSCL.5500** ([https://www.uml.edu/catalog/courses/HSCI/5500](https://www.uml.edu/catalog/courses/HSCI/5500)) Clinical Pathophysiology* (Fall, Spring & Summer)
- **MLSC.5600** ([https://www.uml.edu/catalog/courses/MLSC/5600](https://www.uml.edu/catalog/courses/MLSC/5600)) Molecular Pathology

**Electives:**

Students may select 3 courses from this list. Only one of the courses may be from the Department of Public Health (PUBH). Other electives may be substituted with prior approval from the Graduate Coordinator.

- **MLSC.5120** ([https://www.uml.edu/catalog/courses/MLSC/5120](https://www.uml.edu/catalog/courses/MLSC/5120)) Medical Bacteriology
- **MLSC.5310** ([https://www.uml.edu/catalog/courses/MLSC/5310](https://www.uml.edu/catalog/courses/MLSC/5310)) Clinical Immunohematology
- **MLSC.5500** ([https://www.uml.edu/catalog/courses/MLSC/5500](https://www.uml.edu/catalog/courses/MLSC/5500)) Foundations in Biomedical Research*
- **MLSC.5750** ([https://www.uml.edu/catalog/courses/MLSC/5750](https://www.uml.edu/catalog/courses/MLSC/5750)) Emerging Topics in Clinical Chemistry
- **MLSC.6000** ([https://www.uml.edu/catalog/courses/MLSC/6000](https://www.uml.edu/catalog/courses/MLSC/6000)) Biomarker Discovery & Application with Lab
- **MLSC.6100** ([https://www.uml.edu/catalog/courses/MLSC/6100](https://www.uml.edu/catalog/courses/MLSC/6100)) Clinical Toxicology
- **MLSC.6130** ([https://www.uml.edu/catalog/courses/MLSC/6130](https://www.uml.edu/catalog/courses/MLSC/6130)) Infectious Disease*
- **MLSC.6150** ([https://www.uml.edu/catalog/courses/MLSC/6150](https://www.uml.edu/catalog/courses/MLSC/6150)) Medical Mycology and Parasitology
- **NUTR.5720** ([https://www.uml.edu/catalog/courses/NUTR/5720](https://www.uml.edu/catalog/courses/NUTR/5720)) Nutrigenetics
- **PUBH.5140** ([https://www.uml.edu/catalog/courses/PUBH/5140](https://www.uml.edu/catalog/courses/PUBH/5140)) Healthcare Management*
- **PUBH.6070** ([https://www.uml.edu/catalog/courses/PUBH/6070](https://www.uml.edu/catalog/courses/PUBH/6070)) Healthcare Information Systems*
- **PUBH.6350** ([https://www.uml.edu/catalog/courses/PUBH/6350](https://www.uml.edu/catalog/courses/PUBH/6350)) Healthcare Project Management*
- **PHRM.6100** ([https://www.uml.edu/catalog/courses/PHRM/6100](https://www.uml.edu/catalog/courses/PHRM/6100)) Principles of Pharm Science or **PHRM.6501**
Drug Discovery

- **PHRM.6600**
  (https://www.uml.edu/catalog/courses/PHRM/6600)
  Pharmacokinetics & Drug Metabolism

- **PHRM.6410**
  (https://www.uml.edu/catalog/courses/PHRM/6410)
  Drug Delivery
MLSC.5120 Medical Bacteriology I (Formerly 36.311/512) - Credits: 3
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.

MLSC.5310 Clinical Immunohematology (Formerly 36.531) - Credits: 3
Lecture and case study discussions look at the major red cell antigen/antibody systems that are of importance in understanding transfusion therapies, compatibility testing, and pathological diseases. Emphasis is on differentiation and clinical significance of each system. Donor selection regulations, component preparation, and hemotherapy will also be discussed. Students will be required to do a presentation, poster, and paper on an advanced topic in Clinical Immunohematology.

MLSC.5410 Introduction to Public Health and the Public Health Laboratory (Formerly 36.541) - Credits: 3
This course is designed to provide an overview of public health and the public health laboratory covering topics such as the legal basis and history of public health, public health structure, communications and interactions, and epidemiology. Emphasis will be placed on the role of the public health laboratory and its core functions, its role in policy development, infectious disease, environmental issues, emergency preparedness, newborn screening, global issues, and public health research. Public health laboratory methodology, regulation and improvement, and quality assurance will also be examined.

MLSC.5500 Foundations of Biomedical Research - Credits: 3
This course prepares graduate students in the MS in Clinical Laboratory Science for biomedical research. Students will learn clinical and basic research design and experimental aspects through applying critical thinking skills and engaging in outcome evaluation of research studies and quantitative data analysis and interpretation. Students will develop an understanding of the key differences between clinical, translational and basic research and their implications and relation to diagnostic, treatment and health management. The course will introduce students to literature review, identifying basic and key gaps and formulating key questions for scientific experimental pursuit. The course also reviews basic statistics research methods, including statistical significance.

MLSC.5510 Advanced Pathophysiology (Formerly 36.551) - Credits: 3
Disease processes as appropriate and inappropriate as variants of normal physiological functions. A detailed examination of certain important and illustrative diseases rather than a survey of diseases in general.

MLSC.5530 Emerging Topics in Clinical Chemistry (Formerly 36.553) - Credits: 3
This course is designed to give an in-depth understanding in clinical chemistry. Topics include: analytical techniques and the selection of methodologies. The course allows for a detailed examination and discussion of selected articles from the Journal of Clinical Chemistry.

MLSC.5600 Molecular Pathology (Formerly 36.560) - Credits: 3
This graduate course is designed to study the molecular aspects of disease. Applications and techniques utilized in the field of molecular pathology are emphasized. This course is intended to provide students with information required to understand the increasing role of molecular pathology in the daily practice and management of chronic disease in medicine. Major emphasis on strength and limitations of clinical diagnostics technologies and their utilization in these applications are presented. This course will also provide a review of current molecular pathology literature and principles as they relate to specific organ systems.

MLSC.5750 Emerging Topics in Clinical Chemistry - Credits: 3
This course will provide an advanced perspective on the discipline of clinical chemistry. In depth discussions of new discoveries in clinical chemistry biomarkers, new understanding of disease pathogenesis as they pertain to clinical chemistry will be pursued in this course. System and disease-based approaches to clinical chemistry analytical methods will be used to discuss emerging challenges and opportunities in the field, including analytical challenges. Emphasis will also be placed on theoretical concepts of clinical chemistry instrumentation, including components and design of modern instrumentation and analytical methodologies. The course will also discuss the role of the clinical chemist in ensuring that testing performed in clinical trials meets the highest standards and provides meaningful data.

MLSC.5750 Topics in Clinical Laboratory Science I (Formerly 36.575) - Credits: 3
This course provides students with the knowledge that is
fundamentally necessary to understand the routine operations of the clinical diagnostic laboratory. The course will familiarize students with the diagnostic application of the most current testing methodologies and also provide a forum to discuss and critically review primary literature pertinent to current clinical laboratory issues.

MLSC.6000 Biomarker Discovery & Applications - Credits: 3

This course will cover the burgeoning field of biomarkers research, with a special focus on biomedical and clinical applications. The course is organized in three main sections: (I) Biomarker discovery and validation, including types of biomarkers and platforms for discovery (proteomics, metabolomics, multiplex technologies); (II) biomarker applications in clinical and health research; and (III) new frontiers in biomarker research. Examples of biomarker applications will include organ systems, disciplines (clinical lab sciences and clinical trials, environmental health, toxic tort and forensic litigation), and regulatory perspectives.

MLSC.6001 Biomarkers Discovery and Application Lab - Credits: 1

This course provides hands-on laboratory experience that will illustrate and enhance critical concepts related to biomarker discovery and validation. Techniques will include LC-ESI-MS/MS and multiplexing technologies for biomarker analysis in human biological samples, including urine, and blood.

MLSC.6100 Clinical Toxicology - Credits: 3

Clinical toxicology traditionally studied the toxic effects of therapeutic agents - substances intended to treat or ameliorate disease. Modern clinical toxicology has a broader scope: to examine complex toxicological events that result from the interaction of toxins with normal physiology, including therapeutics, drugs, natural poisons and inadvertent chemical exposures, as well as the clinical management of toxicity. The course places special emphasis on the temporality of events, from the developments of signs, to symptoms, to pathology. Analytical tools, such as mass spectrometry, needed to measure toxins and their metabolic byproducts in biological fluids of living organisms are discussed.

MLSC.6101 Clinical Toxicology Lab - Credits: 1

This course provides hands-on laboratory experience that will illustrate and enhance critical concepts related to clinical toxicology. Techniques will include immunoassay, advanced spectroscopy techniques and emerging technologies for toxicology analysis in human biological samples, including urine, and blood.

MLSC.6150 Medical Mycology and Parasitology (Formerly 36.615) - Credits: 3

This course is designed to instruct students in diagnostic medical mycology and parasitology. Diseases, specimen collection and handling, laboratory identification and treatment of medically significant fungi and parasites will be studied. Discussion of AIDS related infections and prophylactic treatment will be evaluated. Life cycles of parasites, prevention and environmental protection plans will be analyzed.

MLSC.6400 Quality Assurance, Control and Improvement in the Clinical and Public Health Lab (Formerly 36.640) - Credits: 3

This course is designed to provide an overview of total quality management issues in the Clinical and Public Health laboratory. Topics presented will include CLIA and quality control in the laboratory, clinical and public health laboratory QC calculations, charts and graphs, regulations involving new control lots, out-of-control QC situations, method comparison, instrument validation, and quality assurance. Emphasis will be placed on meeting all federal regulations including the FDA, state regulations, as well as meeting professional agency regulations such as JCAHO, CAP, and APHL.

MLSC.7330 Graduate Project - Clinical Laboratory Sciences (Formerly 36.733) - Credits: 3

An independent study or laboratory project which has been approved and is under the direction of the project advisor. Projects are approved by the graduate coordinator in conjunction with the project advisor.

MLSC.7340 Graduate Project - Clinical Laboratory Sciences (Formerly 36.734) - Credits: 1-4

An independent study or laboratory project which has been approved and is under the direction of the project advisor. Projects are approved by the graduate coordinator in conjunction with the project advisor.

MLSC.7430 Master’s Thesis - Clinical Lab Sciences (Formerly 36.743) - Credits: 3

Analytical and/or experimental work conducted under the direction of a thesis advisor and in accordance to the Graduate School Guidelines. Students are required to submit a written proposal for approval by a thesis committee and to present an oral defense at a college seminar.

MLSC.7440 Master’s Thesis - Clinical Laboratory
Science (Formerly 36.744) - Credits: 4

Research Design and Methodology. Analytical and/or experimental work conducted under the direction of a thesis advisor and in accordance to the Graduate School Guidelines. Students are required to submit a written proposal for approval by a thesis committee and to present an oral defense at a college seminar.

MLSC.7530 Doctoral Research (Formerly 36.753) - Credits: 3
MLSC.7560 Doctoral Research (Formerly 36.756) - Credits: 6
MLSC.7590 Doctoral Research (Formerly 36.759) - Credits: 9
NUTR.5060 Biochemistry of Lipids (Formerly 36.506) - Credits: 3

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 anti-oxidants 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.

NUTR.5630 Vitamins and Minerals (Formerly 36.563) - Credits: 3

Provides a foundation for understanding the role of vitamins and minerals in human nutrition. Emphasis is placed on their roles in human biochemistry and physiology. The mechanism of action for each nutrient is examined. The course will explore the effects of nutrient deficiency, and identify the best dietary sources for each vitamin and mineral.

NUTR.5720 Nutrigenetics (Formerly 36.572) - Credits: 3

Regulation of eukaryotic gene expression by specific nutrients, hormones, and metabolites will be discussed including transcriptional, post-transcriptional, and translational mechanisms with emphasis on disease development or prevention. Application of material will include determining how human dietary requirements are affected by gene variants and inherited biochemical characteristics. This course will enable students to link their knowledge of nutrition with the growing discipline of the effects of diet on the human genome and specific hereditary diseases.

NUTR.6000 Public Health Nutrition Practice - Credits: 3

This course provides advanced study in public health and community nutrition. Concepts related to cultural competency, public health and nutrition policy, health promotion, and the nutrition care process will be learned through lectures, guest lectures, in-class activities, case studies, and peer-led discussions. Students will have the opportunity to practice skills in community and public health nutrition settings such as food pantries and senior nutrition centers.

NUTR.6010 Nutrition Assessment (Formerly 36.601) - Credits: 3

This course provides an overview of tools used to assess nutritional health, dietary adequacy, dietary variety, and food security. Lectures and lab will be integrated together to demonstrate and provide experience in methods needed to assess, screen, and monitor physiological and dietary indicators of nutritional health. There will be an emphasis on methods and tools for assessing body composition, biochemical indicators, dietary intake, energy expenditure, and physical activity. Students will learn how to select and apply these methods in community, clinical and research settings and determine the strengths and limitations of each assessment tool.

NUTR.6020 Community Based Interventions (Formerly 36.602) - Credits: 3

This course will examine a broad range of community-based research and programs within the United States. Strategies for effective community-engagement and programming planning, implementation and evaluation will be discussed. Specific attention will be given to cultural tailoring of interventions. Students will engage in experiential learning and will work in teams to write a community funding proposal. Students will be required to present their funding proposal to a community panel. Field visits will allow students to interact with and learn from public health experts.

NUTR.6030 Global Nutrition (Formerly 36.603) - Credits: 3

This course is an examination of the food and nutrition issues around the world. The impact of food production and food intake on the environment and global nature of our food systems will be reviewed. The course will also include consideration of specific nutrient deficiencies, as well as nutrition-related aspects of infectious and chronic disease along with the programs and resources available to combat malnutrition for children and adults worldwide.
NUTR.6040 Nutrition Epidemiology (Formerly 36.604) - Credits: 3

This course is designed for graduate students who are interested in conducting or better interpreting epidemiologic studies relating diet and nutrition status to disease and health. There is an increasing awareness that various aspects of diet and nutrition may be important contributing factors in chronic disease. There are many important problems, however, in the implementation and interpretation of these studies. The purpose of this course is to examine methodologies used in nutritional epidemiologic studies in lecture and lab settings, and to review the current state of knowledge regarding diet and other nutritional indicators as an etiologic factor in disease.

NUTR.6050 Food and Nutrition Management - Credits: 3

This course provides advanced study in food and nutrition management principles. Topics include management theory, personnel selection, training, evaluation, organizational behavior, communication, governmental influences, labor management relations, marketing, and budgeting. This course requires group work, development of a business plan, and completion of management related case studies.

NUTR.6060 Advanced Clinical Nutrition - Credits: 3

This course provides advanced study in clinical nutrition. Topics include the nutrition care process, standardized language and documentation, evidence-based practice, confidentiality of medical records, JCAHO regulations, and coding and billing. Case studies will be completed to review and advanced learning about medical nutrition therapy for acute and chronic nutrition-related diseases. As part of this course, students will practice providing nutrition assessment, counseling, education, professional documentation, and evaluation in clinical nutrition settings.

NUTR.6660 Community Nutrition Supervised Practice - Credits: 1

This supervised practice experience is the application of knowledge and skills in community nutrition. Students will practice nutrition assessment, nutrition counseling, and nutrition education for a wide range of populations at high nutritional risk. Students will develop cultural awareness and skills in cultural competency.

NUTR.6670 Food and Nutrition Management Supervised Practice - Credits: 1

This supervised practice experience is the application of knowledge and skills in food and nutrition management. There will be hands-on experience in human resource and financial management. Management skills specific to the food service industry, including management functions related to safety, security and sanitation, will also be incorporated. Students will also be able to apply knowledge in food production, distribution, and food service systems along with skills in menu planning. There will be an emphasis on using strategies to reduce waste and protect the environment.

NUTR.6680 Clinical Nutrition Supervised Practice - Credits: 1

This supervised practice experience is the application of knowledge and skills in clinical nutrition. Students will receive hands-on experience in nutrition assessment, diagnosis, and treatment of nutrition-related diseases while using skills in nutrition counseling and applying principles from behavior change theories. Students will be able to practice documentation of nutrition care and participate as members of an interdisciplinary team.
HSCI.5020 Graduate Global Health Experience -  
Credits: 3  
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 College of Health Sciences faculty.

HSCI.5500 Human Development and Pathophysiology (Formerly 30.550) - Credits: 3  
The physiological steady state of the human body and disruptions that result over the life span will be examined as well as the pathophysiological mechanism manifested in disease states. The course addresses defense, compensating, and adaptive responses to the pathophysiological processes as they apply to the various systems rather than being a survey course of diseases.

