College of Health Sciences

The graduate programs of the College of Health Sciences prepare health care providers with specialized knowledge and skills for the roles of practitioner, leader and researcher. The College of Health Sciences is led by Shortie McKinney, Ph.D.

Faculty in the College of Health Sciences (pdf)

Graduate Programs Offered

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

- Clinical Laboratory Sciences
  - Concentrations:
    - Clinical Research
    - Clinical Administration
    - Health Informatics
    - Nutritional Sciences
    - Public Health Laboratory Sciences
  - Option: Professional Science Master's Option - Clinical Laboratory Sciences
- Health Informatics and Management
  - Concentrations:
    - Health Informatics
    - Health Management
- Nursing
- Public Health
- Work Environment
  - Options:
    - Occupational and Environmental Hygiene
    - Epidemiology
    - Ergonomics/Safety
    - Work Environment Policy
    - Cleaner Production and Pollution Prevention
    - Professional Science Master's Option - Occupational & Environmental Hygiene
    - Professional Science Master's Option - Ergonomics & Safety
    - Professional Science Master's Option - Epidemiology
    - Professional Science Master's Option - Cleaner Production & Pollution Prevention

Doctor of Physical Therapy (DPT)

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

- Nursing
  - Health Promotion
- Pharmaceutical Science

Post-Master’s Doctorate in Nursing Practice (DNP) Program

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

- Work Environment
  - Options:
    - Occupational and Environmental Hygiene
    - Epidemiology
    - Ergonomics/Safety
    - Work Environment Policy
    - Cleaner Production and Pollution Prevention

Graduate certificates are available in some academic majors.

19.659 Cleaner Production
Course ID: 3619

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.675 Introduction to Manuscript Writing

Course ID: 35633

Course Details: This seminar will cover the basics of how to structure and write an article for a peer-reviewed journal. Participants will bring at least one article from their own field that can serve as a model, as well as a sample of their own writing (can be a course paper or other draft manuscript). Both peer and instructor feedback will help to inform revisions of the draft.

Max Credits: 1.5
Min Credits: 1.5

19.676 Introduction to Proposal Writing

Course ID: 35634

Course Details: 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.

Max Credits: 1.5
Min Credits: 1.5

19.678 Occupational Respiratory Disease Epidemiology

Course ID: 3625

Course Details: Advanced course on the methods and content of research on occupational respiratory disease with focus on the appropriate use of spirometry, symptom questionnaires, and chest radiography in cross sectional and longitudinal studies. Reviews pathophysiology, prevalence, latency considerations and diagnosis of both acute and chronic respiratory disease caused or exacerbated by work. Special attention is devoted to the impact of the healthy worker selection effect in respiratory epidemiology studies.

Max Credits: 3
Min Credits: 3

19.680 Introduction To SAS

Course ID: 3626

Course Details: 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.

Max Credits: 1
Min Credits: 0

19.682 Applied Epidemiology Methods

Course ID: 3628

Course Details: A second level course in modern epidemiologic methods. This course is designed for those planning to work in public health or healthcare. Emphasis is placed on the design and conduct of field studies. Students read the current literature, and learn the particular methods and difficulties of conducting epidemiologic studies in the work environment. 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, cross-sectional and longitudinal study designs.

Max Credits: 3  
Min Credits: 3

19.683 Risk Assessment

Course ID: 3629

Course Details: 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.

Max Credits: 3  
Min Credits: 3

19.684 Musculoskeletal Epidemiology

Course ID: 3630

Course Details: 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.

Max Credits: 3  
Min Credits: 3

18.501 Wetlands Ecology

Course ID: 3489

Course Details: Types, characteristics and definitions, functions and values, regulation and management of wetlands; with due regard given to geology, soils and hydrology, and biological/ecosystem interactions.

Max Credits: 3  
Min Credits: 3

18.527 Environmental Law

Course ID: 1265

Course Details: 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.

Max Credits: 3  
Min Credits: 3

19.500 Analytical Context of the Work Environment

Course ID: 3542

Course Details: 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.

Max Credits: 3  
Min Credits: 3

19.503 Toxicology and Health

Course ID: 3545

Course Details: Examines the effects of the major and chemical physical hazards in the modern work environment. Presents principles
of toxicology as well as the toxicology of heavy metals, organic solvents, pesticides, harmful dusts, asphyxiants. Mechanisms of the effects on human physiologic systems are described along with the physiologic effects of ionizing radiation, heat stress, noise and repetitive trauma.

Max Credits: 3
Min Credits: 3

19.505 Qualitative Research Methods

Course ID: 3547

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.506 Introduction to Environmental Health

Course ID: 30821

Course Details: This course will survey the rapidly growing field of environmental health through an introduction to the links between environmental stressors and impacts on public health. The course will explore human and industrial activities that impact on environmental health such as population, food production, air and water pollution, waste, the built environment, toxic substances, pests, and global climate change. The course will also examine the types of diseases and illnesses that result from environmental impacts. Students will be encouraged to examine in greater detail a specific topic in environmental health of personal interest.

Max Credits: 3
Min Credits: 3

19.508 Principles and Practices of Biological Safety

Course ID: 35700

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.514 Aerosol Science

Course ID: 3553

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.516 Laboratory Environmental Health and Safety

Course ID: 35347

Course Details: 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, work practices and administrative measures for hazard control and regulations governing the area of laboratory safety.

Max Credits: 3
19.520 Climate Change: Science, Communication, and Solutions

Course ID: 36712

Course Details: Climate change offers one of the greatest challenges yet faced by society and scientists. The scientific consensus is clear that climate change is occurring, its pace is accelerating, its impacts on human society will be largely negative, and it is largely caused by anthropogenic greenhouse gas emissions. Yet, despite strong scientific evidence for the enormous challenges that society may face, scientists' attempts to disseminate that evidence beyond their peers have not yet been successful. Indeed in today's media world of blogs, YouTube video clips, and sound-bites, confusion over the scientific reality of climate change frequently dominates the discourse in classrooms and communities. This course will provide students with the tools and knowledge that they need to develop their own well-informed view of climate change. Because climate change is both impacted by humans and will increasingly impact society, this course takes a cross-disciplinary approach, integrating science, policy solutions, and media literacy as they relate to climate change.

Max Credits: 4
Min Credits: 3

19.521 Introduction to Industrial Hygiene

Course ID: 3558

Course Details: 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.

Max Credits: 2
Min Credits: 2

19.523 Introduction To Ergonomics

Course ID: 3559

Course Details: 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.

Max Credits: 2
Min Credits: 2

19.525 Industrial Hygiene and Ergonomics

Course ID: 3560

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.531 Occupation Biomechanics

Course ID: 3562

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.532 Occupational Biomechanics Laboratory

Course ID: 3563
Course Details: 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.