HSCI.5510 Clinical Pathophysiology - Credits: 3  
The student will examine disease processes as variants of normal physiological functions with emphasis on understanding the pathophysiologic basis of common diseases in certain systems. This graduate level course is a comprehensive exploration of the etiology, pathogenesis, clinical manifestations, and treatment of disease.

PUBH.5130 Assessment and Planning in Public Health - Credits: 3  
This course presents methods, concepts and techniques required for the identification of resources and needs, and planning of public programs and advocacy efforts to meet those a community, state, national, and global levels. Students will engage in community assessment and planning activities based on ethical and professional principles. This course will enhance skills needed for a health education specialist.

PUBH.6910 Advanced Program Evaluation - Credits: 3  
The focus of this course is the development of skills needed to plan, conduct, and critique evaluations. Students will learn the major principles and methods associated with systematic evaluation of public health initiatives.
This graduate certificate is a four-course program in Pharmaceutical Sciences intended for individuals who are interested in getting acquainted with pharmaceutical sciences. The courses offered in the certificate program are foundation courses in the Pharmaceutical Sciences MS and Ph.D programs.

Prerequisites:

- Baccalaureate degree from an accredited institution with a minimum GPA of 3.00.
- Completed undergraduate courses in calculus, general and organic chemistry, biochemistry and biology or anatomy and physiology with grades of C or above.

Required Courses:

- PHRM.6100 (https://www.uml.edu/catalog/courses/PHRM/6100) Principles of Pharmaceutical Sciences
- PHRM.6400 (https://www.uml.edu/catalog/courses/PHRM/6400) Pharmaceutical Analysis
- PHRM.6410 (https://www.uml.edu/catalog/courses/PHRM/6410) Drug Delivery
- PHRM.6600 (https://www.uml.edu/catalog/courses/PHRM/6600) Pharmacokinetics and Drug Metabolism

Pursue the degree that’s right for you:

- Masters (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf) support technical roles in research and production settings that will help meet the demand for new drugs that treat human disease and evaluate the safety and effectiveness of drug therapies.

Visit the Pharmaceutical Sciences program website.

Contact:

Suzanne Moore, D.V.M.
(mailto:Suzanne_Moore@uml.edu)

Program Coordinator

Weed Hall

978-934-6264

Updated 12/28/21

Programs of Study

Pharmaceutical sciences is an exciting field that offers many different career opportunities in the biopharmaceutical and pharmaceutical industries, and in research and academia. We offer an M.S., Professional Science Masters and Ph.D. program in Pharmaceutical Sciences.
PHRM.6100 Principles of Pharmaceutical Sciences (Formerly PHSC 610) - Credits: 3

The purpose of this introductory course in the pharmaceutical sciences is to provide an overview of the drug development process, involving drug discovery, drug action, and drug delivery. The student will become acquainted with cutting-edge research in discovery, action, and delivery. This course provides a foundation in pharmaceutical sciences along with theoretical, practical, regulatory, and professional issues in the pharmaceutical sciences.

PHRM.6120 Principles of Pharmaceutical Sciences Laboratory - Credits: 1

The purpose of this introductory course in the pharmaceutical sciences is to provide an overview of the drug development process, involving drug discovery, drug action, and drug delivery. Laboratory experiments will be performed to exemplify and expand upon the principles covered in Principles of Pharmaceutical Sciences lecture.

PHRM.6200 Pharmacokinetics (Formerly PHSC 620) - Credits: 3

This course focuses on the study of the biochemical and physiological effects of drugs and the mechanisms of their actions. The quantitative aspects of drug absorption, distribution, metabolism, and excretion will be explored. The philosophy of pharmacokinetic modeling and its application in practice will be introduced.

PHRM.6300 Pharmaceutical Research Design and Ethics (Formerly PHSC 630) - Credits: 3

This course explores research methodologies and statistics that are commonly used in pharmaceutical research. Scientific integrity in research will be discussed, as well as ethical issues in conducting pharmaceutical research in the laboratory.

PHRM.6400 Pharmaceutical Analysis (PHSC 640) - Credits: 3

Students in this course learn about modern analytical methods used to analyze the purity, strength, and quality of drugs and pharmaceutics.

PHRM.6410 Drug Delivery (Formerly PHSC 641) - Credits: 3

The biological, biophysical and chemical factors that influence drug delivery systems will be analyzed. Principles of cellular drug transport, in vivo drug transport, and modern drug delivery, including drug targeting will be explored. The course will also address membrane trafficking and intracellular transport and the utilization of these mechanisms in drug delivery and targeting.

PHRM.6420 Pharmaceutical Analysis Laboratory - Credits: 1

Students in this course analyze the purity, strength, and quality of drugs and pharmaceutics by applying modern analytical methods. Raw materials and completed dosage forms will also be analyzed in the laboratory.

PHRM.6501 Drug Discovery - Credits: 3

Drug discovery is the translational application of biology, chemistry, medicine, business and law in the identification of new medicines. This course is designed to provide each student with a full understanding of the challenges and opportunities that face scientists engaged in this enterprise in the biotech and pharmaceutical industries. Active learning objectives (case studies; project team work) are included to supplement the more didactic course materials, and to provide a simulation of the approaches used in industry to accomplish the key goal—the nomination of a clinical drug candidate worthy of extensive investment and testing in humans.

PHRM.6600 Pharmacokinetics and Drug Metabolism - Credits: 3

This course focuses on the study of the biochemical and physiological effects of drugs and the mechanisms of their actions. The quantitative aspects of drug absorption, distribution, metabolism, and excretion will be explored. The philosophy of pharmacokinetic modeling and its application in practice will be introduced. An overview of the structure, function and regulation of major drug metabolic enzymes and transporters will also be emphasized.

PHRM.6601 Drug Metabolism (Formerly 36.707) - Credits: 3

This course provides an overview of the structure, function and regulation of major drug metabolic enzymes and transporters.

PHRM.7070 Drug Metabolism (Formerly 36.707) - Credits: 3

This course provides an overview of the structure, function and regulation of major drug metabolic enzymes and transporters.

PHRM.7100 Advanced Topics in Pharmaceutical Sciences (PHSC 710) - Credits: 2

Select advanced topics and the evaluation of scientific literature in pharmaceutical sciences will be discussed in this seminar.

PHRM.7550 Graduate Research - Credits: 1-9

Enrolled students will be completing supervised research as
they progress toward the completion of their degree.

**PHRM.7590 Doctoral Dissertation - Credits: 1-9**

Enrolled students anticipate completion of all dissertation requirements during the semester in which they are enrolled for this course.
Doctoral Program in Physical Therapy

The Doctor of Physical Therapy (DPT) program at UMass Lowell prepares individuals for entry into the profession of physical therapy. The fully accredited program requires a baccalaureate degree for admission and a three-year full-time commitment, including part of each summer.

The curriculum provides a comprehensive foundation in the art and science of physical therapy. Methods of instruction include classroom lecture and discussion, small group / problem-based learning, and skill development during laboratory and clinical experiences. Emphasis is placed on the development of clinical decision-making and critical inquiry skills across the curriculum.

The clinical education program consists of three extended clinical education experiences one (10-week and two 12-week) for a total of 34 weeks. Students experience a variety of practice settings and patient populations in preparation for general practice.

- Program Goals
- Program Outcomes
- Program Philosophy
- Admission Requirements
- Course of Study

Program Goals

1. Prepare entry-level physical therapy clinicians in a manner consistent with contemporary professional norms. Graduates practice as competent, autonomous, collaborative, and doctoral-prepared providers who deliver services along the continuum of care from prevention to the remediation of impairments, activity, and participation restrictions in all populations.

2. Produce, disseminate, and incorporate scholarship that will advance the science, practice and education of physical therapy.

3. Promote, develop, and maintain effective community partnerships, cultivating proficiency in collaborative practice through modeling and experience in inter-professional education.

Program Outcomes

1. Graduates of the Doctor of Physical Therapy program at the University of Massachusetts Lowell will be prepared to exhibit attributes, characteristics and behaviors of professionals including: commitment to learning, interpersonal and communication skills, effective use of time and resources, use of constructive feedback, problem-solving, professionalism, responsibility, critical thinking, and stress management.

2. Graduates will practice physical therapy in a safe, evidence directed, effective, autonomous, mindful, culturally sensitive, ethical, and legal manner consistent with the patient/client management model.

3. Faculty will integrate contemporary practice and current literature to guide curriculum and course content. Faculty employ contemporary teaching and learning strategies with pedagogical principles to physical therapy education.

4. The program adheres to departmental policies and procedures regarding academic achievement and standards of professional behavior and conduct insuring that graduates are prepared to meet current standards of practice.

5. Faculty will promote, develop and maintain scholarship associated with clinical, community and curricular engagement activities.

6. The program will prepare students to apply principles of the scientific method to conduct research and participate in evidence-based practice.

7. The program will develop and maintain local and international partnerships that deepen our commitment to communities and cultures promoting health and wellness.

8. The program will develop, promote and maintain opportunities consistent with Interprofessional Education and Collaborative practice in accordance with the Interprofessional Education Collaborative Core (IPEC) Competencies.

Program Philosophy:
The faculty of the Department of Physical Therapy
Kinesiology believe that individuals have intrinsic worth and a right to optimal health and function. Function is defined as those activities identified by an individual as essential to support physical, social, and psychological well-being and to create a personal sense of meaningful living.

Physical therapists provide services to patients/clients with alterations in body structure and function, activity and participation restrictions or changes in physical function and health status resulting from injury, disease, or other causes. Physical therapists utilize prevention and wellness strategies in individuals at risk for developing a reduction in physical function.

The physical therapist is professionally educated in a program that synthesizes graduate study with undergraduate knowledge, and experiential learning. The graduate of the Doctor of Physical Therapy program is prepared to function as an ethical and competent practitioner who management include examination, evaluation, diagnosis, prognosis, intervention and outcomes. The graduate is prepared to interact and practice in collaboration with a variety of health professionals, provide prevention and wellness services, consult, educate, and engage in critical inquiry. Finally, the graduate is prepared to direct and supervise physical therapy services, including support personnel. Graduate are expected to assume a leadership role in health care and to practice autonomously and cooperatively in a variety of practice settings such as: hospitals, rehabilitation centers, extended care facilities, schools, sports medicine clinics, community health and private practices, and industrial or workplace settings.

Students are active participants in the education process. The relationship between students and faculty is one in which there is mutual respect, understanding, and interchange of ideas. As experienced professionals, the faculty serve as a resource, mentor and role-model for the developing professional. The faculty are facilitators of the learning process. Students are expected to demonstrate commitment to learning as the basis for continued personal and professional growth, effective interpersonal and communication skills, problem-solving and critical thinking skills, and appropriate professional conduct. Effective use of time and resources, feedback, and stress management strategies are also important components of the behaviors of the successful student.

Minimum Admission Requirements

1. Baccalaureate Degree from an accredited university of college within past 10 years.
2. Undergraduate cumulative GPA of 3.0 or greater.
3. Prerequisite Science GPA of 3.0 or greater.
4. Graduate Record Examination, within the last 5 years: >290 combined. (quantitative + verbal) (GRE Code = 3911)
5. Documented personal experience in a physical therapy setting (volunteer or paid). Minimum 35 hours
6. Statement of Purpose (essay)
7. Three (3) Letters of Recommendation, one (1) of which must be submitted by a licensed physical therapist.
8. Computer literacy in word, excel, power point, etc., is expected.

*** Must be taken in a traditional (on-campus/classroom) setting.

Important Notes:

- The Completed Application Deadline is November 1st for admission into the next class beginning matriculation the following May. All documents in support of the application are due at the deadline, e.g. letters of recommendation, official transcripts, official GRE scores, etc.
- No more than two (2) pre-requisite courses may be missing at the time of our application deadline to remain eligible for full consideration. (Courses which are “in-Progress” at the time of the application deadline are considered missing).
- All Applicants: Meeting the minimum application
requirements does not guarantee admission into the program. Students may be asked to provide documentation of equivalent course content proposed to meet admission criteria. Any/All applications deemed incomplete at the application deadline will be ineligible for full department review. The UMass Lowell DPT program does not offer deferred acceptance. All accepted students must begin matriculation the immediately subsequent summer term. The Faculty supports the position to recruit and retain students who by reason of ethnic, cultural, or socioeconomic background are more likely to serve areas of critical need.

**Additional Program Requirements**

1. Proof of yearly physical examination by a physician indicating satisfactory general health status and proof of immunization for measles, mumps, rubella, tetanus, polio, diphtheria, tuberculosis, and Hepatitis B is required prior to clinical education experiences.

2. A CORI check (Criminal Offender Record Information) prior to clinical education experiences is required.

3. Costs related to clinical education experiences including transportation, housing, meals and tuition/fees are assumed by the student. Students should expect and plan for out-of-state clinical placements.

4. Professional behavior (defined as Generic Abilities) is required during all academic and clinical education experiences.

For additional, DPT program-specific, information regarding our admission requirements, please contact:

Keith W. Hallbourg
Graduate Admissions Coordinator
Department of Physical Therapy
University of Massachusetts Lowell
Phone: 978-934-4402
Email: keith_hallbourg@uml.edu
Fax: 978-934-1069

You will need Adobe Acrobat Reader to view any pdf files. It can be downloaded for free from the Adobe website.

Read the UMass Lowell General Regulations for Graduate Students.

Completed Application Deadline: **November 1.**

Please submit add documents in support of your application to our Office of Graduate Admissions.
DPTH.6010 Clinical Anatomy (Formerly 34.601) - Credits: 3

Clinical Anatomy is a study of the structures of the human body, utilizing lectures, demonstrations and A.V. materials. It is a foundation course for physical therapy procedures courses. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6020 Neuroscience: Anatomy (Formerly 34.602) - Credits: 3

Neuroscience anatomy presents the form and functions of the human nervous system. It is a foundation course for physical therapy procedure courses. The student is introduced to clinically relevant neuroanatomy through a close examination of the signs and symptoms of a variety of pathologies, including lesions, tumors, injuries, and congenital disorders. Clinical examples are freely used to highlight the integral relationship between structural anatomy and functional impairment.

DPTH.6030 Anatomy Laboratory (Formerly 34.603) - Credits: 1

This course will introduce anatomical terminology, anatomical structures, functions, and interrelationships of the human body to physical therapy students as a baseline of knowledge for future courses in the program.

DPTH.6040 Neuroscience: Physiology/Neurology (Formerly 34.604) - Credits: 3

Neuroscience presents the principles of neurophysiology, neurology, and motor control as related to the practice of physical therapy. Topics in neurophysiology include: conduction and transmission of the nerve impulse, neuromuscular synaptic transmission and skeletal muscle contraction, muscle tone and spinal reflexes, the neurophysiology of sensation and movement, and the transmission of pain. Neurological conditions will be integrated with these various neurophysiological topics through the use of case studies and will include: peripheral nerve injuries, neuromuscular conditions, and diseases/conditions of the central nervous system. An introduction to the major theories of motor control and their applications to physical therapy examination and intervention will be discussed through problem solving and case studies. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6050 Physical Therapy Interventions I Lecture (Formerly 34.605) - Credits: 3

This course introduces the student to the principles of patient evaluation and treatment. Throughout this course, case studies will be used to promote student integration of didactic material into practical clinical situations. The use of appropriate evaluation procedures and the associated rationale for safe and effective treatment procedures are emphasized. Topics include: principles of biomechanical analysis, body mechanics, exercise prescription, postural evaluation, patient positioning, transfers, gait analysis, gait training, activities of daily living, wheelchair prescription and mobility, isolation/sterile technique, wound care, vital signs, heat and cold modalities, soft-tissue manipulation, and clinical documentation.

DPTH.6060 Neuroscience Laboratory (formerly 34.606) - Credits: 1

Neuroscience laboratory includes the study of the anatomy and function of the human brain, spinal cord, peripheral and autonomic nervous systems through prosection, audiovisual resources and experimental procedures. The gross anatomy of the human brain and spinal cord will be visualized using prosections of human specimens, models, and slides. The second half of the laboratory will focus on the Neurological Evaluation including evaluation of reflex function, assessment of sensory and cerebellar mechanisms, and testing cranial nerve function in typical and simulated atypical subjects. Motor learning activities and Cognitive Testing will be performed. To help synthesize the course content each student will present a neuropathology case study.

DPTH.6070 Physical Therapy Interventions I Laboratory (formerly 34.607) - Credits: 1

This laboratory course develops the psychomotor skills necessary to apply the didactic knowledge presented in the Physical Therapy Interventions I Lecture to clinical situations and patient care. The safe and effective performance of various evaluation and treatment techniques is emphasized. Topics include: principles of biomechanical analysis, body mechanics, exercise prescription, postural evaluation, patient positioning, functional mobility training, gait analysis and training, activities of daily living, wheelchair prescription and mobility, isolation/sterile technique, vital signs, heat and cold modalities, soft-tissue mobilization, and clinical documentation.