Max Credits: 3
Min Credits: 3

19.533 Intervention Research

Course ID: 37513

Course Details: This course will address the design and conduct of intervention studies to reduce occupational and environmental risk factors for injury, illness or disability. Intervention studies may examine any of a range of dependent variables, at the individual or organizational level, such as change in exposure, health endpoint (s), cost of workers' compensation claims, etc. Each student will select an occupational or environmental health problem and identify and justify an appropriate intervention approach. Selected scientific articles will be evaluated with respect to study design and methodologic issues. We will also consider how to evaluate scientific findings in terms of their implications for policy-setting.

Max Credits: 3
Min Credits: 3

19.540 Occupational Safety Engineering

Course ID: 3565

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.542 Human Factors

Course ID: 3567

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.550 Environmental Law

Course ID: 1265

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.555 Comparative Enviromental

Course ID: 3574

Course Details: 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.

Max Credits: 3  
Min Credits: 3

19.556 Analyzing Peace Violence and War

Course ID: 30331

Course Details: This course examines the political, and social factors that cause violence and war, together with the possibilities for peaceful citizen action and constructive solutions to violence and conflicts. Different arenas of conflict are discussed, ranging from workplaces, families and communities, to nations, to the world.

Max Credits: 3  
Min Credits: 3

19.557 Toxic Use Reduction

Course ID: 3575

Course Details: 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.

Max Credits: 3  
Min Credits: 3

19.559 Conflict Resolution

Course ID: 3577

Course Details: This course gives students an understanding of the main issues and solutions involved in community level conflict resolution; e.g., in neighborhoods, workplaces, and other institutions. It develops students' skills in practicing conflict resolution and/or evaluating programs in the field of dispute resolution. It is important to understand why conflict happens and how to resolve conflict.

Max Credits: 3  
Min Credits: 3

19.575 Introduction Biostatistics and Epidemiology

Course ID: 3584

Course Details: Provides an introduction to the principal quantitative methods for assessments of the work environment. Topics include: probability theory, the normal distribution, Gaussian statistics, linear regression, epidemiologic study designs, causal inference in epidemiology, bias, and confounding.

Max Credits: 3  
Min Credits: 3

19.577 Biostatistics for Health Data

Course ID: 3586

Course Details: 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.

Max Credits: 3  
Min Credits: 3

19.579 Disability Outcomes and Interventions

Course ID: 3587
Course Details: 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.

Max Credits: 3
Min Credits: 3

**19.598 Thesis Review**

Course ID: 35547

Course Details:

Max Credits: 1
Min Credits: 1

**19.600 Work Environment Capstone**

Course ID: 3590

Course Details: This course is designed to provide students with the opportunity to examine an interdisciplinary problem in depth and propose a solution to the problem. The product will be a term paper and a public presentation of the proposed approach. Students will work with a faculty member (usually the academic advisor) to serve as a consultant to the process of developing a solution, although the faculty member's role will be to provide guidance and general advice, not detailed directions. A Capstone Report may be designed as an extension of the Research Project.

Max Credits: 3
Min Credits: 3

**19.601 Work Environment Capstone**

Course ID: 3591

Course Details: This 3.0 credit course (19.600 and 19.601) is designed to provide students with the opportunity to examine an interdisciplinary problem in depth and propose a solution to the problem. The product will be a term paper and a public presentation of the proposed approach. Students will work with a faculty member (usually the academic advisor) to serve as a consultant to the process of developing a solution, although the faculty member's role will be to provide guidance and general advice, not detailed directions. A Capstone Report may be designed as an extension of the Research Project.

Max Credits: 3
Min Credits: 3

**19.610 Exposure Assessment**

Course ID: 3592

Course Details: 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.

Max Credits: 3
Min Credits: 3

**19.611 Physical Properties of Aerosols**

Course ID: 3593

Course Details: 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.
19.612 Exposure Data Analysis
Course ID: 3594
Course Details: 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.

19.613 Design and Evaluation Of Ventilation Systems
Course ID: 3595
Course Details: 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.

19.614 Evaluation of Work Environment Hazards
Course ID: 3596
Course Details: This course provides the work environment professional with a systematic method of evaluating chemical, ergonomics and work organizational hazards in the field. Formal walk around inspections are conducted and formal reports are prepared. Sampling strategies and statistical considerations in the quantification of occupational exposures are covered. The health risks and control of physical hazards (noise and vibration) in the work environment are a major focus of this course.

19.615 Solutions for Work Environment Hazards
Course ID: 3597
Course Details: 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.

19.616 Exposure and Risk Assessment
Course ID: 34949
Course Details: 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.

19.618 Risk Management and Training
Course ID: 34950

Course Details: This course will introduce models of health and safety management with a focus on communication with management and employees. Development of effective worker training programs will be covered. The methods and policy implications of quantitative risk analysis and assessment will be introduced and cases discussed.

Max Credits: 3
Min Credits: 3

19.619 Measurement of Chemical Exposure

Course ID: 35999

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.620 Advanced Exposure Assesment

Course ID: 3600

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.621 Nanomaterials: Exposure, Health and Safety

Course ID: 34722

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.622 Biomarkers in Occupations and Environment

Course ID: 30332

Course Details:

Max Credits: 3
Min Credits: 3

19.623 Skin Exposure to Chemicals

Course ID: 34723

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.632 Advanced Biomechanics
Course ID: 3603
Course Details: 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.

Max Credits: 3
Min Credits: 3

19.638 Methods In Work Analysis
Course ID: 3606
Course Details: 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.

Max Credits: 3
Min Credits: 3

19.640 Macroergonomics: A comprehensive approach to Job and Organizational Design
Course ID: 35457
Course Details: 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.

Max Credits: 3
Min Credits: 3

19.643 Health Work Organization Design
Course ID: 3608
Course Details: 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.

Max Credits: 3
Min Credits: 3

19.651 Work Environment Policy
Course ID: 3612
Course Details: 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.

Max Credits: 3
Min Credits: 3

19.654 Work, Technology and Training

Course ID: 3614

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.655 Introduction to Environmental and Natural Resource Economics

Course ID: 3615

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.658 Clean Product Design

Course ID: 3618

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.687 Quantitative Models Environmental Health

Course ID: 3633

Course Details: In this seminar readings, discussion, group work and computer exercises are used to gain an understanding of how certain kinds of quantitative models work. Emphasis is placed on the underlying assumptions of these models, and on gaining an intuitive understanding of the most common modeling procedures. The types of models covered will be those most important to current research and policy in environmental health, including ordinary least squares, the method of maximum likelihood, Monte Carlo simulation, and systems of ordinary difference equations. There will be a diverse set of readings, frequent computer exercises to be worked either individually or in groups, and a final project. Facility with Excel or an analogous spreadsheet program will be assumed.

Max Credits: 3
Min Credits: 3

19.688 Research Synthesis Environmental Health Policy

Course ID: 3634

Course Details: Introduces students to methods used to synthesize, evaluate, and present environmental, epidemiologic, and other scientific data for environmental health policy. Through presentation of a variety of existing methods, case studies, guest lectures, and group projects, students will develop an understanding of the complexities and issues involved in evaluating and synthesizing scientific information for public policy. The course will examine methods for using both quantitative and qualitative research findings.

Max Credits: 3
19.689 Advanced Regression Modeling

Course ID: 30857

Course Details: This course will cover introductions to several different regression methods used in epidemiology to model exposure-response relationships. Topics include general linear models, logistic regression, mixed models, generalized linear models, generalized linear models, generalized linear models, principal component analysis (factor analysis,) and survival models. Students should have working familiarity with SPSS.

Max Credits: 3
Min Credits: 3

19.690 Critical Review Health Regulations

Course ID: 3635

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.702 Independent Study: Industrial Hygiene

Course ID: 3639

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

Max Credits: 1
Min Credits: 1

19.704 Independent Study: Ergonomics

Course ID: 3641

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

Max Credits: 1
Min Credits: 1

19.708 Independent Study: Epidemiology

Course ID: 3644

Course Details: 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.

Max Credits: 1
Min Credits: 1

19.709 Independent Studies: Occupational Epidemiology

Course ID: 3645

Course Details: 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.

Max Credits: 1.5
Min Credits: 1.5
19.712 Independent Study: Industrial Hygiene
Course ID: 3648
Course Details: Advanced topics in industrial hygiene, exposure assessment or exposure control not offered in the regular curriculum. Topics may vary from year to year.
Max Credits: 2
Min Credits: 2

19.727 Sel Top: Epidemiology
Course ID: 3660
Course Details: 
Max Credits: 3
Min Credits: 3

19.728 Sel Top: Work Env Policy
Course ID: 3661
Course Details: 
Max Credits: 3
Min Credits: 3

19.733 Graduate Project
Course ID: 3665
Course Details: Advanced research project required of all master's degree candidates in the ergonomics, industrial hygiene, occupational epidemiology and work environment policy concentrations.
Max Credits: 3
Min Credits: 3

19.735 Independent Study: Policy
Course ID: 3666
Course Details: 
Max Credits: 3
Min Credits: 3

19.736 Graduate Project - Work Environment
Course ID: 3667
Course Details: 
Max Credits: 6
Min Credits: 6

19.737 Independent Study: Epidemiology
Course ID: 3668
Course Details: 
Max Credits: 3
Min Credits: 3

19.739 Graduate Project - Work Environment

Course ID: 3669
Course Details: Advanced research project required of all master's degree candidates in the ergonomics, industrial hygiene, occupational epidemiology and work environment policy concentrations.
Max Credits: 9
Min Credits: 9

19.743 Master's Thesis Research

Course ID: 3670
Course Details:
Max Credits: 3
Min Credits: 3

19.763 Continued Graduate Research

Course ID: 3676
Course Details:
Max Credits: 3
Min Credits: 3

19.999 Intercampus Graduate Research

Course ID: 33695
Course Details: This course will allow doctorate students to remain active while they are taking courses/research at the other UMASS campuses.
Max Credits: 0
Min Credits: 0

30.550 Human Development and Pathophysiology

Course ID: 4469
Course Details: 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.
Max Credits: 3
Min Credits: 3

33.522 Independent Study Health Promotion

Course ID: 4574
Course Details: 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.
Max Credits: 3
Min Credits: 1
33.552 Social, Cultural and Policy Issues in Health Care

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.554 Palliative and End of Life Nursing Care

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.558 Geropsychiatric and Mental Health Nursing

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.559 Advanced Pharmacology

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.600 Theoretical Foundations for Advanced Nursing Practice

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.601 Research for Evidence-Based Practice

Course Details: 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.

Max Credits: 3
Min Credits: 3

**33.602 Clinical Psychopharmacology**

Course ID: 32567

Course Details: 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.

Max Credits: 3

Min Credits: 3

**33.603 Psychopharmacology and Related Psychobiology**

Course ID: 33009

Course Details: This course aims to familiarize the student with current theory and practice related to adult psychopharmacology. Particular attention is paid to current standards of practice, practice guidelines and evidence-based approaches to the use of the range of psychotherapeutic agents that are used in the treatment of psychiatric disorders. The course will orient the student to current psychobiological theory related to the hypothesized effects of psychopharmacologic drugs used in the treatment of psychiatric disease.

Max Credits: 3

Min Credits: 3

**33.610 Adult Gerontological Nursing I**

Course ID: 4580

Course Details: Focus is on health promotion and biopsychosocial wellbeing of 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 related to the older adult are addressed.

Max Credits: 4

Min Credits: 4

**33.613 Adult Gerontological Nursing Practicum I**

Course ID: 4583

Course Details: This course focuses on promotion of biopsychosocial well-being of 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 finding to clinical practice is emphasized. The utilization of current clinical technologies is introduced.

Max Credits: 3

Min Credits: 3

**33.614 Gerontological Nursing Practicum II**

Course ID: 4584

Course Details: The focus of this course is on the comprehensive assessment and diagnosis of health problems in adults and in 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. Pharmacological and complementary therapies are applied.

Max Credits: 3

Min Credits: 3

**33.620 Adult Psychiatric-Mental Health Nursing I**
Course Details: The focus of this course is on health promotion, diagnosis and management of the common psychiatric/mental health issues pertaining to adults from diverse backgrounds. Utilizing current scientific research, students develop skills in analyzing data, differential diagnosis, and developing holistic plans of care that address health promotion, illness prevention and mental health promotion of a wide variety of client populations. Principles of psychopharmacology and psychopharmacological therapies as well as psychotherapy skills are addressed.

Max Credits: 4
Min Credits: 4

33.621 Adult Psychiatric-Mental Health Nursing II

Course Details: This course focuses on the role of the advanced practice psychiatric mental health nurse in assessment and diagnosis of complex psychiatric/mental health problems and the challenges these problems pose to effective health promotion and illness management. The course aims to develop skills in the area of advanced diagnostic reasoning, critical thinking, ethical decision-making and appropriate selection of both pharmacologic and non-pharmacologic therapies appropriate to complex presentations of psychiatric disorders. The course focuses on the needs of adults presenting with acute and chronic psychiatric/mental health problems and explores the interrelationship between physical, psychosocial, spiritual and cultural dimensions of health and illness.

Max Credits: 4
Min Credits: 4

33.622 Adult Psychiatric-Mental Health Nursing III

Course Details: This course builds on Adult Psychiatric/Mental Health 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/clinical nurse specialist within psychiatric care are analyzed. Advanced knowledge of the management of complex mental health issues is integrated in nursing practice. Transition of the role of the advanced practice nurse is examined, and actualized through an intensive, precepted, clinical experience.

Max Credits: 4
Min Credits: 4

33.623 Adult Psychiatric-Mental Health Practicum I

Course Details: This course focuses on health promotion, illness prevention, assessment and treatment of psychiatric/mental health issues. Students engage in comprehensive mental health assessment, clinical decision-making, and intervention strategies to facilitate health promotion and illness prevention in the care of adults from diverse backgrounds with acute and episodic psychosocial issues and mental health problems. The utilization of current clinical technologies is introduced.