DPTH.6080 Musculoskeletal Physical Therapy I (formerly 34.608) - Credits: 3

This course is the first of a three-course series which explores physical therapy management of musculoskeletal dysfunction. In this first course, general models for physical therapy intervention will be presented. The evaluation, treatment and prevention of pathological conditions affecting the musculoskeletal system of the lower extremity will be emphasized. Normal function will be included as a basis for recognizing and therapeutically resolving dysfunction of
skeletal and joint structures, muscles and soft tissues. A problem-solving approach to resolve impairments, contributing to functional limitations and disabilities, will be stressed. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6090 Medical/Surgical Pathology (formerly 34.609) - Credits: 3
This course presents an introduction to the study of diseases commonly seen in people with conditions treated by physical therapists. Mechanisms of cell growth, response to injury, cell death as well as the psychosocial effects on the patient and family are reviewed.

DPTH.6100 Musculoskeletal Physical Therapy I Laboratory (formerly 34.610) - Credits: 1
This lab course develops psychomotor skills and clinical application of didactic knowledge gained in MSPT I Lecture (DPTH.6080). The examination and treatment procedures are taught using demonstrations, peer practice and case studies as they pertain to the hip, knee and ankle/foot. Examination procedures are organized by body regions and include interview, observation, palpation, anthropometric measurements, goniometry, joint play mobility, muscle strength testing, and special tests. Treatment procedures focus on integrating joint mobilization, passive and active stretching techniques, progressive strengthening exercises, and edema control with the thermal modalities, therapeutic exercises and functional activities taught in PT Interventions.

DPTH.6110 Professional Issues/Clinical Practice (formerly 34.611) - Credits: 3
This course is divided into two sections. The first course section will provide an overview of the profession of physical therapy. Professionalism, cultural competence and communication skills will be discussed as they apply to classroom instruction and clinical practice. The APTA (American Physical Therapy Association) Standards of Practice, Code of Ethics, The Scope of Physical Therapy Practice, ethnography and Evidence-Directed Care and Massachusetts and New Hampshire practice regulations will be discussed. The second portion of the course will emphasize the development of effective documentation skills.

DPTH.6120 Cardiopulmonary Physical Therapy I (formerly 34.612) - Credits: 3
In Cardiopulmonary Physical Therapy students will learn the essentials of physical therapy examination, evaluation and intervention for patients with pathological cardiopulmonary conditions. The course emphasizes a problem solving, clinical decision-making approach. Successful completion of the course requires the ability to integrate and synthesize information from this course with prerequisite and other related courses in a variety of cardiopulmonary case based problem-solving experiences.

DPTH.6140 Cardiopulmonary Physical Therapy I Laboratory (formerly 34.614) - Credits: 1
Cardiopulmonary Physical Therapy Laboratory is taken concurrently with Cardiopulmonary Physical Therapy Lecture (DPTH.6120). The course emphasizes procedures employed by the physical therapist when treating cardiopulmonary conditions. These laboratory experiences are designed to provide an opportunity to practice examination, evaluation, and interventions as discussed in lecture and demonstrate psychomotor proficiency in each procedure. Students will be expected to integrate and synthesize information from related courses in a variety of cardiopulmonary problem solving experiences.

DPTH.6150 Clinical Education I Seminar (formerly 34.615) - Credits: 1
This course is the first in a series of two one-credit seminars. The first installment will provide an overview of the clinical education experience portion of the Doctor of Physical Therapy program. Topics include; the roles of clinical educators, the process of obtaining and assigning clinical sites, the clinical performance instrument (CPI), appropriate communication in the clinical setting, ethical practice, psychosocial aspects, and generic abilities.

DPTH.6160 Research Methods (formerly 34.616) - Credits: 3
This course presents the role of research in the development and critical analysis of physical therapy clinical practice. Students are guided through the process of clinical scientific research including the following content areas: philosophy of science and causation, problem and hypothesis identification, review and analysis of scientific literature, methods of hypothesis testing, data analysis and interpretation and critique/evaluation of research results.

DPTH.6170 Neurological Physical Therapy Lecture I (formerly 34.617) - Credits: 3
This course presents current evidence-based practice, knowledge translation, and practical applications of the principles of neuroplasticity, motor control and motor learning. A variety of neurological conditions with different levels of impairment, activity limitation, and participation restriction will be examined. Emphasis is on the development
of clinical decision-making skills following the Guide to Physical Therapist Practice patient/client management model. Concurrent laboratory sessions emphasize the development of movement analysis and intervention skills to optimize restoration of function and participation.

**DPTH.6190 Neurological Physical Therapy Laboratory I (formerly 34.619) - Credits: 1**

This laboratory course must be taken concurrently with Neurological Physical Therapy I, DPTH.6170. Emphasis is on the development of problem solving and psychomotor skills necessary for successful management of the patient/client with neurological dysfunction. Videos and patient demonstrations are used to develop skills in examination, evaluation, and clinical decision making. Peer practice is used to promote the development of psychomotor skills in advanced therapeutic exercise and functional training. Problem solving in the application of interventions for different levels of impairments, activity limitations, and participation is stressed.

**DPTH.6200 Neurological Physical Therapy II (formerly 34.620) - Credits: 3**

This course is the second of two courses dealing with physical therapy management of adults with neurological conditions. Current evidence-based practice and knowledge translation will be applied to neurological conditions with different levels of impairment, activity limitation, and participation restrictions. Emphasis is on the development of clinical decision-making skills following the Guide to Physical Therapist Practice patient/client management model. Concurrent laboratory sessions integrate examination and movement analysis with therapeutic interventions to optimize restoration of function and participation.

**DPTH.6210 Musculoskeletal Physical Therapy II Lecture (formerly 34.621) - Credits: 3**

This course is the second of a three-course series which focuses on physical therapy management, and summarizes medical and surgical management of musculoskeletal dysfunction. The evaluation, treatment and prevention of pathological conditions affecting the upper extremity will be emphasized. Normal function will be included as a basis for recognizing and therapeutically resolving dysfunction of skeletal and joint structures, muscular and soft tissue. A problem-solving approach to resolve impairments, which contribute to activity limitations and participation restrictions, will be stressed.

**DPTH.6220 Neurological Physical Therapy II Laboratory (formerly 34.622) - Credits: 1**

This laboratory course must be taken concurrently with Neurological Physical Therapy II, DPTH.6200. Emphasis is on the development of problem solving and psychomotor skills necessary for successful management of the patient/client with neurological dysfunction. Videos and patient demonstrations are used to develop skills in examination, evaluation, and clinical decision making. Peer practice is used to promote the development of psychomotor skills in advanced therapeutic exercise and functional training. Problem solving using case studies in the application of interventions for different levels of impairments, activity restrictions and participation limitations is stressed.

**DPTH.6230 Musculoskeletal Physical Therapy II Laboratory (formerly 34.623) - Credits: 1**

This laboratory course develops the psychomotor skills to allow clinical application of didactic knowledge gained in Musculoskeletal Physical Therapy II Lecture. The safe and effective performance of examination and treatment procedures are taught using demonstrations, peer practice, case studies and mock evals as they pertain to the shoulder, elbow, forearm, wrist, and hand. Examination procedures, organized by body regions, include interview questions, observation, palpation, anthropometric measurements, goniometry, joint play mobility, muscle strength testing, and special tests. Treatment procedures focus on joint mobilization/manipulation, passive and active stretching techniques, and progressive strengthening exercises.

**DPTH.6250 Physical Therapy Interventions II (formerly 35.625) - Credits: 3**

This course is a study of advanced physical therapy procedures which utilize electrophysics and electrophysiology in evaluating and treating a variety of physical impairments. The course will emphasize theories and techniques used in electrodiagnosis, electromyography, functional electrical stimulation, iontophoresis, transcutaneous electrical stimulation, biofeedback, laser and therapeutic electrical currents including light and radar waves.

**DPTH.6260 Geriatric Physical Therapy (formerly 34.626) - Credits: 3**

This course will focus on the special needs of the elderly and on the physical therapy management of the geriatric client. The physical changes associated with normal aging as well as pathological changes will be discussed and analyzed. Program planning will stress holistic consideration of the rehabilitative, cognitive/behavioral, and psychosocial needs of the elderly. (Re)Evaluation including functional evaluation, treatment planning (and treatment plan evaluation), treatment cost effectiveness, documentation, reimbursement issues will be analyzed as they relate to the physical therapy management of the geriatric client. All physical therapy graduate courses (number 34.) are restricted to PT majors only.
DPTH.6270 Physical Therapy Interventions II Laboratory (formerly 34.627) - Credits: 1

This course is a practical application of theories and principles presented in Physical Therapy Interventions II Lecture (DPTH.6250).

DPTH.6280 Musculoskeletal Physical Therapy III (formerly 34.628) - Credits: 3

This course provides the second-year physical therapy student with an introduction to physical therapy evaluation and management of dysfunction of the cervical, thoracic and lumbar spine, ribcage, and pelvis. The development of evaluation strategies, documentation skills, organized clinical decision making, and effective patient management techniques will be emphasized. Discussions and exercises will focus on developing patient diagnoses, functional problems lists, long and short-term goals, and treatment strategies. Critical thinking/problem solving strategies will be incorporated into all aspects of patient management. Emphasis will be on creating a climate that encourages learning. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6290 Directed Research (formerly 34.629) - Credits: 1-3

The directed research experience provides students with the opportunity to develop a research project with the guidance of a faculty advisor. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6300 Musculoskeletal III Laboratory (formerly 34.631) - Credits: 1

This laboratory course provides the student the opportunity to apply the didactic knowledge gained in the Musculoskeletal Physical Therapy II Lecture through a systematic clinical reasoning approach which focuses on the concept of-regional interdependence. Additionally, specific evidence-based evaluation and functional management techniques for the spine and pelvis will be demonstrated by instructors and practiced by students.

DPTH.6310 Pediatric Physical Therapy Lecture (formerly 34.631) - Credits: 3

This course focuses on the development of the individual from the prenatal period through adolescence within the context of the individual's family and cultural background. Emphasis will be on the examination, evaluation, diagnosis and formulation of a physical therapy plan of care for infants, children and adolescents with physical therapy related issues including wellness and prevention of disability. The framework for the course will be based upon principles of development, neural plasticity, motor control, motor learning, pediatric clinical decision making, the WHO ICF, and evidence directed care including clinical practice guidelines. The student will integrate the course material and synthesize appropriate plans of care using case studies and other interactive activities.

DPTH.6330 Pediatric Physical Therapy Laboratory (formerly 34.633) - Credits: 1

Through classroom and clinical laboratory experiences, the student will gain introductory level skill in the examination, evaluation, intervention, and development of a physical therapy plan of care for infants, children, and adolescents who have or are at risk for developing disabling problems requiring physical therapy intervention. Preventive and wellness strategies will also be developed and discussed. Problem solving and evidence directed practice including Clinical Practice Guidelines will be emphasized.

DPTH.6350 Clinical Education II Seminar (formerly 34.635) - Credits: 1

This course is the second in a series of two one-credit weekly seminars. The class will continue to explore the professional issues and application of didactic material in the clinical setting. Clinical education will be examined from the perspective of career development and physical therapy board preparation.

DPTH.6370 Integrating Clinical Practice (formerly 34.637) - Credits: 3

This course will focus on integrating clinical reasoning skills in physical therapy with an emphasis on application of evidence-based research and current concepts of disablement. Students will share clinical experiences focusing on utilization of - best practices and - Clinical Practice Guidelines.

DPTH.6390 Medical/Surgical -Orthopedics (formerly 34.639) - Credits: 3

Medical Surgical conditions (Orthopedics) present topics related to pathology and medical-surgical treatment of musculoskeletal disorders. Included will be bone development, bone repair, orthopedic examination, diagnostic examinations (including imaging), pathology and pathophysiology of musculoskeletal disease.

DPTH.6400 Professional Prep in PT (formerly 34.640) - Credits: 3

This course will focus on facilitating the students transition into the Physical Therapy Profession including successful
completion of the professional licensure examination, the National Physical Therapy Exam: Student groups will outline and present review materials for the exam to each other including a list of sources for further study. The faculty facilitator will oversee the development and content of the presentations and supervise practice examinations. Students are guided through reflection in practice, development of a personal professional development plan, a Vision and Mission Statement including continuing education, pro bono and community service and participation in the American Physical Therapy Association. Other topics will include strategies for successful interviewing.

DPTH.6420 Health Policy & Admin (formerly 34.642) - Credits: 3
This course explores the social, political, and economic policies that impact the delivery of physical therapy services and health. The course underscores the issues of professionalism, leadership, management, and the advocacy to foster excellence in autonomous practice for the benefit of members and society. The course emphasizes leadership in promoting cultural competence, global and community health through the life span, social responsibility, effective application of technology, and health services research.

DPTH.6430 Evidence Directed Care (formerly 34.643) - Credits: 3
This course presents the role of evidence in the development and critical analysis of PT clinical practice guidelines and recommendations. Students practice analyzing, weighting, comparing and integrating sources of evidence. Methods of integrating various forms of evidence are covered including: examination and intervention systematic reviews, meta-analyses and clinical practice guidelines. The role of the PT’s experience and background, patient, family, and stakeholders in the development of clinical practice guidelines will be analyzed. Current topics such as the role of Telemedicine and theories of Behavioral Change will be discussed, compared and integrated into plans of care and clinical use.

DPTH.6440 Clinical Education Fieldwork II (formerly 34.644) - Credits: 1
This is the continuance of Directed Research experience providing students with the opportunity to complete and present a research project with the guidance of a faculty advisor. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6450 Physical Therapy Interventions III (formerly 34.645) - Credits: 3
This course introduces the second year physical therapy student to various topics related to specialized physical therapy management of patients. Topics include, but are not restricted to: lower extremity prosthetic and orthotic management, hand orthotic fabrication, introduction to ergonomic principles, ergonomic design of seating systems and workstations, cumulative trauma disorders, work site analysis, functional capacity evaluation, lumbar stabilization exercises, the acute care environment, post-mastectomy management, and aquatic therapy interventions.

DPTH.6460 Complex Cases in Physical Therapy (formerly 34.646) - Credits: 3
This course, which runs concurrently with Clinical Education Experience III (DPTH.6530), is designed to promote evidenced-based practice, intra-professional correspondence, and further socialization into the profession of physical therapy. Students are expected to incorporate evidence based practice in real-time clinical practice whenever possible and speak to the implementation, progress, and outcome(s) via on-line posting of related case studies. Furthermore, students are expected to critically evaluate the degree to which the current evidence supports or conflicts with the common practice intervention. Additionally, students will critically evaluate their classmate’s cases study postings offering feedback and/or treatment suggestions based upon their experience(s) and the evidence.

DPTH.6470 PT Interventions III Lab (formerly 34.647) - Credits: 1
All physical therapy graduate courses (number 34.) are restricted to PT majors only.

DPTH.6480 Service Learning in Physical Therapy (formerly 34.648) - Credits: 3
This three-credit course is designed to serve as a service-learning experience in the final year for doctoral physical therapy students. The course is designed to provide relevant and meaningful service opportunities for culturally competent physical therapy services with a focus on prevention, health promotion, fitness, and wellness to individuals, groups, and communities. The service learning experience will prepare students for active civic participation in a diverse society. Through the use of readings, discussion, reflection and presentations students will gain an understanding what it means to build the capacity of a community and develop the competency skills of an entry level physical therapy practitioner.

DPTH.6500 Clinical Education Experience I (formerly 34.650) - Credits: 3
A ten-week full time, clinical experience designed to integrate basic physical therapy evaluative and treatment procedures, foster development of an autonomous professional through the synthesis and utilization of advanced academic theory in evaluation and treatment. Students are expected to use sound scientific rationale and a problem solving approach in aspects of patient care. Students are under the direct supervision of licensed physical therapists in general acute facilities and outpatient setting.

DPTH.6520 Clinical Education Experience II (formerly 34.653) - Credits: 3

This second, twelve-week, clinical experience designed to further promote the development of an autonomous professional as well as stimulate socialization into the profession. Students are expected to function as independently as possible using the problem solving process as a basis for all clinical decision making. Communication, coordination and consultation with other members of the health care team and responsibility for total client management are emphasized.

DPTH.6530 Clinical Education Experience III (formerly 34.653) - Credits: 3

This terminal, twelve-week, clinical education experience is designed as the final promotion of complete socialization and transition into the profession of physical therapy. Students are expected to function as independently as possible using problem solving processes as a basis for all clinical decision making. Communication, coordination, and consultation with other members of the health care team and responsibility for complete patient management are emphasized.
Graduate Certificate Programs in Health Informatics and Health Service Management

HIM Certificate Requirements

The Health Information Management program offers four-course Graduate Certificates in two different areas:

- Health Service Management
- Health Informatics

Many students complete one of these Certificates before seeking admission to the Health Information Management Masters degree program, as the Certificate courses are accepted as credits toward the Masters degree. Moreover, students who complete a Graduate Certificate with a grade point average of 3.5 or better are not required to take the Graduate Record Exam in applying for admission to the MS program.

UMass Lowell is one of the largest accredited online education providers in New England. As developed under a blended learning grant from the Alfred P. Sloan Foundation and its Sloan-C initiative, the HIM program offers graduate studies in an online format, providing a more accessible program of study for busy healthcare and IT professionals.

Admission Requirements

1. Official transcript indicating graduation from an accredited baccalaureate institution.
2. A one-page statement of purpose indicating career plans, interests and objectives in pursuing a graduate degree.
3. A professional resume.
4. TOEFL scores must be submitted if a citizen of a non-English speaking country and have not earned an academic degree in the United States (Minimum Score: 79).

Although a background in health is not required for admission, applicants with significant health industry experience are given preference when program capacity is limited. For other applicants, ones academic record and professional work experience are especially important. Applications can be submitted and evaluated at any time. We nevertheless recommend that those seeking admission for the Fall semester have applications complete by May 15, and that those seeking admission for the Spring semester have applications complete by December 15. All application materials go to Graduate Admissions.

Health Service Management Certificate

The Management Certificate is offered primarily as a continuing education opportunity for health industry professionals interested in pursuing career advancement. It teaches core skills required in healthcare service management and helps students gauge interest and prospects for continuing with a full 12-course MS HIM program.

Required Courses:

- PUBH.5110 (Healthcare Finance)
- PUBH.5140 (Healthcare Management)

Elective Courses (choose two):

- PUBH.5060 (Quantitative Methods in Health Management)
- PUBH.5020 (Organizational Behavior in Healthcare)
- PUBH.5310 (Health Informatics)
- PUBH.6070 (Healthcare Information Systems)
- PUBH.5120 (Operations Analysis and Quality Improvement)
- PUBH.5150 (Applied Health Economics)
- PUBH.6160 (Law and Ethics in Healthcare)
- PUBH.6250
Health Informatics Certificate

The Health Informatics Certificate is primarily meant to provide healthcare professionals with the requisite skills and understanding required to support health IT initiatives of the workplace.

Required Courses:

- PUBH.5310 (https://www.uml.edu/catalog/courses/PUBH/5310)
  Health Informatics
- PUBH.6070 (https://www.uml.edu/catalog/courses/PUBH/6070)
  Healthcare Information Systems

Elective Courses (choose two):

- PUBH.5060 (https://www.uml.edu/catalog/courses/PUBH/5060)
  Quantitative Methods in Healthcare
- PUBH.5150 (https://www.uml.edu/catalog/courses/PUBH/5150)
  Applied Health Economics
- PUBH.6160 (https://www.uml.edu/catalog/courses/PUBH/6160)
  Law

For General Questions

Sandra Guy
Department of Public Health
Zuckerberg College of Health Sciences
Email: Sandra_Guy@uml.edu
Phone: 978-934-5437
PUBH.5000 Analytical Context of the Work Environment (Formerly 19.500) - Credits: 3

An overview course to be taken in the first semester in the Master's program. Case studies are used to introduce students first to the hazard analysis methods, and second, to the prevention methods of each of the department's sub-disciplines. Interconnections between exposures and illness/accident development are reviewed at three levels: individual, work organization and society.

PUBH.5010 Social and Behavioral Determinants of Health (Formerly PUBH 501) - Credits: 3

This course introduces core concepts of social and behavioral determinants of health and provides a foundation for the analysis of social, political and economic influences on health and their role in contributing to health inequities. The core functions of public health and essential services are discussed as well as the history of public health, its philosophy and values. Upstream and downstream reforms to addressing fundamental determinants are evaluated. The influence of behavioral and psychological factors on health and disease are analyzed.

PUBH.5020 Organizational Behavior in Health Care (Formerly 32.502) - Credits: 3

This course reviews the organizational structure of healthcare facilities and the behavior of individuals within them. Students analyze the role of administration, human resources, providers and other support staff and apply organizational, behavioral, and social science practice and theory, to the operations of the healthcare organization. Comparison is made between healthcare and non-health care types of industry to highlight the unique characteristics of healthcare workers. An emphasis is also made on leadership styles, organizational culture, and change management within the healthcare organization.

PUBH.5021 Public Health Policy (Formerly PUBH 502) - Credits: 3

The course focuses on expanding students' knowledge and skills for developing and evaluating contemporary public health policy in the United States and international settings. Students will gain information about the current US national health care system as it relates to emergent public health topics and priorities in the US and globally. This course will focus on competencies for designing, implementing, evaluating and advocating for evidence-based policy, program and practices.

PUBH.5030 Toxicology and Health (Formerly 19.503) - Credits: 3

The course introduces students to the basic principles and mechanisms of toxicology with a focus on occupational and environmental health. Concepts of dose, dose rate, dose-response analysis, and test systems are presented in the context of the toxicology of major organ systems and toxic agents. The course covers toxicology of major organ systems (respiratory, dermal, immunologic, cardiovascular, neurologic, reproductive systems, and cancers), major classes of contaminants (airborne particles, respirable fibers, vapors/gases, heavy metals, organic solvents, pesticides, sensitizers, emerging contaminants), and their mechanisms of action. A review of the necessary human biology and biochemistry of life is also provided.

PUBH.5050 Qualitative Research Methods (Formerly 19.505) - Credits: 3

This course explores and examines non-quantitative methodologies in the social sciences and political economy. The course will discuss hypothesis generation, survey design, research problem design, case studies, ethnographic methods, participatory research methods, content analysis, interviewing techniques and key informant interviews. Doctoral students in work environment policy are particularly urged to take this course. The course will be offered in collaboration with the Department of Regional Economic and Social Development as course 57.592.

PUBH.5060 Quantitative Methods in Health Management (Formerly 32.506) - Credits: 3

This course explores analytic methods that can be used to improve the decision making of management, clinicians and others within the healthcare industry. Students learn the conceptual foundations of quantitative analysis and common methods used in supporting decision-making: developing evidence-based practices; analyzing data and testing hypotheses. Students also learn how to use industry-standard data analysis software applications, statistical packages and common applications for the development and reporting of analytic findings.

PUBH.5061 Environmental Health (Formerly 19.506) - Credits: 3

This environmental health course explores the links between human activities and environmental systems and examines how these interactions can impact human health. The course is designed to provide knowledge and skills necessary to understand how human and industrial activities such as population growth, methods of food production, pollution of the air and water, waste, the built environment, toxic substances, pest control, and global climate change can result in human diseases and impact the environment. Understanding the links between human activities and environmental systems is essential to developing effective prevention strategies and
building sustainable communities.

**PUBH.5070 Leadership and Management in Public Health - Credits: 3**

The purpose of this course is to enhance the students' ability to effectively build and lead high-performing Public Health organizations. This course will integrate fundamental principles from the behavioral and social sciences to provide students with a coherent set of strategies and techniques to effectively collaborate with internal external stakeholders as well as to influence meaningful, sustainable change. This course will also provide students opportunities to self-reflect on their own leadership styles and develop growth plans.

**PUBH.5080 Principles and Practices of Biological Safety (Formerly 19.508) - Credits: 3**

This course is designed to provide an overview of hazard recognition, evaluation and control of potentially hazardous biological materials. This introduction to the field will cover the potential risks of working with biological materials, the use of engineering, work practices and administrative measures for hazard control and regulations governing the area of biosafety. Requires working knowledge of Microbiology, and permission of Instructor.

**PUBH.5100 Fundamentals of Occupational Health (Formerly 19.510) - Credits: 3**

This course provides an overview of key topics in the field of occupational health and safety including physical agents and biological and chemical hazards. The measurement and control of various physical agents are covered, including noise, ionizing and non-ionizing radiation, heat stress and extreme environments. Students will understand the health risks from biological hazards and blood borne pathogens, as well as the regulations and methods of prevention. They will also gain knowledge of hazard communication regulations, material safety data sheet and how to research chemical hazards.

**PUBH.5110 Health Care Finance (Formerly 32.511) - Credits: 3**

Provides broad exposure to the concepts and practices of healthcare finance and healthcare financial management. Teaches a practical understanding of basic healthcare financial issues, financial reporting and analysis, and provider payment structures. The course enables students to read, analyze and use healthcare financial information in today’s healthcare environment.

**PUBH.5120 Operations Analysis for Quality Improvement (Formerly 32.512) - Credits: 3**

This course focuses on a multi-disciplinary approach to operations analysis, process redesign and quality improvement in health care. Focus is placed on the tools, methods and processes used for improving work flow processes, patient safety and performance in a variety of health care settings. Students study the history, development and principles of quality improvement in healthcare.

**PUBH.5140 Healthcare Management (Formerly 32.514) - Credits: 3**

This course provides a framework for addressing common issues faced by management within a healthcare organization. Students are provided with an overview of how healthcare institutions are organized and governed, the unique roles of management, clinical staff, support staff, and human resources in the healthcare setting. Students also learn the management systems designed for efficient and effective operations.

**PUBH.5141 Aerosol Science (Formerly 19.514) - Credits: 3**

Basic properties of airborne particles, with particular regard to properties important to health. Includes basic properties of gas-borne particles, uniform particle motion, particle collection mechanisms, filtration, particle sampling, respiratory deposition, particle statistics, electrical properties, and optical properties. Course includes lectures and laboratory.

**PUBH.5150 Applied Health Economics (Formerly 32.515) - Credits: 3**

Students explore the economic dimensions of healthcare by considering the input, output, production and costs of producing quality healthcare which meets demand and evaluates the behavior of supply. Students consider provider payer systems and aspects relative to private and public health insurance in determining market power and competitive markets. Common economic evaluation methods are introduced to measure health service feasibility, and promote value judgment in the realm of healthcare reform and regulatory compliance.

**PUBH.5160 Laboratory Environmental Health and Safety (Formerly 19.516) - Credits: 3**

This course is designed to provide an overview of hazard recognition, evaluation and control in laboratory environments. This introduction to the field will cover the potential risks of working with chemicals, radioactive materials, animals and biological materials. It will also introduce the use of engineering, workpractices and administrative measures for hazard control and regulations governing the area of laboratory safety.
PUBH.5210 Introduction to Industrial Hygiene (Formerly 19.521) - Credits: 2

A survey course covering introductory topics in ergonomics and industrial hygiene. Ergonomics topics include work measurement, anthropometry, biomechanics, psychosocial stress and work reorganization, special emphasis is placed on the recognition and control of work-related musculoskeletal disorders. Industrial hygiene topics will cover the identification, measurement, and control of chemical and physical hazards in the work environment including principles of air sampling and analysis, ventilation and other control technologies, and the use of personal protective equipment with special attention to respiratory and hearing protection.

PUBH.5230 Introduction To Ergonomics (Formerly 19.523) - Credits: 2

PUBH.5250 Industrial Hygiene and Ergonomics (Formerly 19.525) - Credits: 3

PUBH.5300 Ergonomics and Work (Formerly 19.530) - Credits: 3

An overview of the scientific basis for design of the workplace to optimize physical and mental interaction of workers with machines, tools, and work methods. Topics include work measurement, anthropometry, biomechanics, work physiology, cumulative trauma disorder and information presentation and processing.

PUBH.5310 Health Informatics (Formerly 32.531) - Credits: 3

This course introduces healthcare professionals to the power of data and the importance of analysis. Students learn how population informatics, consumer health informatics, translational bioinformatics, and clinical research informatics are essential components in selecting the techniques and systems used for transforming clinical data into information, knowledge and improved decision-making. The past, current and future role of healthcare IT is also discussed.

PUBH.5311 Occupation Biomechanics (Formerly 19.531) - Credits: 3

The anatomical and physiological basis of human motor capabilities. Quantitative models are developed to explain muscle strength performance, motion control, physical fatigue, and acute and chronic musculoskeletal trauma, particularly static link models of lifting and other manual activities. Application to the evaluation and design of various tasks and occupations.

PUBH.5320 Occupational Biomechanics Laboratory (Formerly 19.532) - Credits: 3

A laboratory presentation of the biomechanical basis for understanding and predicting human motor capabilities using bioinstrumentation. Computerized data acquisition, electromyography and load cells for strength measurement are examples of the equipment used in this lab. Particular emphasis is placed on the evaluation of occupational activities.

PUBH.5330 Intervention Research (Formerly 19.533) - Credits: 3

This course covers the design, implementation and evaluation of interventions to reduce risk factors for poor health and related outcomes. Topics include the use of casual diagrams to identify possible intervention points; logic models for program evaluation; and design of formal evaluation research studies. Selected scientific articles will be used to illustrate topics covered in the lectures. Each student will select a public health problem of interest and develop a case study over the course of the semester.

PUBH.5400 Occupational Safety Engineering (Formerly 19.540) - Credits: 3

The purpose of this course is to introduce students to the principles of safety hazards in the work environment. This course is primarily designed to emphasize the safety aspects of the hazards at work. It begins with the historical development of occupational safety and health and progressively examines the fundamentals of recognition, measurement, evaluation, and control of occupational safety hazards.

PUBH.5420 Human Factors (Formerly 19.542) - Credits: 3

The functional processes of human systems in the workplace that affect psychosocial health and productivity. Review of associations between work design principles and effects on human well-being, learning, and performance. Human perceptive, cognitive, metabolic, and social-psychologic limitations. Human-machine interactions affecting "stress" and learning at the level of individuals and of groups. Introduction
to "healthy" job redesign, "conducive production", and measurement strategies. Principles applied through practical design problems.

**PUBH.5490 Sustainable Housing Development and Land Use: Policy and Practice (Formerly 19.549) - Credits: 3**

Housing is fundamental to the quality of life in communities, and housing policies shape the availability of this fundamental good. This course will examine the economic, environmental, social, and cultural factors that shape housing and its sustainability. Overall housing and land use policy in the United States will be summarized, with students learning of the ways in which housing policy impacts communities, states, and regions. The course will then give students a detailed understanding of the process through which housing is developed and the role the market, government, funders, workers, and housing consumers play in influencing the creation and development of housing. The course will highlight the ways in which current housing development policy and practices are not sustainable, and will examine more recent efforts to establish standards and practices that enhance sustainability. Students will learn how to take a housing project through the various stages, such as project conceptualization, market analysis, design, site acquisition, financing, construction, and occupancy. While the course focuses on the U.S. context, students will learn of international efforts to achieve greater sustainability in housing. The course will provide students with both practical and theoretical knowledge of housing and land use policy and development practices. Case studies of actual projects will be presented.

**PUBH.5500 Environmental Law (Formerly 18/19.527) - Credits: 3**

The large body of law, which has developed since the early 1960’s, is examined in considerable detail. Federal laws relating to the environment, particularly with the Environmental Protection Agency and the Occupational Safety and Health Acts. State and local laws and ordinances are discussed where pertinent.

**PUBH.5510 Work Environment Policy and Practice (Formerly 19.551) - Credits: 3**

This course provides an overview of occupational safety and health (OSH) policy and practice. It focuses on the legal and administrative vehicles, especially the Occupational Safety and Health Administration (OSHA) and OSH Act of 1970. I demonstrates the public health and business case for safety via case studies. The course provides an analytical framework for examining social, economic, and political factors in the recognition and control of occupational hazards and a management program for identifying and preventing hazards at the worksite. The course covers national and international workplace management systems as well as business and organizational management policies to ensure safety and how these are translated to effective practice at the level of a specific worksite.

**PUBH.5550 Comparative Environmental (Formerly 19.555) - Credits: 3**

Human social and productive activities often harm the natural environment. Environmentally related health problems will become more prominent and put additional stress on industrial, as well as transitional and developing nations. A sustainable world is one that provides not only for environmental viability but also economic health, social justice and political participation. This course is designed to explore the dynamics and interactions of social, economic and political factors that aid or impede a community’s ability to contribute to global environmental sustainability. The course will be offered in collaboration with the Department of Regional Economic and Social Development as course 57.518.

**PUBH.5570 Toxic Use Reduction (Formerly 19.557) - Credits: 3**

Toxic Use Reduction (TUR) is a new approach to hazardous waste management and environmental protection. Rather than addressing chemical contamination as waste (after its generation), to be managed through permits and emission regulations, TUR focuses on chemicals while still in production. In Massachusetts, firms are required to prepare plans demonstrating how they will reduce or eliminate the use of toxic chemicals. The course is organized as a set of discussions and case studies from the real-life program.

**PUBH.5590 Conflict Resolution (Formerly 19.559) - Credits: 3**

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.