Max Credits: 3
Min Credits: 3

33.624 Adult Psychiatric-Mental Health Practicum II

Course Details: This course focuses on advanced psychiatric-mental health nurses as direct providers of selected services for adults with acute, episodic or chronic psychiatric/mental health problems in a variety of settings. Application and evaluation of concepts, theories, psychotherapeutic and pharmacologic strategies and evidence-based research findings are required. Development of critical decision making skills and interdisciplinary collaboration is emphasized.

Max Credits: 3
Min Credits: 3

33.651 Advanced Health Assessment and Diagnostic Reasoning
Course Details: 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.

Max Credits: 3  
Min Credits: 3

33.660 Family Health Nursing I

Course ID: 4593

Course Details: The focus of this course is on health promotion and management of common health issues pertaining to women 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.

Max Credits: 4  
Min Credits: 4

33.661 Family Health Nursing II

Course ID: 4594

Course Details: Focus 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 nursing strategies are addressed.

Max Credits: 4  
Min Credits: 4

33.662 Family Health Nursing III

Course ID: 4595

Course Details: 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.

Max Credits: 4  
Min Credits: 4

33.663 Family Health Nursing Practicum I

Course ID: 4596

Course Details: 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 women 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.

Max Credits: 3  
Min Credits: 3

33.664 Family Health Nursing Practicum II

Course ID: 4597

Course Details: This course focuses on the comprehensive assessment and diagnosis of health problems in adults and in older adults with complex, multi-system health issues. Students utilize evidence-based strategies to design, implement, and evaluate interventions to promote optimum functioning and wellness. Pharmacological and complementary therapies are applied.

Max Credits: 3
Min Credits: 3

**33.677 Thesis Review**

Course ID: 35266

Course Details:

Max Credits: 1

Min Credits: 1

**33.681 Nursing Administration I**

Course ID: 4604

Course Details:

Max Credits: 3

Min Credits: 3

**33.686 Introduction to Clinical Dimensions of Sleep & Chronobiology**

Course ID: 35738

Course Details: Through lecture-accompanied slide presentations, readings and web-based assignments, participants in this course will learn about normal sleep and its variations. The human circadian timing system will be explored to understand the physiologic dimensions of sleep and relationship of sleep and wakefulness to environmental cues.

Max Credits: 3

Min Credits: 3

**33.687 Diagnosis & Differential Diagnosis across Sleep Disorders**

Course ID: 35739

Course Details: Building on knowledge of normative sleep and chronobiology, this course addresses sleep-related pathology. In addition to formal sleep disorder diagnoses covered in the International Classification of Sleep Disorders, this course specifically focuses on medical and psychiatric comorbidity related to insomnia and sleep dysregulation: hypertension and cardiovascular disease, obesity, endocrine dysregulation, inflammatory disease, cancer and a large number of psychiatric diseases.

Max Credits: 3

Min Credits: 3

**33.688 Clinical Assessment & Intervention in Sleep Dysregulation**

Course ID: 35740

Course Details: This course requires the application and synthesis of content from previous courses to apply clinical assessment strategies to normative and pathologic sleep. Discussion of intervention strategies bifurcates between behavioral and pharmacologic strategies used in clinical practice. Evidence based approaches endorsed by practice guidelines from the American Academy of Sleep Medicine form the foundation for the intervention strategies discussed.

Max Credits: 3

Min Credits: 3

**33.690 Orthopedic and Rehabilitation Nursing**

Course ID: 35748

Course Details: This course will provide the post-baccalaureate nurse the opportunity to expand knowledge about issues related to musculoskeletal injuries and conditions. The course focuses on topics pertinent to the nursing care and treatment of acute and chronic musculoskeletal conditions across the lifespan. Content will include scope of nursing practice in orthopedics and rehabilitation, musculoskeletal assessment, perioperative care, diagnostic studies, pain, immobility and complication prevention. Pediatric and geriatric considerations, physical, nutritional and psychosocial aspects of injury and rehabilitation, as well as metabolic and degenerative conditions will be discussed.
33.701 Philosophy of Science

Course ID: 4609

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.702 Theoretical Foundations of Health Promotion

Course ID: 4610

Course Details: Study of the multidisciplinary theories, which direct or have the potential to direct inquiry in health promotion. Course content is derived from nursing, anthropology, psychology, sociology, economics, medicine and management.

Max Credits: 3
Min Credits: 3

33.703 Research In Nursing and Health Promotion

Course ID: 4611

Course Details: Study of the most recent research which examines the antecedents and correlates of health risk and health promotion behavior. Emphasis is placed on the critical analysis of research methodologies used in current research.

Max Credits: 3
Min Credits: 3

33.706 Measurement in Health & Behavioral Research

Course ID: 4614

Course Details: This course provides students with theoretical principles of measurement and design in health and behavioral research. The strategies, techniques, and issues in the development and administration of survey instruments will be critically examined. Psychometric properties using standardized approaches to measurement will be analyzed.

Max Credits: 3
Min Credits: 3

33.707 Epidemiology of Health Promotion

Course ID: 4615

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.709 Intervention Development in Health Promotion

Course ID: 4617

Course Details: Study of current health promotion intervention research at the individual family and community levels. Emphasis is on the critical analysis of research methodology and the design of the intervention protocols.

Max Credits: 3
**33.713 Curriculum and Teaching In Nursing**

Course ID: 4621

Course Details: 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.

Max Credits: 3  
Min Credits: 3

**33.715 Independent Study**

Course ID: 4623

Course Details: The study of highly specific content area related to the student's dissertation topic. Course objectives and projects are jointly designed by student and faculty member. No more than 1 independent study is acceptable as cognate credit.

Max Credits: 3  
Min Credits: 3

**33.716 Qualitative Methods**

Course ID: 4624

Course Details: 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.

Max Credits: 3  
Min Credits: 3

**33.717 Evaluation Research**

Course ID: 4625

Course Details: This course focus is 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.

Max Credits: 3  
Min Credits: 3

**33.730 Quantitative Research Methods and Grantsmanship**

Course ID: 37483

Course Details: 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.

Max Credits: 3  
Min Credits: 3

**33.731 Health Promotion Research**

Course ID: 37484

Course Details: 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.
Max Credits: 3
Min Credits: 3

33.743 Master's Thesis - Nursing
Course ID: 4642
Course Details: 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.

Max Credits: 3
Min Credits: 3

33.753 Doctoral Dissertation
Course ID: 4645
Course Details: 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.

Max Credits: 3
Min Credits: 3

33.756 Doctoral Dissertation
Course ID: 4646
Course Details: 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.

Max Credits: 6
Min Credits: 6

33.759 Doctoral Dissertation
Course ID: 33003
Course Details: 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.

Max Credits: 9
Min Credits: 9

33.763 Continued Graduate Research
Course ID: 4647
Course Details: 
Max Credits: 3
Min Credits: 3

33.769 Continued Graduate Research
Course ID: 4650
Course Details:
33.770 Evidence Appraisal

Course ID: 35090

Course Details: 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.

Max Credits: 9
Min Credits: 9

33.771 Advanced Nursing Leadership and Management

Course ID: 35091

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.772 Scholarly Project Implementation

Course ID: 35092

Course Details: In this course, the student will implement the Scholarly Project according to DNP Scholarly Project guidelines. Building on the previous semesters; course work and proposal design, students will meet in seminar every other week on campus to share progress on the project and to discuss issues related to implementation. Seminars will serve to guide students through the phases of the scholarly project implementation and evaluation.

Max Credits: 3
Min Credits: 3

33.773 Evidence Dissemination, Advocacy & Policy

Course ID: 4651

Course Details: this course will include a weekly seminar. The students will complete the scholarly project by undertaking dissemination activities. The student will analyze policies influencing DNP practice and quality, cost, and access to health care and participate in the policy making process.

Max Credits: 3
Min Credits: 3

33.774 Scholarly Project Design

Course ID: 37475

Course Details: 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.

Max Credits: 3
Min Credits: 3

33.777 Independent Study: Practicum in Nursing Education
Course ID: 33361

Course Details: In this independent study practicum 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.

Max Credits: 3
Min Credits: 3

33.793 Cooperative Education

Course ID: 37139

Course Details:

Max Credits: 1
Min Credits: 1

34.501 Pharmacology

Course ID: 33819

Course Details: An introduction to the chemistry, biochemistry and physiological actions of various pharmaceuticals. Fundamental concepts will be stressed and will include a discussion of drug receptors, drug receptor interactions, pharmacokinetics, enzyme induction, drug metabolism, drug safety and effectiveness and idiosyncratic reactions. Several major groups of drugs will be studied including: central nervous system stimulants, hypnotics, narcotic analgesics, anti-inflammatory drugs, cholinergics, adrenergics, adrenergic blocking drugs, antihypertensives, antihistamines, diuretics, adrenal steroids, anti-anemic drugs and antibiotics. Articles from the current literature will be discussed.

Max Credits: 2
Min Credits: 2

34.510 Models and Measurement in Disability

Course ID: 33437

Course Details: This course will introduce students to the World Health Organization's International Classification of Function and discuss its implications for models and measurement of disability. Discussion will focus on defining and measuring disability based on the enabling-disabling process with both temporal and spatial dynamics. Temporal dynamics will include both short cycle dynamics (days to weeks) as well as longer range cycles (i.e. the life cycle). Spatial dynamics will include multi level - bidirectional interactions that emerge through cell, organ, system, organism, and environmental scales. The multi level structure will be emphasized as mechanism to link disciplines and the need for diverse strategies required for examining, evaluating and intervening for reducing disability. There will be an emphasis on the important recurrent feedback loops between human and environment in long-term health trajectories and transitions from health to disability and from acute disturbances to chronic conditions. These discussions will occur in two primary areas: musculoskeletal and cardiovascular system dynamics. Open to: Undergraduate Seniors and Graduate Students It is recommended that students have completed at least a year of upper division exercise physiology, biological science, engineering or psychology coursework. In addition, a year of general physics and a semester of statistics or research methods is recommended but not required.

Max Credits: 3
Min Credits: 3

34.601 Clinical Anatomy

Course ID: 4684

Course Details: 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.

Max Credits: 3
Min Credits: 3

34.602 Neuroscience: Anatomy

Course ID: 4685
Course Details: Neuroscience anatomy presents the structural features of the central nervous system as they relate to problems encountered in clinical neurology. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.603 Anatomy Laboratory

Course ID: 4686

Course Details: Clinical Anatomy Laboratory is a visualization of the structures of the human body utilizing laboratory dissection of prosected parts and human cadavers. The laboratory also incorporates the recognition of underlying structures using surface anatomy and palpation of body and soft tissues. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.605 Physical Therapy Interventions I Lecture

Course ID: 4688

Course Details: This course introduces the student to the principles of patient evaluation and treatment utilizing case studies to integrate didactic information into practical clinical situations. The appropriate use of evaluation procedures and the rationale for safe and effective use of treatment procedures are emphasized. Topics include: principles of biomechanical analysis, body mechanics, principles of goniometry and muscle testing, patient positioning and transfers, gait training and activities of daily living with assistive devices, wheelchair prescription and mobility, isolation/sterile technique, wound care, monitoring vital signs, heat and cold modalities, aquatic therapy, and evaluation of normal gait. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.606 Neuroscience Laboratory

Course ID: 4689

Course Details: This course introduces the student to the principles of patient evaluation and treatment utilizing case studies to integrate didactic information into practical clinical situations. The appropriate use of evaluation procedures and the rationale for safe and effective use of treatment procedures are emphasized. Topics include: principles of biomechanical analysis, body mechanics, principles of goniometry and muscle testing, patient positioning and transfers, gait training and activities of daily living with assistive devices, wheelchair prescription and mobility, isolation/sterile technique, wound care, monitoring vital signs, heat and cold modalities, aquatic therapy, and evaluation of normal gait. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.607 Physical Therapy Interventions I Laboratory

Course ID: 4690

Course Details: This laboratory course develops the psychomotor skills necessary to apply the didactic knowledge presented in the Physical Therapy Interventions I Lecture to clinical situations. The safe and effective performance of various evaluation and treatment techniques is emphasized. Topics include: patient interviewing; isolation/sterile techniques; wound care and bandaging; monitoring vital signs; patient positioning and bed mobility; transfers; gait training and activities of daily living with assistive devices; wheelchair mobility; massage/soft tissue mobilization/lymph edema management; heat and cold modalities; gait analysis; goniometry and strength testing; postural analysis and anthropometry. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.608 Musculoskeletal Physical Therapy I

Course ID: 4691

Course Details: 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.

Max Credits: 3
Min Credits: 3

34.610 Musculoskeletal Physical Therapy I Laboratory

Course ID: 4693

Course Details: This laboratory course develops the psychomotor skills to allow clinical application of didactic knowledge gained in Musculoskeletal Physical Therapy I Lecture. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.612 Cardiopulmonary Physical Therapy I

Course ID: 4695

Course Details: Cardiopulmonary Physical Therapy provides instruction in a variety of pathological cardiopulmonary conditions encountered by physical therapists. The course emphasizes examination, evaluation and interventions employed by the physical therapist in dealing with these conditions. Students will be expected to integrate and synthesize information from related courses in a variety of cardiopulmonary problem solving experiences. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.614 Cardiopulmonary Physical Therapy I Laboratory

Course ID: 4697

Course Details: Cardiopulmonary Physical Therapy Laboratory is taken concurrently with Cardiopulmonary Physical Therapy 34.612. The 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. The course emphasizes procedures employed by the physical therapist in dealing with cardiopulmonary conditions. In addition, students will be expected to integrate and synthesize information from related courses in a variety of cardiopulmonary problem solving experiences. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.615 Clinical Education I Seminar

Course ID: 4698

Course Details: This course is the first in a series of two one-credit weekly seminars. The class will continue to explore the professional issues and clinical practice begun in 34.611 in various settings. Requirements include successful completion of the one week Clinical Education Fieldwork Experience I in Spring, Year 1. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.616 Research Methods

Course ID: 4699

Course Details: 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.