**PUBH.5750 Epidemiology and Biostatistics - Credits: 3**

Epidemiology is the study of the distribution and determinants of disease in human populations, and the risk factors associated with diseases. This course provides an introduction to epidemiology and the associated biostatistical methods that constitute the principal quantitative methods for disease
prevention. Topics include: measures of disease frequency, measures of central tendency and spread, rates and risks, precision and validity, bias, simple linear regression, and the important study designs (population surveys, cohort, case-control and cross-sectional studies).

PUBH.5760 Biostatistical Programming - Credits: 3
This course is designed to provide familiarity with several types of statistical software commonly used in public health research. The course covers topics including: reading raw data and existing data sets; modifying data; combining data sets; applying basic statistical procedures; and sorting, summarizing, and printing data.

PUBH.5770 Biostatistics for Health Data - Credits: 3
This is a practical course in biostatistical methods for health research. Emphasis is placed on developing an understanding of the use and interpretation of standard biostatistical methods. Topics include probability and sampling distributions, regression and ANOVA, methods for analyzing rates and proportions, power and sample size calculations. Students will gain experience in using a statistical software package to apply and expand their data analysis skills.

PUBH.5790 Disability Outcomes and Interventions (Formerly 19.579) - Credits: 3
This course will address the epidemiology of disability outcomes through a mix of didactic presentation and critical discussion of the literature, covering both observational and intervention studies. Qualitative research methods will also be highlighted in terms of how they can enrich the study hypotheses, construct measures, etc. The first half of the course will cover observational studies of individual and environmental risk factors for disability outcomes, including features of both the workplace and the community. Then we will describe the key design features of clinical trials to evaluate interventions, again at both the individual and the organizational levels. Interspersed with lecture material, selected observational and intervention studies from the peer-reviewed scientific literature will be evaluated with respect to study design, methodologic rigor, and adequacy of statistical analysis.

PUBH.5910 Co-Op Internship CPT (Formerly 19.591) - Credits: 0-1
Practical training course for students to perform CPT. "Variable credit course, student chooses appropriate amount of credits when registering."

PUBH.5930 Directed Study (Formerly 19/31/32.593) - Credits: 1-3

PUBH.5980 Thesis Review (Formerly 19.598) - Credits: 1
PUBH.6000 Practicum/Capstone I (Formerly 19.600) - Credits: 3
This is the first course in a two-semester sequence that provides the opportunity to apply practical skills through a culminating practice experience for students in the Master’s programs in Work Environment and Public Health. The course is designed to provide students with the opportunity to examine an interdisciplinary problem in depth and propose a solution to the problem by applying technical knowledge and skills obtained in their program to a real world issue. The product will be a report and a public presentation of the project.

PUBH.6010 Practicum/Capstone II (Formerly 19.601) - Credits: 3
This is a second course in a two-semester sequence that provides the opportunity to apply practical skills through a culminating practice experience for students in the Master’s programs in Work Environment and Public Health. The course is designed to provide students with the opportunity to examine and interdisciplinary problem in depth and propose a solution to the problem by applying technical knowledge and skills obtained in their program to a real world issue. The product will be a report and a public presentation of the project.

PUBH.6030 Global Development and Health (Formerly PUBH.603) - Credits: 3
This course discusses global health efforts in relationship to human health and quality of life. Using a case methodology, this course will enable students to analyze complex health and development challenges in the less-developed world, and propose and evaluate interventions that address challenges. Topics include maternal and child health, nutrition, infectious and noninfectious diseases, natural disasters, sanitation and health inequality. Access to health care in developing and developed countries will be analyzed. The concept of positive deviance will also be explored.

PUBH.6050 Advanced Research Methods in Work Environment (Formerly 19.605) - Credits: 3
An advanced seminar focused on developing research skills needed for understanding the causes of health and safety hazards in the work environment as well as their solutions. The seminar topics will vary each semester, depending on the research fields of the students enrolled as well as the expertise of the participating faculty members. The goal is to provide depth in theory, background literature, state of the art
measurement tools, and research methods at a level appropriate to students undertaking independent research. All doctoral students are required to take two semesters of this seminar.

**PUBH.6070 Healthcare Information Systems (Formerly 32.607) - Credits: 3**

This course provides a broad-range overview of the healthcare information systems industry, its history, recent developments and continuing challenges, as well as a practical understanding of healthcare information systems acquisition and implementation. Topics include EMR, Data, CMS Quality Programs, Clinical Integration and health information exchange.

**PUBH.6090 Work in Progress Seminar (Formerly 19.609) - Credits: 1**

This seminar course provides a forum for doctoral students (and advanced master’s students) to discuss research with their peers and the faculty in a supportive interdisciplinary community. Doctoral trainees from all Public Health fields are required to present their work in progress to their peers. Although all doctoral students must register for this seminar for credit in one semester during their career, they are expected to attend and present regularly while they are in the research and writing phase of their doctorate.

**PUBH.6100 Exposure Assessment (Formerly 19.610) - Credits: 3**

Concepts of quantification of occupational exposures (chemical and physical hazards) for purpose of correlating health effects with exposures. Topics discussed include reasons for conducting exposure assessment, sampling methods, sampling strategies (for epidemiology, compliance, control), and statistical considerations. Principles are illustrated through a series of case studies.

**PUBH.6110 Physical Properties of Aerosols (Formerly 19.611) - Credits: 3**

A seminar covering aspects of aerosol science not discussed in 19.514 but necessary for the completion of research projects involving aerosols. Topics covered include the electrical, thermal, and optical properties of aerosols, particle agglomeration, evaporation and condensation, and the generation and measurement of test aerosols. Course will consist of lectures and laboratory sessions.

**PUBH.6120 Exposure Data Analysis (Formerly 19.612) - Credits: 3**

An advanced seminar covering statistical considerations for exposure sampling and data analysis. Topics include sampling data distributions; the effects of averaging time, autocorrelation, multiple task jobs and limit of detection samples on the sampling distribution; the use of linear models to examine between and within worker variability in exposure; the determination of homogeneous exposure groups; the development of multiple regression models to predict exposure levels and evaluate exposure determinants; and methods of model development, interpretation and validation.

**PUBH.6131 Design and Evaluation Of Ventilation Systems (Formerly 19.613) - Credits: 3**

A seminar intended for students pursuing research involving industrial ventilation system design and evaluation. It covers material not included in 19.518, such as recent theoretical models which describe system performance, design of systems for high-temperature operation, trouble-shooting techniques, and advanced instrumentation techniques. Course consists of lectures and laboratory sessions.

**PUBH.6140 Evaluation of Work Environment Hazards (Formerly 19.614) - Credits: 3**

This course provides the work environment professional with a systematic method of evaluating chemical, ergonomics and work organizational hazards in the field. Basic industrial processes and their potential hazards are reviewed. Approaches for evaluation of indoor air quality are covered. Worksite surveys of hazards and control technologies and the evaluation of existing health and safety programs are implemented through a series of workplace walkthrough visits in a variety of industries. Team work skills are developed and utilized to produce professional final reports and presentations that cover rankings of worksite hazards and recommendations.

**PUBH.6150 Solutions for Work Environment Hazards (Formerly 19.615) - Credits: 3**

Techniques for controlling exposure to airborne contaminants. Basic controls include substitution, ventilation, isolation, administrative controls, and personal protective equipment. Special focus is placed on Toxic Use Reduction (TUR) and Pollution Prevention strategies.

**PUBH.6160 Law and Ethics in Healthcare (Formerly 32.616) - Credits: 3**

This course presents and overview of legal and ethical issues facing managers and providers in health care. It provides students with a foundation of health law and ethics and reviews health care legal and ethical situations and dilemmas. The goals are to provide students with practical knowledge of
health law and ethics and their application to the real world of health care.

PUBH.6161 Exposure and Risk Assessment (Formerly 19.616) - Credits: 3

This course covers quantitative and qualitative approaches to the development of sampling strategies. Statistical considerations in the quantification of occupational exposures are covered. Assessment of dermal exposures and the use of biomarkers for exposure assessment are also a focus of this class. An introduction to the methods of risk assessment will also be covered.

PUBH.6191 Measurement of Chemical Exposure (Formerly 19.619) - Credits: 3

Basic properties of airborne particles, with particular regard to properties important to health. Sampling and analysis methods used in the evaluation of occupational exposures to aerosols, gases, vapors. Direct reading instrumentation, calibration and data processing. Integrated sampling methods and chemical analysis of organic and inorganic compounds will be covered in class and lab.

PUBH.6200 Advanced Exposure Assessment (Formerly 19.620) - Credits: 3

An advanced seminar covering exposure assessment for studies of acute and chronic respiratory disease, pharmacologic modeling for exposure assessment and the design of models to evaluate the role of production process factors in determining workplace airborne exposures. The course assumes a prior background in epidemiology and biostatistics as well as industrial hygiene and toxicology.

PUBH.6210 Nanomaterials: Exposure, Health and Safety (Formerly 19.621) - Credits: 3

This course presents a comprehensive overview of environmental health and safety issues of nanotechnology, with focus on biologically based exposure assessment and control. Methods based on biology, toxicology, and knowledge of disease mechanisms are presented for identifying and quantifying nanoscale materials exposures found in occupational/environmental setting and consumer products and for designing exposure assessments for the study of health effects. This course is needed to fill a gap in the current curriculum offerings and to assist the various researchers in understanding possible risks associated with diverse nanotechnologies. The course will include introductory lectures, paper critiques, and laboratory sessions.

PUBH.6220 Biomarkers in Occupations and Environment (Formerly 19.622) - Credits: 3

This new course, the only of its kind in the occupational environmental hygiene program in the country, will discuss the significance of occupational environmental and household skin exposure to chemicals, skin exposure assessment and regulatory aspects. The course will address important topics, such as physiology and metabolism of normal skin, skin absorption of a variety of chemicals, including solids and nanomaterials, factors affecting skin permeation, permeability of compromised skin barrier integrity, skin sampling methods, skin-lung interactions and prevention of skin exposure, through a mix of didactic presentations and critical discussion of the scientific peer-reviewed literature. Each session will start with a presentation on the topic, followed by guided discussions of realistic, but provocative, scenarios. As laboratory space and instrumentation becomes available in the near future, a laboratory component will be added to the course to emphasize major sampling techniques and illustrate/visualize skin permeation of chemicals.

PUBH.6250 Health Policy (Formerly 32.625) - Credits: 3

This course provides students with a basic framework for health policy analysis and examines major aspects of U.S. health policy. Detailed consideration and discussion focus on the relationship of national policy to the planning, implementation and funding of healthcare services. The course covers topics such as the healthcare policy environment in the U.S., government-funded healthcare through Medicaid and Medicare, and the Massachusetts healthcare reform.

PUBH.6260 Leadership in Healthcare (Formerly 32.626) - Credits: 3

The purpose of this course is to encourage students to carefully analyze their leadership style and skills within the context of health care. The course includes the study and application of leadership theories, concepts, and skills. Students will also assess their own leadership potential through the completion of readings, personal and leadership self-assessments, values exploration, and leadership skill exercises.

PUBH.6270 Socioeconomic Inequalities in Health (Formerly 32.627) - Credits: 3

The course explores the relationship between social and economic justice and public health. Focusing primarily on the U.S., the forces that either establish and exacerbate or prevent socioeconomic inequities will be analyzed to understand the intricate links between social, behavioral, physical, and
biological determinants of health. Several theoretical orientations will be reviewed in order to better understand how each frames research and public health strategies that have been used to address health inequalities. Students will be able to competently articulate the relationships between social and health inequalities. They will be able to explain the strengths and limitations of different theoretical orientations to these issues and frame the policy needs to positively reduce health disparities.

PUBH.6320 Health Information System Design and Analysis (Formerly 32.632) - Credits: 3

This course introduces students to the health information system lifecycle. Students take a detailed look at the process of system planning, analysis, design, and implementation. Concepts are taught in a manner that applies to any discipline within the health organization and provides a practical understanding of the steps necessary for successful systems delivery and its importance to organization success. Skills learned will enable students to work effectively with and support the information systems planning effort to ensure better system alignment with information services, clinical and administrative objectives.

PUBH.6321 Advanced Biomechanics (Formerly 19.632) - Credits: 3

A course in advanced biomechanical modeling methods, covering three dimensional static models, optimization methods and dynamic models. Special emphasis will be placed on biomechanical models of the hand. Time will also be dedicated to reviewing current developments in the scientific literature.

PUBH.6330 Healthcare Database Design (Formerly 32.633) - Credits: 3

A practical approach to the design, and development of a relational database with an emphasis on healthcare. Analyzing the requirements of the database proceeds to the design of the structure of the relational database, which is then developed in a Relational Database Management System (RDBMS). Microsoft Access is used as the RDBMS platform.

PUBH.6350 Healthcare Project Management (Formerly 32.635) - Credits: 3

This is a graduate level course providing a comprehensive foundation for project management as it applies to healthcare. Students will be introduced to the theory and concepts of project management and the tools to manage projects with a focus on healthcare. At the end of this course, students should be able to develop, execute, and control a basic project plan that is capable of supporting organizational objectives linked to measures of success for a single project.

PUBH.6380 Health Information Technology Strategic Planning (Health Information Technology) (Formerly 32.638) - Credits: 3

A graduate-level course introducing healthcare professionals to strategic planning for the information systems organization. The concepts are taught in a manner that allows the skills learned to be applied to any discipline with the organization. The course is designed to give healthcare professional a practical understanding of strategic planning and its importance to a successful organization. Skills learned in this course will enable the student to work effectively with and support the information systems planning effort in order to ensure better IS, clinical and business alignment.

PUBH.6381 Methods In Work Analysis (Formerly 19.638) - Credits: 3

Criteria for selection of an approach to ergonomic job analysis depend on the combination of exposures (micro- and macro-level ergonomic stressors) observed to be present as well as the analytical goal. Many ergonomic analysis techniques are based on traditional industrial engineering approaches (time-motion study and work sampling), applied to the identification and evaluation of potential risks to workers' health. A variety of methods, both observational and instrumentational, will be discussed; laboratory sessions will permit hands-on application of several of these for critical evaluation.

PUBH.6390 Electronic Health Record Systems (Formerly 32.639) - Credits: 3

The course addresses Electronic Health Records (EHR) integration with patient care flow, clinical decision making and patient engagement, as well as patient registries and clinical quality reporting. Students also learn core EHR functions, strategies for EHR optimization, and how the EHR can be leveraged for population health management. The course uses industry-leading EHR software as a learning tool to demonstrate how electronic health record technologies are used in a healthcare setting.

PUBH.6400 Macroergonomics: A comprehensive approach to Job and Organizational Design (Formerly 19.640) - Credits: 3

The purpose of this course is to introduce students to the Macroergonomics field. Macroergonomics, also known as the third generation of ergonomics, is a top-down sociotechnical systems approach to the design of organizations, work systems,
and jobs. The goal of macroergonomics is a fully harmonized work system at both the macro- and micro-ergonomic level which results in improved productivity, job satisfaction, health and safety, and employee commitment.

PUBH.6430 Health Work Organization Design (Formerly 19.643) - Credits: 3

Rationales for prevention; determinant of job change feasibility, classic and alternative work organization theories, alternative productivity conceptions, health and growth assessment strategies, conducive work processes, work-group based re-design processes, communicative and network-oriented processes, organization-level change process, product redesign, occupational and political strategic issues.

PUBH.6510 Work Environment Policy (Formerly 19.651) - Credits: 3

This course provides an overview of occupational safety and health policy in the U.S. It focuses on the legal context, especially on OSHA, but also provides an analytical framework for examining the role of social, economic and political factors in the recognition and control of occupational hazards.

PUBH.6540 Work, Technology and Training (Formerly 19.654) - Credits: 3

This course examines the broader issues of the impact of technology on the work environment and on workers. Topics include technology and craft work, Taylorism and the development of mass production methods, labor in the “factory of the future”, skill-based automation, shop floor programming, and other issues in technology policy. The course is offered in collaboration with the Department of Regional Economic and Social Development as 57.503.

PUBH.6550 Introduction to Environmental and Natural Resource Economics (Formerly 19.655) - Credits: 3

This course introduces students to the economic and policy aspects of environmental quality and natural resource issues. The course also incorporates relevant work-environment related 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 of efficiency criteria will be applied to a wide variety of environmental, work-environment and natural resource problems. In attempting to do so we shall also emphasize how difficult it is to model actual environmental problems in the real world. We shall draw upon the basic tools of environmental and health economics to discuss current policy issues and questions that policy makers confront in practice. Graduate students in work environment will be required to do an economic analysis of an occupational health and safety intervention.

PUBH.6580 Clean Product Design (Formerly 19.658) - Credits: 3

This advanced seminar will provide an introduction to clean product design and management which includes the use of lifecycle thinking, eco-design concepts, materials analysis, inherent product safety, recycling and reuse, produce take back, and design for the environment. As background, the seminar will cover renewable resources, bio-based materials and green chemistry solutions and conclude with a consideration of new forms of sustainable consumption.