Max Credits: 3
34.617 Neurological Physical Therapy Lecture I

Course ID: 4700

Course Details: This course is the first of two courses dealing with the physical therapy management of adult patients/clients with neurological dysfunction. Concepts, practical applications, and strategies based on theories of motor skill development, motor control, and motor learning will be discussed. A variety of neurological conditions with different levels of impairments, functional limitations and disabilities will be examined. Emphasis is on the development of clinical decision making skills using a problem solving approach. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.619 Neurological Physical Therapy Laboratory I

Course ID: 4702

Course Details: This laboratory course must be taken concurrently with Neurological Physical Therapy I, 34.617. Emphasis is on the development of problem solving and psychomotor skills necessary for successful management of the patient/client with neurological dysfunction. Videotapes 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, functional limitations, and disabilities is stressed. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.620 Neurological Physical Therapy II

Course ID: 4703

Course Details: This course is the second of two courses dealing with physical therapy management of adult patients with neurological dysfunction. Concepts, practical applications, and strategies based on theories of motor skill development, motor control, and motor learning will be discussed. A variety of neurological conditions with differing levels of impairments, functional limitations, and disabilities will be examined. Emphasis is on the development of clinical decision making skills using a problem-solving approach. Practice is offered in the development of appropriate plans of care. Concurrent laboratory sessions emphasize the development of assessment and intervention skills. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.621 Musculoskeletal Physical Therapy II Lecture

Course ID: 4704

Course Details: This course is the second of a three-course series which focuses on physical therapy management of musculoskeletal dysfunction. Treatment of the ankle and foot will be included as a continuation of the first course. 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 tissues. A problem-solving approach to resolve impairments, which contribute to functional limitations and disabilities, will be stressed. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.622 Neurological Physical Therapy II Laboratory

Course ID: 4705

Course Details: This course is the second of two lab courses dealing with physical therapy management of adult patients with neurological dysfunction. Videotapes and patient demonstrations will be used to promote clinical decision making skills in examination and evaluation of patients with neurological dysfunction. Classroom laboratory experiences (peer practice) will be used to provide the student with the opportunity to gain mastery of psychomotor skills in advanced therapeutic exercise. Problem solving in the application of interventions for different levels of impairments, functional limitations, and disabilities will be stressed. All physical therapy graduate
courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.623 Musculoskeletal Physical Therapy II Laboratory

Course ID: 4706

Course Details: This laboratory course develops the psychomotor skills to allow clinical application of didactic knowledge gained in Musculoskeletal Physical Therapy II Lecture. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.625 Physical Therapy Interventions II

Course ID: 4708

Course Details: 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. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

34.626 Geriatric Physical Therapy

Course ID: 4709

Course Details: 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.

Max Credits: 3
Min Credits: 3

34.627 Physical Therapy Interventions II Laboratory

Course ID: 4710

Course Details: This course is a practical application of theories and principles presented in 34.625, Physical Therapy Interventions II Lecture. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

34.628 Musculoskeletal Physical Therapy III

Course ID: 4711

Course Details: 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.

Max Credits: 3
**34.629 Directed Research**

Course ID: 4712

Course Details: 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.

Max Credits: 3
Min Credits: 1

**34.630 Musculoskeletal III Laboratory**

Course ID: 4713

Course Details: This laboratory course provides the student the opportunity to apply the didactic knowledge gained in the Musculoskeletal Physical Therapy II Lecture through a problem solving approach. Additionally, specific evaluation and functional management techniques for the spine and pelvis will be demonstrated by instructors and practiced by students. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

**34.631 Pediatric Physical Therapy Lecture**

Course ID: 4714

Course Details: This laboratory course provides the student the opportunity to apply the didactic knowledge gained in the Musculoskeletal Physical Therapy II Lecture through a problem solving approach. Additionally, specific evaluation and functional management techniques for the spine and pelvis will be demonstrated by instructors and practiced by students. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

**34.633 Pediatric Physical Therapy Laboratory**

Course ID: 4716

Course Details: Through classroom and clinical laboratory experiences, the student will be given the opportunity to 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 disabling problems requiring physical therapy intervention. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

**34.635 Clinical Education II Seminar**

Course ID: 4718

Course Details: This course is the second in a series of two one-credit weekly seminars. The class will continue to explore the professional issues and clinical practice begun in 34.611 and 34.615 in various practice settings. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 1
Min Credits: 1

**34.637 Clinical Reasoning I**

Course ID: 4720

Course Details: This capstone course provides students with the opportunity to integrate medical and physical therapy examination procedures using a case study format. Includes advanced topics of diagnostic imaging (e.g. CT scans, MRI, radiography, arthrography).
Discussions focus on understanding laboratory chemistry values, and data derived from vascular, neurologic, cardiopulmonary, metabolic, and endocrine tests. Students are expected to evaluate complex case data and determine a differential diagnosis. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3  
Min Credits: 3

34.640 Clinical Reasoning in Physical Therapy II

Course ID: 4723

Course Details: This capstone course provides students with the opportunity to integrate medical and physical therapy management related to complex cases (patients who have disorders of several systems, e.g. musculoskeletal, cardiovascular, neurological). Students will present a patient, including history, examination, evaluation, diagnosis, prognosis, and intervention. Students are expected to articulate and justify their clinical reasoning, contrasting different approaches to management in both acute and active rehabilitation phases. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3  
Min Credits: 3

34.641 Business Skills in Physical Therapy

Course ID: 4724

Course Details: This course provides an overview of the operation of physical therapy services. The course will emphasize a micro approach concerning issues and trends related to the delivery of health care and their implications for the management of physical therapy services. Key issues will include facilities design and clinic organization, personnel management, budgeting, and operations management. Topics related to the key issues will include: marketing, quality improvement, utilization review, legal and ethical issues such as sexual harassment, and integration of the Guide to Physical Therapy Practice and the LAMP (Leadership, Administration, Management, and Professionalism) document with respect to these topics. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 2  
Min Credits: 2

34.642 Health Care Issues

Course ID: 4725

Course Details: This course provides an overview of the operation of physical therapy services within the structure of the United States health care system. The course will emphasize a macro approach concerning issues and trends related to the delivery of health care and their implications for the management of physical therapy services. Key issues will include: the politics of health care, re-engineering of the health care system, reimbursement for services, managed care organizations, the code of ethics and standards of practice, and integration of the Guide to Physical Therapy Practice and the LAMP (Leadership, Administration, Management, and Professionalism) document with respect to these topics. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 2  
Min Credits: 2

34.644 Clinical Education Fieldwork II

Course ID: 4727

Course Details: 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.

Max Credits: 1  
Min Credits: 1

34.645 Physical Interventions III

Course ID: 4728

Course Details: All physical therapy graduate courses (number 34.) are restricted to PT majors only.
34.647 PT Interventions III Lab

Course ID: 4730
Course Details: All physical therapy graduate courses (number 34.) are restricted to PT majors only.

34.648 Service Learning in Physical Therapy

Course ID: 30345
Course Details: 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.

34.650 Clinical Education Experience I

Course ID: 4732
Course Details: A ten-week full time clinical education experience designed to integrate basic physical therapy evaluation and treatment procedures with an emphasis on the musculoskeletal and cardiopulmonary systems. Students are directly supervised by licensed physical therapists in acute care and outpatient settings.

34.651 Sectional Human Anatomy

Course ID: 37338
Course Details: Sectional Human Anatomy is a study of the structures of the human body as revealed through Computed Tomographic images. It is a foundational course for the medical physics program.

34.652 Clinical Education Experience II

Course ID: 4733
Course Details: This twelve-week full time experience promotes the 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 all aspects of patient care. Students are allowed to explore areas of interest in a variety of settings.

34.653 Clinical Education III

Course ID: 4734
Course Details: (Fall 3rd year) This full time eight week clinical experience is designed to promote socialization into the professions of physical therapy. 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 is emphasized. Settings in pediatrics, neurological rehabilitation, outpatient orthopedics and acute care facilities are appropriate for this experience. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

**34.654 Clinical Education Experience IV**

Course ID: 4735

Course Details: (Spring, 3rd year) The final full time eight-week clinical experience is designed to promote socialization into the profession of physical therapy. 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 is emphasized. Settings in pediatrics, neurological rehabilitation, outpatient orthopedics and acute care facilities are appropriate for this experience. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

**34.658 Independent Studies**

Course ID: 4739

Course Details: All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3
Min Credits: 3

**34.659 Sectional Human Anatomy Laboratory**

Course ID: 37337

Course Details: Sectional Human Anatomy Laboratory provides training in the recognition of anatomical structures from CT images, and the direct translations among CT images, Body surface features, and cadaveric structures.

Max Credits: 1
Min Credits: 1

**36.506 Biochemistry of Lipids**

Course ID: 4832

Course Details: This advanced course in the nutritional biochemist 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.

Max Credits: 3
Min Credits: 3

**36.512 Medical Bacteriology I**

Course ID: 4783

Course Details: A study of the cultural, biochemical, genetic, serological and pathogenic characteristics of disease producing microorganisms. Emphasis will be placed on the pathophysiology of the infectious diseases and their relationship to isolation and identification of the pathogenic microorganisms.

Max Credits: 3
Min Credits: 3

**36.531 Clinical Immunohematology**
Course ID: 4834

Course Details: 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.

Max Credits: 3
Min Credits: 3

36.541 Introduction to Public Health and the Public Health Laboratory

Course ID: 33182

Course Details: 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.

Max Credits: 3
Min Credits: 3

36.551 Advanced Pathophysiology

Course ID: 4837

Course Details: 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.

Max Credits: 3
Min Credits: 3

36.553 Advanced Clinical Chemistry

Course ID: 4838

Course Details: 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.

Max Credits: 3
Min Credits: 3

36.560 Molecular Pathology

Course ID: 36721

Course Details: 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.

Max Credits: 3
Min Credits: 3

36.563 Vitamins and Minerals

Course ID: 4842

Course Details: 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.

Max Credits: 3
36.565 Lab Methods in Nutrition Assessment

Course ID: 31884

Course Details: This course provides the student the opportunity to assess nutritional status using several modern analytical methods. The course uses spectrophotometry, HPLC and automated procedures to assess the status of vitamins, lipids, iron, glucose, and insulin. The student will learn the mathematical calculations needed for the methods. This course enables the student to appreciate how nutrient analysis is designed and implemented in the analytical laboratory.

Max Credits: 3
Min Credits: 3

36.572 Nutrition and Gene Expression

Course ID: 4844

Course Details: Regulation of eukaryotic gene expression by specific nutrients, hormones, and metabolites will be discussed. Transcriptional, post-transcriptional, and translational mechanisms of specific nutrients with emphasis in disease development or prevention. The information gained will be useful for design of appropriate diets, based on inherited biochemical characteristics. This course will enable students to link their knowledge of nutrition with the growing body of knowledge on the human genome and specific hereditary diseases with a nutritional component. Students will be required to submit a paper in nutrition and gene expression, on a topic agreed upon by student and instructor.

Max Credits: 3
Min Credits: 3

36.575 Topics in Clinical Laboratory Science I

Course ID: 4846

Course Details: 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.

Max Credits: 3
Min Credits: 3

36.580 Clinical Applications of Molecular Genetics

Course ID: 4848

Course Details: This course begins with a review of basic molecular genetics, followed by a discussion of the human genome project, including the application of its technology to the management of genetic diseases. Laboratory techniques used to analyze pre- and postnatal tissue samples is described, including RFLP-Southern blot technology, real-time PCR, VNTR assessment, and gene expression analysis by microchip arrays. Cloning and stem cell analysis follows, including the ethical, legal, and social issues surrounding these areas. Cancer genetics and cytogenesis is presented, with emphasis on molecular changes that lead to the onset of cancer. Genetic treatments for cancer are reviewed. Gene therapy is detailed, including the historical perspective, gene therapy vectors and their mode of action, and the newest methods for treating genetic disorders at the DNA level. Structural and functional genomics follows, centering around the creation of pharmaceuticals solely based on the genetic basis of diseases. The course ends with a discussion of the human proteome project, including goals and objectives, current progress, and the storage of data in complex bioinformatic databases.

Max Credits: 3
Min Credits: 3

36.582 Seminar in Advanced Nutrition

Course ID: 30346

Course Details: Review and analysis of contemporary research publications in human nutrition. Recently discovered nutrients that may be essential to human health will be evaluated. We will critically examine the benefits of dietary modification in controlled investigations. Course will focus on published studies of the relation of dietary practices to health and disease. We will examine nutrition policy, and the way scientific findings in nutrition translate into public health practice. This course will be of value to students who wish to critically examine literature in human nutrition, and who seek to develop new directions for nutrition research.
Max Credits: 3  
Min Credits: 3  

**36.613 Infectious Disease**  
Course ID: 4851  
Course Details: This course is designed for graduate students in the health sciences focusing on the pathophysiology of infectious disease. Major infectious organisms will be discussed as biological models and presented in the way they affect major systems of the body. Emphasis will be placed on journal readings describing significant episodes of emerging infections and current technology in diagnosis and treatment of infectious diseases.  
Max Credits: 3  
Min Credits: 3  

**36.615 Medical Mycology and Parasitology**  
Course ID: 4852  
Course Details: 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.  
Max Credits: 3  
Min Credits: 3  

**36.640 Quality Assurance, Control and Improvement in the Clinical and Public Health Laboratory**  
Course ID: 34606  
Course Details: 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.  
Max Credits: 3  
Min Credits: 3  

**36.733 Graduate Project - Clinical Laboratory Sciences**  
Course ID: 4860  
Course Details: 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.  
Max Credits: 3  
Min Credits: 3  

**36.734 Graduate Project - Clinical Laboratory Sciences**  
Course ID: 4861  
Course Details: 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.  
Max Credits: 4  
Min Credits: 4  

**36.743 Master's Thesis - Clinical Lab Sciences**
Course Details: 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.