PUBH.6590 Cleaner Production (Formerly 19.659) - Credits: 3

This course will explore the rapidly expanding developments in cleaner production methods and policies. The course will focus on new directions in environmentally conscious manufacturing and product design in Europe. The subject will cover topics ranging from European demonstration projects, environmental auditing, cleaner technology assessment, eco-efficiency models, water and energy conservation, sustainable product design, eco-design and life cycle assessment, product take-back and extended product life, full cost accounting, industrial ecology, environmental management systems and ISO 14000. Special emphasis will be given to new information data sources and an introduction to new cleaner production methods software.

PUBH.6660 MPH Practicum (Formerly PUBH.666) - Credits: 3

This practicum is the first of two culminating experiences in the MPH program that requires a student to apply theories and principles from coursework in a public health setting. The practicum is a planned, supervised and evaluated practice experience under the supervision of a qualified preceptor. Students meet in a seminar with a faculty member who oversees the practicum experience. Students will finish work on their final applied practice project during the practicum and integrated practical learning courses.

PUBH.6670 Integrated Practical Learning (Formerly PUBH.667) - Credits: 3

This course is designed as the second of two applied learning courses following PUBH.6660 MPH Practicum. It is a culminating experience for students in the MPH program.
Students in this course will demonstrate the mastery of a body of public health knowledge and achievement of the MPH competencies. They will do this through completing their practicum experience and developing a high-quality written product.

PUBH.6750 Introduction to Manuscript Writing (Formerly 19.675) - Credits: 3

This course helps doctoral students (and high-level master's students) gain knowledge and critical practical skills in scientific writing and oral communication in public health. This includes writing dissertation proposals, dissertations, grant applications, scientific meeting abstracts, scientific manuscripts, factsheets, and presenting to scientific and non-scientific audiences. Specific content area includes study design and methodology, the structure of scientific documents, literature review, and communication strategies. Specific attention will be given to effective scientific writing and to guiding principles for ethical research.

PUBH.6760 Introduction to Proposal Writing (Formerly 19.676) - Credits: 1

This seminar will cover the basics of how to write a thesis proposal or grant application. Participants will bring at an idea for a project and, if possible, an outline or draft of a proposal to be developed further with peer and instructor feedback.

PUBH.6800 Introduction To SAS (Formerly 19.680) - Credits: 0-1

This course is designed for researchers who will be doing data analysis using SAS. No prior programming experience is necessary, though familiarity with and general experience in use of a PC (DOS and Windows) is required. The course covers topics including: basics of SAS, reading raw data and existing SAS data sets, modifying data, combining data sets, basic statistical procedures, sorting, summarizing, and printing data. "Variable credit course, student chooses appropriate amount of credits when registering." .

PUBH.6820 Applied Epidemiology Methods (Formerly 19.682) - Credits: 3

This course emphasizes the design and conduct of epidemiology studies. Major topics covered include: casual inference in epidemiology, point and interval estimation for cohort and case control studies, exposure assessment for epidemiology, control of confounding, the identification and interpretation of effect modification, as well as cross-sectional designs and meta-analysis.

PUBH.6830 Risk Assessment (Formerly 19.683) - Credits: 3

This course will review both the methods and policy implications of risk assessment in the development of occupational and environmental standards. Students will conduct risk assessments on real problems, and study important cases in which these methods have been used in setting public policy.

PUBH.6840 Musculoskeletal Epidemiology (Formerly 19.684) - Credits: 3

An advanced course on methods and content of research on work-related musculoskeletal disorders. Reviews pathophysiology, diagnosis, prevalence, latency and surveillance issues. The key literature is examined with attention to study design, quality of exposure assessment, control of bias and adequacy of statistical analysis. .

PUBH.6850 Applied Public Health Research and Practice - Credits: 3

The focus of this course is to provide students with advanced skills necessary to collect quantitative and qualitative data for public health research and practice. Students will learn quantitative methods including questionnaire development, survey planning, data collection, data coding and data management. The course will prepare students to design, conduct, analyze and interpret qualitative research. Strategies for mixed methods research in social and behavioral sciences will be discussed.

PUBH.6860 Program Development and Implementation - Credits: 3

This course is designed to equip students with the knowledge and skills necessary to systematically develop and implement public health programs. Models for program planning are utilized to inform program design. In addition to didactic work, students are guided through the creation of a program and implementation strategies to accelerate the translation of evidence into practice.

PUBH.6870 Quantitative Models for Public Health - Credits: 3

This course introduces quantitative models commonly used in public health research and practice. Emphasis is placed on understanding the logic and underlying assumptions of theses models. Students will gain knowledge and skills in properly selecting and applying these models in various practical settings. Topics include probability sample surveys, quantitative risk assessment, quasi experimental design, propensity matching, interrupted time series, epidemics of
infectious diseases, Monte Carlo simulations, and predictive analytics.

PUBH.6871 Health Communication and Technology - Credits: 3

Students will explore the theories and practice of communication in public health, with a particular emphasis on the role of technology in sharing public health information. The impact of social and environmental factors on the success of health messages, and the relevance of social media and other technology to positively impact issues in population health will be analyzed. The strategic and ethical use of media in developing and implementing effective public health communications is a focus of the course. The targeting of health communication campaigns to populations for the purpose of influencing behaviors and health policy will be examined.

PUBH.6890 Advanced Regression Modeling (Formerly 19.689) - Credits: 3

This course will introduce linear, generalized linear and time-to-event regression models that are commonly used in epidemiologic research, community needs assessment and public health program/policy evaluations. Topics include regression models for continuous, binary, ordinal, multinomial, count, time-to-event, and longitudinal data.

PUBH.6900 Critical Review Health Regulations (Formerly 19.690) - Credits: 3

Course designed to explore the practical applications of epidemiologic methods to the setting of actual standards. Students gain experience in distinguishing minor from major design and analysis flaws. Course is presented as a seminar with four case studies and problem analysis.

PUBH.6950 Chemical Process/Sustainability (Formerly 19.695) - Credits: 3

This course surveys the basis of chemical engineering process design and fundamentals of unit operations. The student will be able to understand the basics of chemical engineering design methods for the purpose of enhancing sustainability of chemical production processes.

PUBH.7020 Independent Study: Industrial Hygiene (Formerly 19.702) - Credits: 1

Advanced topics in industrial hygiene, exposure assessment or exposure control not offered in the regular curriculum. Topics may vary from year to year.

PUBH.7040 Independent Study: Ergonomics (Formerly 19.704) - Credits: 1

Advanced topics in biomechanics, work physiology, occupational safety or human factors not covered in the regular curriculum. Content may vary from year to year.

PUBH.7080 Independent Study: Epidemiology (Formerly 19.708) - Credits: 1

Advanced topics in occupational epidemiology, design and confounding, exposure-response modeling, or surveillance not covered in the regular curriculum. Content may vary from year to year.

PUBH.7090 Independent Studies: Occupational Epidemiology (Formerly 19.709) - Credits: 1

Advanced topics in occupational epidemiology, design and confounding, exposure-response modeling, or surveillance not covered in the regular curriculum. Content may vary from year to year.

PUBH.7110 Independent Study: Industrial Hygiene (Formerly 19.711) - Credits: 1-3

Advanced topics in industrial hygiene, exposure assessment or exposure control not offered in the regular curriculum. Topics may vary from year to year.

PUBH.7120 Independent Study: Industrial Hygiene (Formerly 19.712) - Credits: 1-3

Advanced topics in industrial hygiene, exposure assessment or exposure control not offered in the regular curriculum. Topics may vary from year to year.

PUBH.7130 Independent Study: Ergonomics (Formerly 19.713) - Credits: 3

Advanced topics in biomechanics, work physiology, occupational safety or human factors not covered in the regular curriculum. Content may vary from year to year.

PUBH.7150 Independent Study: Work Environment Policy (Formerly 19.715) - Credits: 3

Advanced topics in work environment policy, risk perception, risk communication and management, regulatory affairs or labor-management programs not covered in the regular curriculum. Content may vary from year to year.
PUBH.7170 Independent Study: Epidemiology  
(Formerly 19.717) - Credits: 3  
Advanced topics in occupational epidemiology, design and confounding, exposure-response modeling, or surveillance not covered in the regular curriculum. Content may vary from year to year.

PUBH.7190 Independent Study: Clean Production  
(Formerly 19.719) - Credits: 3  
Advanced topics in clean production, pollution prevention, and environmental protection efforts. Not offered in the regular curriculum. Topics may vary from year to year.

PUBH.7210 Selected Topics: Industrial Hygiene  
(Formerly 19.721) - Credits: 1-3  

PUBH.7230 Selected Topics: Ergonomics  
(Formerly 19.723) - Credits: 3  

PUBH.7250 Epidemiologic Theory  
(Formerly 19.725) - Credits: 1-3  

An advanced seminar in epidemiologic theory. The goal of the course is to develop each student's own theoretical perspective on the field to ground practical problems of study design and analysis. Students read a major text in modern chronic disease epidemiology as well as relevant papers, and discuss and evaluate the perspectives of different authors. Topics include: causality, study designs, measures of disease frequency, measures of association, statistical inference, biases, and confounding.

PUBH.7270 Sel Top: Epidemiology  
(Formerly 19.727) - Credits: 3  

PUBH.7280 Sel Top: Work Env Policy  
(Formerly 19.728) - Credits: 3  

PUBH.7290 Selected Topics: Clean Production  
(Formerly 19.729) - Credits: 3  

PUBH.7330 Capstone Project  
(Formerly 32.733) - Credits: 3  
Near the end of one's Master's Degree program, students register for Capstone Project and complete a real world case study report and presentation. The Capstone Project applies concepts and skills learned in the program. It involves research and development, and culminates in a substantial business-type report. 3 credits, Requires Instructor Permission.

PUBH.7331 Graduate Project  
(Formerly 19.733) - Credits: 3  
Advanced research project required of all master's degree candidates in the ergonomics, industrial hygiene, occupational epidemiology and work environment policy concentrations.

PUBH.7350 Independent Study: Policy  
(Formerly 19.735) - Credits: 3  

PUBH.7360 Graduate Project - Work Environment  
(Formerly 19.736) - Credits: 6  

PUBH.7370 Independent Study: Epidemiology  
(Formerly 19.737) - Credits: 3  

PUBH.7390 Graduate Project - Work Environment  
(Formerly 19.739) - Credits: 9  
Advanced research project required of all master's degree candidates in the ergonomics, industrial hygiene, occupational epidemiology and work environment policy concentrations.

PUBH.7430 Master's Thesis Research  
(Formerly 19.743) - Credits: 3  

PUBH.7590 Doctoral Dissertation  
(Formerly 19.759) - Credits: 1-9  
Faculty supervision of doctoral dissertation.

PUBH.7610 1 - Credit Continued Graduate Research  
(Formerly 19.761) - Credits: 1  
1-Credit Continued Graduate Research course is for students with less than one year to defend or complete program. Part of reduce course load program for international students.

PUBH.7630 Continued Graduate Research  
(Formerly 19.763) - Credits: 3  

PUBH.7700 Directed Readings: Epidemiology Biostatistics  
(Formerly 19.770 - Credits: 3  

PUBH.7750 Capstone/Thesis Review  
(Formerly 32.775) - Credits: 1  

PUBH.7760 Curricular Practical Training (CPT)  
(Formerly 32.776) - Credits: 0-1  
An internship, practicum or other type of employment that is either required by the students academic program or an experience for which a student receives academic credit. To be eligible the student must be in legal F-1 status and have been enrolled full-time for one academic year. CPT work experience
must be in the student's field of study and contain a curricular component. "Variable credit course, student chooses appropriate amount of credits when registering."

**PUBH.9990 Intercampus Graduate Research**
(Formerly 19.999) - Credits: 0

This course will allow doctorate students to remain active while they are taking courses/research at the other UMASS campuses.
Master of Science in Nursing

The UMass Lowell School of Nursing offers a master’s program in nursing that emphasizes depth of knowledge and excellence in nursing in two areas of specialization: Adult-Gerontological Nursing and Family Health Nursing.

- Description of Program
- Program Outcomes
- Admission and Degree Requirements
- Degree Pathway
- Areas of Specialization

Description of Program

The objectives of the masters program curriculum are to provide advanced practice nursing education which focuses on:

1. Health promotion of individuals, families and groups from diverse populations;
2. Management of health problems in collaboration with client, families, and health professionals;
3. Leadership in the profession; and

The graduate program is designed for a four-semester, two-calendar year schedule, although part-time study is possible. Within each major area of specialization all students are prepared with knowledge and skills necessary for leadership in a variety of settings. Methods of inquiry, research and scholarly techniques are integral parts of the curriculum.

Program Outcomes

The masters degree program educates graduates who are prepared to:

1. Practice in the advanced nursing role of the specialty
2. Collaborate with clients, peers, and other health professionals
3. Demonstrate leadership in the profession.

Admission and Degree Requirements

Requirements for the master’s program are:

- A baccalaureate degree with a major in nursing from an accredited program,
- An undergraduate scholastic average of 3.0 or better,
- Official transcripts, from all of your previous degree coursework (Associates and Bachelors in Nursing) as well as any completed or in progress graduate courses.
- An introductory course in statistics. Course grade must be on transcripts
- License to practice nursing in the Commonwealth of Massachusetts. Out of state RN licenses are accepted for application review, but all accepted students will need to obtain Massachusetts License prior to practicum courses.
- Experience working as an RN prior to enrolling in Advanced Health Assessment and subsequent Specialty courses.
- A resume, summarizing educational and professional nursing experience and any other related honors, special skills or certifications.
- Two letters of recommendation preferably from nursing faculty, supervisors or nurse leader in your organization. All recommendations should be sent to graduate admissions using the link and if addendum documents are attached they should be on hospital/school/agency letterhead and signed by the author of the recommendation. Recommendation should address your academic ability and professional qualifications as well as your potential for success in a graduate NP program.
- Written Statement: A goal statement that briefly highlights relevant work history and immediate and long term professional goals as an advanced-practice nurse. Goal statements should be congruent with the specialty tracks offered at UMass-Lowell (FNP or AGNP) and demonstrate an understanding of the scope of the advanced practice nurse in ambulatory, long term care settings.
- Computer literacy with WORD, email, internet searches and electronic learning platforms and programs.
- GREs are not required for the MS program
A minimum of 42 credits of course work is required for graduation with an MS for all students. A research project or a thesis is an option but not required for graduation.

Students may be admitted for part-time study. Part-time students must meet the same admission requirements for graduate study as full-time students. Part-time students will meet with their assigned advisor and plan a schedule for their program of studies. All admitted students are advised to contact their assigned advisors for program of study recommendations and to register for courses during University advisement periods (April and November).

Transfer of credits for non-matriculated students: The maximum number of credits that can be transferred from non-UMass Lowell programs is 6 credits. Prospective students can take up to an additional 6 credits from UMass Lowell prior to matriculation and can be applied to the MS degree.

Those taken at another accredited institution may be transferred if appropriate to the MS degree program in nursing and after approval by the faculty of record for the UMass Lowell course and the petition signed by the Graduate Coordinator. To qualify for transfer, the course must have been taken within 5 years prior to the date of matriculation. Transfer of credits may not be granted for Advanced Health Assessment, Specialty Courses or Specialty Practicum courses.

Admission is competitive. Admission is competitive and only completed applications will be reviewed. It is the responsibility of the applicant to check their electronic admission file for completion of checklist items. Applications are accepted on a Rolling Admission basis for the Fall and Spring matriculation. Full-Time Students are generally admitted to the Fall Semester and can complete the degree in 2 years (4 semesters). Part-Time students can complete the degree in 3-5 years. Please seek advice from Lisa Marchand (Lisa_Marchand@uml.edu) Coordinator of the MS/NP program for appropriate courses to take as a non-matriculated student. Upon admission, these courses can be transferred via petition.

Additional Information

The following health and professional documentation is required upon admission: Current CPR certification, RN nursing license, required immunizations (or titers indicating immunity) influenza, Hepatitis B, MMR, Tdap, varicella, PPD; and recent health exam by health care provider. In addition, every student must be cleared by CORI (Criminal Offender Record Information). Students who cannot provide this information will be unable to complete required clinical practicum.

Degree Pathway for Master of Science in Nursing Advanced Practice Registered Nurse (full time option*)

- Degree Pathway
  (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

Areas of Specializations:

Adult-Gerontological Nursing

This specialty focuses on promoting health of young adults age 13 and up, adults and older adults during the process of normal aging and identifying and treating common health problems. Students develop advanced skills in communicating with young adults, adults and older adults, health assessment, health teaching and nursing intervention and evaluation. Students are prepared as nurse practitioners and eligible to sit for the adult gerontological primary care nurse practitioner certification exam.

Family Health Nursing

This specialty focuses on facilitating the health practices of families during the process of normal development and identifying and treating common health problems across the life span. Students develop advanced skills in communicating with families, health assessment, health teaching and nursing intervention and evaluation. Students are prepared as nurse practitioners and are eligible to sit for the family nurse practitioner certification exam.

Doctorate in Nursing Practice (DNP) Program

About the Program

Our DNP program educates advanced practice registered nurses and nurse leaders who seek to develop or expand their leadership roles in the health care system. With the knowledge and skills acquired through UML’s DNP program, our graduates will be prepared to propose solutions to improve patient care and health care outcomes. This is achieved through an interdisciplinary curriculum which provides nurses with knowledge and skills in evaluation research, health policy, organizational leadership and financing, evidence-based practice and health care informatics. Our DNP graduates will have a positive impact on the health care system by using an evidence-based approach to improve health care delivery.

By enriching our DNP program with content on cultural competency, DNP graduates are prepared to reduce health care disparities for culturally diverse and underserved populations. Our graduates will also have advocacy skills that are essential in influencing governmental and organizational policy decisions.

The DNP Program offers 4 pathways for the completion of the
DNP degree:

- **Post Baccalaureate DNP (BS-DNP)**: may be completed in 4 years full time, including summer semesters, or 5 years, part-time, including summer semesters. Courses are delivered in a hybrid format. Students choosing this option have up to 8 years to complete the requirements for graduation. The BS-DNP pathway offers 2 options: Adult-Gerontology Primary Care Nurse Practitioner (A-GPCNP) Family Nurse Practitioner (FNP)

- **Post Master’s DNP (MS-DNP)**: may be completed in 3 academic years part time or 2 academic years full time. Courses are delivered in an online format with 5 on-campus intensives. Students have up to 5 years to complete requirements for graduation.

- **Fast Track BS-DNP**: GPA of 3.5 is required for applicants from UMass Lowell Solomont School of Nursing baccalaureate program. Applicants may transfer up to 12 credits from approved BS courses (5000 or higher) toward the DNP degree. Students who are completing their BS program in the spring are eligible to apply for the Fast Track BS-DNP option for admission in the following fall term. Courses are delivered in a hybrid format with online courses, requiring 1 Saturday a month on campus. Students have up to 8 years to complete the requirements for graduation. The BS-DNP pathway offers 2 options in preparation: Adult-Gerontology Primary Care Nurse Practitioner (A-GPCNP) Family Nurse Practitioner (FNP)

- **Fast Track MS-DNP**: GPA of 3.5 is required for applicants from UMass Lowell Solomont School of Nursing master’s program or students from universities with which UMass Lowell has an agreement. Applicants may transfer up to 6 credits from approved master’s courses toward the DNP degree. Students who are completing their master’s program in the spring are eligible to apply for the Fast Track Master’s DNP option for admission in the following fall term. Courses are delivered in an online format and students have up to 5 years to complete requirements for graduation.

See below for the:

- Doctor of Nursing Practice Scholarly Project

**Post Baccalaureate Doctor of Nursing Practice Option (BS-DNP)**

**Specific application requirements include:**

- Program application and all required documents submitted through the Graduate Admissions office.
- A baccalaureate degree with a major in Nursing from an accredited program.
- An undergraduate scholastic average of 3.0 or better.
- Official transcripts, from all previous degree coursework ( Associates and Bachelors in Nursing) as well as any completed or in progress graduate courses.
- An introductory course in statistics. Course grade B (3.0 or better) must be on transcripts.
- License to practice nursing in the Commonwealth of Massachusetts. Out of state RN licenses are accepted for application review, but all accepted students will need to obtain Massachusetts License prior to practicum courses.
- Experience working as an RN prior to enrolling in Advanced Health Assessment and subsequent Specialty courses.
- A resume, summarizing educational and professional nursing experience and any other related honors, special skills or certifications.
- Two letters of recommendation preferably from nursing faculty, supervisors or nurse leader in your organization.
- A goal statement highlighting: relevant work history, immediate and long term professional goals as an advanced-practice nurse, and the reason you chose the BS-DNP Doctor of Nursing Practice degree option. Goal statements should be...
congruent with the specialty tracks offered at UMass-Lowell (FNP or AGNP) and demonstrate understanding of the Doctor of Nursing Practice degree.

- Computer literacy with WORD, email, internet searches and electronic learning platforms and programs.
- Completed application and fees.
- An interview.

**Degree Pathway Information**

- BS-DNP & Fast Track Full-time (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

Post-Masters Doctorate of Nursing Practice Option (MS-DNP)

**Specific application requirements include:**

- Program application submitted to the Graduate Admissions office.
- MS in Nursing with APRN preparation with national certification as an APRN or board eligible for certification OR MS in Nursing with a current RN license.
- Prior official transcripts from undergraduate and graduate programs.
- Two letters of recommendation (one academic recommendation preferred).
- Interview with nursing faculty.
- Minimum cumulative GPA of 3.0 on a 4.0 scale in a nursing Masters degree program, 3.3 GPA preferred.
- Written narrative of professional goals.
- 500 Master’s or Post-Master’s practicum hours. Applicants who are not APRNs must provide evidence of practice hour equivalents from their master’s program or ANCC certification in their area of practice which affords 250 hours.
- Resume.
- TOEFL if appropriate.

**Degree Pathway Information**

- MS-DNP & Fast Track Part-time Pathway (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)
- MS-DNP & Fast Track Full-time Pathway (https://www.uml.edu/resources/catalog-archive/current/Graduate.pdf)

BS-DNP Option (Fast Track)

**Specific Application Requirements include:**

- Application and all required documentation submitted through Graduate Admissions Office.
- Application fee being waived.
- Applicants must be in their final year of their BS program at UMass Lowell.
- A 3.5 or better GPA in the SSON BS program at the time of application, graduation and acceptance will be conditional upon passing the NCLEX exam.
- Two letters of recommendation, one from faculty and one from current employer.
- A goal statement highlighting: relevant work history, immediate and long term professional goals as an advanced-practice nurse, and the reason you chose the Doctor of Nursing Practice degree option. Goal statements should be congruent with the specialty tracks offered at UMass-Lowell (FNP or AGNP) and demonstrate and understanding of the Doctor of Nursing Practice degree.
- An interview.

MS-DNP Option (Fast track)
Specific Application Requirements include:

- Program application submitted to the Graduate Admissions office with the application fee being waived.
- Students must be in their final year of their MS NP program at UMass Lowell or a university with which UMass Lowell has a current agreement for Fast Track MS to DNP admission. Non-UMass Lowell students must submit official transcripts.
- The student must have maintained a 3.5 or better GPA in their masters program at the time of application and graduation.
- Students must submit 2 letters of recommendation, one from faculty and one from current employer.
- Students must submit a letter of purpose identifying immediate and long-term goals and a resume with evidence of working in a professional role.
- Interview with UMass Lowell faculty.
- Within six months of completing the masters NP program the student must show evidence of passing the national APRN certification exam and obtain a state license to practice as an APRN.
- Up to 6 credits of approved graduate level courses (5000 or higher) which were awarded to the MS degree may be applied toward the DNP degree as long as a grade of B or higher was obtained in the courses.

Contact

Susan Parker (https://www.uml.edu/Health-Sciences/Nursing/faculty/parker-susan.aspx), DNP, APRN, GNP-BC, ACHPN
Phone: 978-934-4685

Doctor of Nursing Practice Scholarly Project

Criteria for DNP Project

Types of DNP Projects

DNP Scholarly Project Guidelines

DNP Proposal

Completing the DNP Project

The DNP scholarly project reflects the culmination of academic studies completed throughout the DNP program that demonstrates the ability of the student to effect positive change in a health care setting/arena through the careful syntheses of evidence as well as to evaluate the effectiveness of the change.

Criteria for the DNP Scholarly Project

The DNP Scholarly Project Should:

- Focus on a change that impacts healthcare outcomes either through direct or indirect care.
- Have a system (micro-, meso-, or macro-level) or population or aggregate focus.
- Demonstrate implementation in the appropriate arena or area of practice.
- Use a systematic approach and collect data using methods and tools that meet accepted standards.
- Be conducted according to ethical principles and is approved by UMass Lowell Institutional Review Board if applicable.
- Include a plan for sustainability (e.g. financial, systems, or political realities).
- Include an evaluation of processes and/or outcomes (formative or summative).
- Be disseminated to the appropriate audiences.

Types of DNP Scholarly Projects

Some examples of scholarly projects include, but are not limited to:

- Quality improvement projects to address gaps in practice.
- Evaluation of implementation of evidence-based practice guidelines.
- Development of models of care or programs.
- Evaluation of financial analyses to compare models of care.
- Analysis of policies related to health care practice.
Development of inter-professional and/or intra-professional collaborative projects to implement policy or evaluate care models.

**DNP Scholarly Projects Guidelines**

Students choose a DNP Project Chair at the designated point in course work. The Chair, a UMass Lowell faculty member or emeritus with a terminal nursing degree, guides the student through the development to the conclusion of the project acting as the PI if an IRB is required at UML. A Community Mentor, who represents the health care setting, is selected by the student and the Chair, and is the third member of the DNP Scholarly Project Team. The UMass Lowell IRB may determine that the project is expedited or exempt. IRB status may be determined by the health care setting in which the project is conducted. Students are required to complete the

DNP Scholarly Project Team Request Form
(https://na2.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=%20bc386b3a-7eb3-4b3c-99fa-41403655375c&envna2&acct1414feb7-5343-%204689-999f-c3b89141fef7&v2)
(DocuSign).

**DNP Proposal**

The Scholarly Project Proposal must be approved by the Scholarly Project Team. A proposal hearing is required, and upon successful completion of the hearing, the DNP Scholarly Project is completed and signed.

DNP Scholarly Project Proposal Approval Form
(https://na2.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=%2014274354-a446-42c3-a84c-b1ce6c969c14&envna2&acct1414feb7-5343-%204689-999f-c3b89141fef7&v2)
(DocuSign).

**Oral Presentation**

Students are required to present a final oral presentation of their DNP Scholarly Project. Upon successful completion of the presentation the student’s DNP Project is approved and the DNP Scholarly Project Approval is signed.

DNP Scholarly Project Approval Form
(https://na2.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=%2030d20acc-a3bc-476d-9cd6-d07b0d187df8&envna2&acct1414feb7-5343-%204689-999f-c3b89141fef7&v2)
(DocuSign).

**Completion of the DNP Scholarly Project**

Students are required to complete all course work, present a final oral presentation, prepare a manuscript of publishable quality, disseminate the project through an approved means, and complete their portfolio. The Project Approval Form is completed and signed.

DNP Project Paper Approval Form
(https://na2.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=%20b341d381-98dd-45f8-8a1f-0fb64652db89&envna2&acct1414feb7-5343-%204689-999f-c3b89141fef7&v2)
(DocuSign).

**Stop Out Procedure**

Students accepted into DNP Program who elect to stop out of the BS-to-DNP Program and earn a master’s degree have one of two options:

1. The student who has earned 60 credits which includes successful completion of all 5000 and 6000 level courses, and NURS.7170
   (https://www.uml.edu/catalog/courses/NURS/7170), NURS.7700
   (https://www.uml.edu/catalog/courses/NURS/7700), NURS.7740
   (https://www.uml.edu/catalog/courses/NURS/7740) and
   NURS.7710
   (https://www.uml.edu/catalog/courses/NURS/7710) with at least a B, may petition to earn a master’s degree and graduate from the university. This student must be in good standing and have a GPA of at least 3.0 with no more than 6 credits below a B (3.00). The student who wishes to return to complete the DNP Degree must reapply, however, if it is within 3 semesters, only a new application form and statement of purpose are needed. Students may
be readmitted on a space available basis. Graduating students must complete the clearance process at the Registrar’s Office. All graduate courses whether taken for the doctoral program or as part of the master’s degree will be included in the point average and listed on the student’s transcript.

2. The student with less than the 60 credits completed of the required courses who wishes to stop out with a master’s degree, may petition to drop down to the master’s program on a space available basis in the master’s program. This student must have an earned GPA of at least a 3.0, be in good standing with GPA attainment as indicated above. The student who wishes to return to complete the DNP degree must reapply. Students may be readmitted on a space available basis.
NURS.5220 Independent Study Health Promotion (Formerly 33.522) - Credits: 1-3

Health Promotion gerontological clinical practicum is designed to be taken as a co-requisite to 33:611 Gerontological Nursing II didactic, in which the student focuses on comprehensive assessment and diagnosis of health problems in older adults with complex, multi-system health issues. Students utilize evidence-based research to design, implement and evaluate intervention strategies to promote optimum functioning and wellness. Pharmacological and complementary therapies are applied. Client teaching is included.

NURS.5520 Social, Cultural and Policy Issues in Health Care (Formerly 33.552) - Credits: 3

This course links health and illness to other central domains of life: gender, kinship, and culture within the context of the family, community and the current health care system. It draws on concepts from the social, health, and policy sciences to critically examine factors relating to health and health-seeking behaviors across the life course. Ethical dimensions of health policy formation and implementation are analyzed.

NURS.5530 Scholarly Writing - Credits: 2

This course provides an overview of, and introduction to the concepts and skills of scholarly writing as it pertains to scientific reports and papers. Course topics will include scientific literature searches, organizations of research papers and reports, ethical and authorship considerations, and steps in critiquing one’s own and others’ writing. Course objectives will be accomplished by reading and critiquing professional writing, creating original written work, and integrating feedback to improve work.

NURS.5540 Palliative and End of Life Nursing Care (Formerly 33.554) - Credits: 3

Through didactic, discussion and field experiences, participants in this course explore research and theory related to death, dying, grief, bereavement, and end-of-life-care throughout the lifespan. Personal, professional, cultural, and ethical barriers and facilitators to the provision of palliative care will be examined using a holistic approach. Comfort and restorative care will be considered within the context of the family and the community in a variety of settings where palliative care is provided.

NURS.5580 Geropsychiatric and Mental Health Nursing (Formerly 33.558) - Credits: 3

The focus of this course is on the nursing care of older adults with psychiatric and mental health problems. This course promotes a holistic approach to mental health care of older adults within the community and long-term care setting. Nursing implications of psychopharmacology, behavioral, and complementary interventions will be discussed. Community resources for older adults with psychiatric and mental health problems will be explored.

NURS.5590 Advanced Pharmacology (Formerly 33.559) - Credits: 3

This nursing course focuses on clinical pharmacology and the mechanisms of drug action which determine therapeutic efficacy in clinical practice. Content includes basic pathophysiology, clinical pharmacology and monitoring parameters and standards of practice. Emphasis is given to implications of patient safety, patient diversity and patient teaching.

NURS.6000 Theoretical Foundations for Advanced Nursing Practice (Formerly 33.600) - Credits: 3

Course focuses on the analysis, critique, and application of theory as a basis for advanced practice nursing. Relationships among theories, research, and nursing practice are emphasized.

NURS.6010 Research for Evidence-Based Practice (Formerly 33.601) - Credits: 3

Course focuses on the critique of research studies for the purpose of determining implications for evidence-based practice. The research process will be applied to researchable nursing problems. The role of frameworks, ethics, research designs, sampling theory, and measurement strategies are emphasized.

NURS.6020 Clinical Psychopharmacology (Formerly 33.602) - Credits: 3

This survey course aims to educate advanced practice nurses for safe and effective prescribing practices in the treatment of psychiatric illnesses. The course utilizes a symptom management framework that integrates concepts from normative psychobiology with pathophysiology of the psychiatric diseases. From this perspective, emphasis is placed on gaining a fundamental understanding of the hypothesized compliment between the pathophysiologic basis of the disease state and mechanism of action of the drug treatment as a basis for rational selection of pharmacologic treatment. Current standards of practice and treatment algorithms are emphasized in helping the student to develop a working knowledge of psychopharmacology for the practice arena.

NURS.6040 Directed Study: Multiple Topic - Credits: 4
NURS.6100 Adult Gerontological Nursing I (Formerly 33.610) - Credits: 4

The focus of this course is on the advanced practice nursing role in the holistic assessment and management of health problems of the adult and older adult within a family and community context. Evidence-based strategies to prevent and treat common health problems and to maintain and promote health through the application of advanced knowledge, theory, relevant research and critical decision making are emphasized. Community resources, pharmacological therapies, and complementary strategies are addressed.

NURS.6110 Adult Gerontological Nursing II (Formerly 33.611) - Credits: 4

The focus of this course is on health promotion and biopsychosocial well-being of young, middle aged and older adults from diverse cultures. Utilizing current scientific research, physical/natural sciences, social sciences, and the humanities, implications for advanced nursing interventions and health policy are identified. Principles of pharmacology and pharmacological therapies, and complementary therapies are addressed.

NURS.6120 Adult/Gerontological Nursing III (Formerly 33.612) - Credits: 4

This capstone course builds on the adult/gerontological nursing curriculum of the previous three semesters. Issues related to health care policy and legislation relative to their impact on the role of the nurse practitioner within primary care are analyzed. Advanced knowledge of the management of complex health issues is integrated in nursing practice. Transition to the role of the advanced practice nurse is examined and actualized through an intensive, precepted, clinical experience.

NURS.6130 Adult Gerontological Nursing Practicum I (Formerly 33.613) - Credits: 4

This course focuses on comprehensive assessment and diagnosis of health problems in adults and older adults with complex, multi-system health issues. Students utilize evidence-based research to design, implement and evaluate intervention strategies to promote optimum functioning and wellness. Pharmacological and complementary therapies are applied. Group leadership, client and peer teaching are included.

NURS.6140 Adult-Gerontological Nursing Practicum II (Formerly 33.614) - Credits: 3

The focus of this course is on promotion of biopsychosocial well-being of adults and older adults through comprehensive assessment of health, the diagnosis of age-related changes and health problems, and the design, implementation and evaluation of pharmacologic and complementary intervention strategies. The application of scientific knowledge, theory and research findings to clinical practice is emphasized.

NURS.6500 Family and Adult-Gerontological Advanced Practice Nursing I - Credits: 4

Focus is on the advanced practice nursing role in the holistic assessment and management of health problems of the adolescent, adult, and older adults, within a family and community context. Evidence-based strategies are applied to the prevention, treatment, and management of acute and chronic health problems. Health promotion and maintenance are emphasized through the application of advanced knowledge, theory, research, and critical decision-making. Community resources, pharmacological therapies, and complementary strategies are integrated throughout the course.

NURS.6510 Advanced Health Assessment and Diagnostic Reasoning (Formerly 33.651) - Credits: 3

This course focuses on the development of advanced critical thinking and clinical judgment skills through comprehensive health assessment. Health promotion and health maintenance content, including relevant research findings are utilized to evaluate health status and to evaluate health risk among individuals and groups. Age, gender, and cultural variations in health and implications for advanced practice are included. Advanced practice health assessment skills are developed and refined.

NURS.6511 APRN Practicum 1 - Credits: 3

This course focuses on comprehensive assessment and diagnosis of health problems in adolescents, adults and older adults with complex, multisystem health issues. Students utilize evidence-based research to design, implement, and evaluate intervention strategies to promote optimum functioning and wellness. The application of advanced knowledge, theory, relevant research, and critical decision making are emphasized. Pharmacological and complementary therapies are applied. Group leadership, client and peer teaching are included. Transition of the role of the advanced practice nurse is examined and actualized through an intensive, precepted clinical experience.

NURS.6512 APRN Practicum II - Credits: 3

This course focuses on comprehensive assessment and diagnosis of health problems in adolescents, adults and older adults with complex, multisystem health issues. Students utilize evidence-based research to design, implement, and evaluate intervention strategies to promote optimum functioning and wellness. The application of advanced knowledge, theory, relevant research, and critical decision making are emphasized. Pharmacological and complementary therapies are applied. Group leadership, client and peer teaching are included. Transition of the role of the advanced practice nurse is examined and actualized through an intensive, precepted clinical experience.
NURS.6513 APRN Practicum III - Credits: 3
Advanced knowledge of the management of complex health issues of individuals across the life span is integrated in advanced nursing practice. Transition to the role of the advanced practice nurse is examined and actualized through an intensive, precepted, clinical experience.

NURS.6520 APRN Care of Adults - Credits: 3
Focus is on the advanced practice nursing role in the holistic assessment and management of health problems of the adolescent, adult, and older adult, within a family and community context. Evidence-based strategies are applied to the prevention, treatment, and management of acute and chronic health problems. Health promotion and maintenance are emphasized through the application of advanced knowledge, theory, research, and critical decision making. Community resources, pharmacological therapies, and complimentary strategies are integrated throughout the course.

NURS.6521 APRN Care of Children and Adolescents - Credits: 3
This course focus is on the advanced practice nursing of children adolescents in the primary care setting. Health promotion, disease prevention, diagnosis and management principles are applied to alterations in health within a family and community context. Evidence-based strategies to prevent, assess, diagnose and treat common health problems are emphasized as the scientific foundation for independent practice. Additionally, this course emphasizes collaborative partnership development among individuals, families, and intra-professional teams.

NURS.6522 APRN Women’s Health Across the Lifespan - Credits: 3
The focus of this course is on health promotion and management of common health issues pertaining to women, from menarche to older adulthood. Based on current scientific research, students will develop knowledge to assess, diagnose and manage alterations in health and develop holistic plans of care that address the health promotion, illness prevention, and primary care needs women across the lifespan. Sociocultural and political factors that affect the health of women will be discussed.

NURS.6523 APRN Care of Older Adults - Credits: 3
Focus is on the advanced practice nurse in the holistic assessment and management of health problems of the adult and older adult in a family and community context. Evidence-based strategies to prevent and treat common health problems and to maintain and promote health though the application of advanced knowledge, theory, relevant research and critical decision making are emphasized. Community resources, pharmacological therapies and complimentary strategies are addressed.

NURS.6524 APRN Role Transition - Credits: 1
This course builds on the APRN curriculum of the previous three semesters. Issues related to health care policy, legislation, transition to the APRN role, ethical and fiscal concepts relative to their impact on the role of the nurse practitioner are analyzed.

NURS.6600 Family Health Nursing I (Formerly 33.660) - Credits: 4
Focus is on the advanced practice-nursing role in the holistic assessment and management of health problems of the family across the lifespan within a family and community context. Evidence-based strategies to prevent and treat common health problems and to maintain and promote health through the application of advanced knowledge; theory, relevant research and critical decision making are emphasized. Community resources, pharmacological therapies, and complimentary strategies are addressed.

NURS.6610 Family Health Nursing II (Formerly 33.661) - Credits: 4
The focus of this course is on health promotion and management of common health issues pertaining to woman and to infants, children, and adolescents. Based on current scientific research, students develop skills in analyzing data, differential diagnosis, and developing holistic plans of care that address the health promotion, illness prevention, and primary care needs of a wide-variety of client populations.

NURS.6620 Family Health Nursing III (Formerly 33.662) - Credits: 4
This capstone course builds on the family nursing curriculum of the previous three semesters. Issues related to health care policy and legislation relative to their impact on the role of the nurse practitioner within primary care are analyzed. Advanced knowledge of the management of complex health issues is integrated into nursing practice. Transition to the role of the advanced practice nurse is examined and actualized through an intensive, precepted, clinical experience.

NURS.6630 Family Health Nursing Practicum I (Formerly 33.663) - Credits: 3
The focus of this course is on the advanced practice-nursing role in the holistic assessment and management of health
problems of the family across the lifespan within a family and community context. Evidence-based strategies to prevent and treat common health problems and to maintain and promote health through the application of advanced knowledge, theory, relevant research and critical decision-making are emphasized. Community resources, pharmacological therapies, and complementary strategies are addressed.

NURS.6640 Family Health Nursing Practicum II (Formerly 33.664) - Credits: 3

This course focuses on health promotion, illness prevention, and treatment through the comprehensive assessment and management of common health issues of infants, children, adolescents and woman in the context of family and social environments. Application of theory, knowledge, and research findings to clinical practice is emphasized. The utilization of current clinical technologies is introduced.

NURS.6890 Scholarly Project/Capstone (Formerly 33.689) - Credits: 3

This capstone project affords the student the opportunity for further knowledge development in an area of interest and learning need. The faculty-guided experience involves the development of a scholarly project which may involve a number of options: a scholarly review of the literature in a specific area; development of clinical teaching materials related to some dimension of sleep and/or sleep disorders; or a translational research project whereby a body of current research is interpreted for application to practice. The project will be negotiated with the faculty of record to meet the objectives of the course.

NURS.7010 Philosophy of Science (Formerly 33.701) - Credits: 3

This course provides doctoral students in nursing with philosophical perspectives in science, the nature of knowledge and its development, nursing knowledge development and philosophical underpinning to theory development, methods in scientific inquiry.

NURS.7020 Theoretical Foundations of Health Promotion (Formerly 33.702) - Credits: 3

This course critically examines conceptual frameworks and theories of health promotion and health behavior. The content includes theoretical perspectives from multiple disciplinary perspectives including nursing, psychology, sociology, and public health. Health promotion orientations will include behavioral change and lifestyle modification, environmental enhancement and restructuring, and social ecological approaches.

NURS.7060 Measurement in Health & Behavioral Research (Formerly 33.706) - Credits: 3

This course provides students with theoretical principles of measurement and design in health and behavioral research. The strategies, techniques, and issues in survey research, sampling methods, and the development and administration of survey instruments will be critically examined. Psychometric properties using standardized approaches to measurement will be analyzed. Students will be required to select an appropriate instrument and conduct a comprehensive psychometric evaluation of the instrument.

NURS.7070 Epidemiology of Health Promotion (Formerly 33.707) - Credits: 3

This course provides an in-depth exploration of the concepts and methods of epidemiological research. Students will critique the principles of epidemiology with an emphasis on health promotion research. Students will analyze and develop epidemiological approaches, which seek to promote health and prevent disease.

NURS.7130 Curriculum and Teaching In Nursing (Formerly 33.713) - Credits: 3

The focus of this course is on development, implementation, and evaluation of nursing curricula and academic courses. Contemporary theories of learning are applied to analysis of student learning needs, teaching strategies and educational methodologies. This course is intended for those nursing students post-MS or enrolled in doctoral study who wish to teach in the academic and/or practice environment. However, students in a MS program who are interested may register for the course with permission.

NURS.7150 Independent Study (Formerly 33.715) - Credits: 3

This independent study course is designed to enhance the international student's verbal and writing skills in order to successfully integrate in a doctoral level program. The student will meet weekly with the course instructor in addition to participating in a formal communication and writing course for international students.

NURS.7160 Qualitative Methods (Formerly 33.716) - Credits: 3

The study of predominating qualitative methodology in the health sciences literature. Emphasis is on phenomenology, ethnography, life history/narrative, critical incidents, grounded theory, case study, and associated methodologies.
NURS.7170 Evaluation Research (Formerly 33.717) - Credits: 3
This course focuses on the basic concepts of evaluation research and their application to education, health and social programs. Specific design and analytic approaches that effect quality evaluation research will be reviewed. Students will design a mock evaluation study. Prerequisites: Completion of a graduate level research methods course.

NURS.7180 Directed Study (Formerly 33.718) - Credits: 1-4

NURS.7300 Quantitative Research Methods and Grantsmanship (Formerly 33.730) - Credits: 3
This course introduces students to strategies and methods in research including an analysis of theoretical and empirical links, operationalization of concepts, research design, and ethics in behavioral research. Students will identify appropriate funding sources and complete a research grant application.

NURS.7310 Health Promotion Research (Formerly 33.731) - Credits: 3
This course focuses on interdisciplinary health promotion research that targets diverse individuals, families, groups, and communities/society. Students will identify and analyze ethical issues, philosophical and conceptual underpinnings, measurement principles and major gaps in current knowledge in nursing and health promotion. Students will critique research approaches to health promotion studies and propose a research study in a topic relevant to health promotion.

NURS.7330 Graduate Project - Nursing (Formerly 33.733) - Credits: 3
Course focus is on application of the nursing research process. The student actively engages in at least two aspects of research under the guidance of a faculty mentor. The course product has practical implications for nursing practice.

NURS.7370 Advanced Qualitative Methods (Formerly 33.737) - Credits: 3
This course will focus on the in-depth historical and philosophical underpinnings of qualitative research. The student will examine and critique various analytic qualitative methods. The student will complete a project incorporating qualitative analysis using a qualitative software program.

NURS.7390 Mentored Research Experience (Formerly 33.739) - Credits: 3
In this course, students participate in a mentored research experience. Students actively contribute as a member of a research study that will contribute to scientific knowledge. Opportunities are provided for the application of research skills and the dissemination of research with an emphasis on an interdisciplinary approach. This course also includes a monthly seminar, which focuses on ethical underpinnings, cultural considerations and disparities in health research.

NURS.7430 Master’s Thesis - Nursing (Formerly 33.743) - Credits: 3
Course focus is on the application of the full research process to a topic relevant to nursing practice and/or health outcomes. The student is expected to propose, conduct and defend the study under the guidance of a designated faculty thesis committee.

NURS.7520 Independent Study - Credits: 9
Independent Study

NURS.7530 Doctoral Dissertation (Formerly 33.753) - Credits: 1-6
A structured series of sequenced seminars which guides students through dissertation proposal development, defense, collection and analysis of data. The first seminar concludes with the development of Chapters I and II of the dissertation; the second seminar concludes with defense of the proposal; and the third seminar culminates in the development of discussion and conclusions of the dissertation effort.

NURS.7560 Doctoral Dissertation (Formerly 33.756) - Credits: 6
A structured series of sequenced seminars which guides students through dissertation proposal development, defense, collection and analysis of data. The first seminar concludes with the development of Chapters I and II of the dissertation; the second seminar concludes with defense of the proposal; and the third seminar culminates in the development of discussion and conclusions of the dissertation effort.

NURS.7590 Doctoral Dissertation (Formerly 33.759) - Credits: 9
A structured series of sequenced seminars which guides students through dissertation proposal development, defense, collection and analysis of data. The first seminar concludes with the development of Chapters I and II of the dissertation; the second seminar concludes with defense of the proposal; and the third seminar culminates in the development of discussion and conclusions of the dissertation effort.
NURS.7610 Continued Grad Research (Formerly 33.761) - Credits: 1
Continued Grad Research

NURS.7630 Continued Graduate Research (Formerly 33.763) - Credits: 3
NURS.7690 Continued Graduate Research (Formerly 33.769) - Credits: 9
NURS.7700 Evidence Appraisal (Formerly 33.770) - Credits: 3

In this course the student will explore the role of the DNP in evaluating evidence to inform practice. The student will also identify a critical issue or influential trend within the health care system that impacts health care delivery. Methods relevant to reviewing, analyzing, synthesizing, and applying evidence from the scientific literature will be discussed. Models of systematic reviews of the literature will be explored and implemented. Decisions will be made relative to the student’s topical area of interest and identification of the Scholarly Project Chair.

NURS.7710 Advanced Nursing Leadership and Management (Formerly 33.771) - Credits: 3

This course consists of a seminar and leadership experience. The seminar will explore the major concepts in leadership and management and their application in the health care setting. The role of DNP will also be discussed in terms of leadership in the health policy, education, and clinical settings. A leadership project will be completed by the end of the semester.

NURS.7720 Scholarly Project Implementation (Formerly 33.772) - Credits: 3

In this course, students will implement their DNP Projects according to DNP Scholarly Project guidelines. Building on the course work of previous semesters, students will share progress on their projects and discuss issues related to implementation. Course work will guide students through the phases of implementation and evaluation.

NURS.7730 Evidence Dissemination, Advocacy & Policy (Formerly 33.773) - Credits: 3

In this course the student will design and present the Scholarly Project proposal. Students will meet biweekly with the scholarly project chair to develop the DNP scholarly project using knowledge acquired in previous course work. Students will complete a University of Massachusetts Lowell Institutional Review Board application that considers ethical and cultural issues related to the scholarly project.

NURS.7740 Scholarly Project Design (Formerly 33.774) - Credits: 3

In this course, students will implement their DNP Projects according to DNP Scholarly Project guidelines. Building on the course work of previous semesters, students will share progress on their projects and discuss issues related to implementation. Course work will guide students through the phases of implementation and evaluation.

NURS.7760 DNP Immersion - Credits: 3

This course focuses on the synthesis of advanced practice leadership and evidence-based practice by the DNP student in the health care specialty of their choice. In preparation for the translation of acquired knowledge to practice in the scholar practice role of the DNP, the student completes this practicum under the guidance and mentor-ship of faculty and a preceptor. The DNP student utilizes this opportunity to refine and incorporate evidence-based practice into the care and education of patients, families and other professionals. The DNP student will assume a leadership role in some aspect of the care and/or education provided in a specialty practice. Students will utilize core concepts from the DNP Essentials.

NURS.7770 Independent Study: Practicum in Nursing Education (Formerly 33.777) - Credits: 3

In this course, students will apply knowledge of curriculum and teaching in nursing in an educational setting under the mentorship of a nursing faculty member. Students will actively engage in curriculum development, evaluation and refinement, course preparation, classroom and clinical teaching, and student evaluation. The nurse educator role will be explored.

NURS.7930 Cooperative Education (Formerly 33.793) - Credits: 1