Max Credits: 3
Min Credits: 3

36.744 Master's Thesis - Clinical Laboratory Science

Course ID: 4866

Course Details: 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.

Max Credits: 4
Min Credits: 4

36.753 Doctoral Research

Course ID: 4867

Course Details:

Max Credits: 3
Min Credits: 3

36.756 Doctoral Research

Course ID: 4868

Course Details:

Max Credits: 6
Min Credits: 6

36.759 Doctoral Research

Course ID: 4869

Course Details:

Max Credits: 9
Min Credits: 9

38.501 Physiological Dynamics

Course ID: 36396

Course Details: This course will provide intermediate to advanced coverage of physiological dynamics. A myriad of complex dynamics underlie health and disease and represent highly integrated regulatory systems with cycles, oscillations and feedbacks across time and scale. Physiological Dynamics will teach students basic tools for analyzing the dynamics of the physiological systems; and to identify normal dynamics and relate altered dynamics to disease. The course will focus on the interpretation of physiological dynamics in understanding healthy response to exercise, stress, fatigue and disease. Topics will include physiological origins and implications of: the normal electrocardiogram (ECG); common ECG abnormalities, temporal variations in the physiological system (heart rate variability, blood pressure variability, blood flow, pulse transit time); and multi level relationships between components of physiological regulation. A common theme will be the added clinical information associated with understanding the temporal and spatial dynamics of the physiological systems. Temporal dynamics will include both short cycle dynamics (days to weeks) as well as longer range cycles (i.e. the life cycle). Spatial dynamics will include multi level - bidirectional interactions that emerge through cell, organ, system, organism, and environmental scales. There will be an emphasis on the important recurrent feedback loops between human and environment in long-term health trajectories and transitions from health to disease and from acute disturbances to chronic conditions.

Max Credits: 3
57.567 Introduction to Environmental and Natural Resource Economics

Course ID: 3615

Course Details: 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 form 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.

Max Credits: 3
Min Credits: 3

19.507 Environmental Health in Practice

Course ID: 32049

Course Details: Through a combination of class lectures, field trips, and a service learning project, this course is designed to introduce students to the daily responsibilities of an environmental health professional. The class will provide in-depth knowledge and hands-on understanding of topics such as food safety, indoor air quality, water quality, waste water disinfection, and chemicals management. Through lectures and guest speakers students will understand the challenges facing environmental health professionals and the resources available to them. Students will undertake a final group project for a health board or other organization.

Max Credits: 3
Min Credits: 3

19.545 Chemicals and Health

Course ID: 36702

Course Details: Provides a broad overview of how the design, manufacture, use and disposal of chemicals and chemical products affect health and ecosystems. Provides an in-depth overview of how chemicals are monitored in the environment (including biomonitoring), how their risks are characterized, and the prevention of chemical risks through safer chemical design.

Max Credits: 3
Min Credits: 3

19.630 Research Design for Ergonomics

Course ID: 3602

Course Details: Procedures for conducting research on ergonomics (human factors, biomechanics, etc.). Experimental design alternatives, field research, survey research, considerations of data collection and reduction, sequential design procedures, and ethical use of human subjects.

Max Credits: 3
Min Credits: 3

19.679 Psychiatric Diseases and Work

Course ID: 34724

Course Details: This course will explore the relationships between mental health and psychiatric diseases and working life. Both the impacts of mental illness on work, as well as the effects of work and the work environment on mental health will be covered. By the end of the semester, students will understand: basic psychiatric terminology, and the different psychiatric syndromes in relation to their clinical symptomatology and long term prognoses; how to assess those syndromes using epidemiologic screening tools; and the current state of the art on the impact of working conditions on mental diseases and mental health, and the impact of these on working life.

Max Credits: 1.5
Min Credits: 1.5
19.701 Independent Study: Industrial Hygiene

Course ID: 3638

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

Max Credits: 3

Min Credits: 3

19.711 Independent Study: Industrial Hygiene

Course ID: 3647

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

Max Credits: 3

Min Credits: 3

19.713 Independent Study: Ergonomics

Course ID: 3649

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

Max Credits: 3

Min Credits: 3

19.715 Independent Study: Work Environment Policy

Course ID: 3651

Course Details: 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.

Max Credits: 3

Min Credits: 3

19.717 Independent Study: Epidemiology

Course ID: 3653

Course Details: 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.

Max Credits: 3

Min Credits: 3

19.719 Independent Study: Clean Production

Course ID: 3655

Course Details: Advanced topics in clean production, pollution prevention, and environmental protection efforts. Not offered in the regular curriculum. Topics may vary from year to year.

Max Credits: 3

Min Credits: 3

19.721 Selected Topics: Industrial Hygiene

Course ID: 3657
19.723 Selected Topics: Ergonomics
Course ID: 3658
Max Credits: 3
Min Credits: 3

19.725 Epidemiologic Theory
Course ID: 3659
Max Credits: 3
Min Credits: 1.5

19.729 Selected Topics : Clean Production
Course ID: 3662
Max Credits: 3
Min Credits: 3

19.761 1 - Credit Continued Graduate Research
Course ID: 38148
Max Credits: 1
Min Credits: 1

30.577 Health Disparities in a Global Economy
Course ID: 36775
Max Credits: 3
Min Credits: 3

30.614 Health Care Management
Course ID: 4473
Max Credits: 3
Min Credits: 3
32.502 Organizational Behavior in Health Care

Course Details: Provides a systems overview of the organizational structure and behavior of individuals in healthcare institutions, along with an examination of the role of managers, clinicians and other leaders. The course applies organizational, behavioral and social science practice and theory to healthcare organizations.

Max Credits: 3
Min Credits: 3

32.504 Health Data Analysis

Course Details: This course focuses on the application of both descriptive and inferential statistical techniques to the analysis of health care data. Students will learn how to a) formulate research questions and hypotheses answerable through quantitative data analysis, b) use computer software (Statistical Package for The social Sciences, SPSS) and an online Probability Calculator to analyze data, and c) interpret the meaning of statistical findings. Areas covered include graphs, measurement, normal distribution, hypothesis testing, t tests, ANOVA, correlation and regression, and chi-square. Emphasis is on using weekly SPSS assignments to analyze research questions using a sample data base from the Framingham Heart Study. Prerequisite: an elementary statistics course.

Max Credits: 3
Min Credits: 3

32.506 Quantitative Methods in Health Management

Course Details: The course teaches analytic methods that can be used to improve the decision making of healthcare managers, clinicians and others within the healthcare industry. Students learn the following: the conceptual foundations of quantitative analysis - e.g., what statistics is all about, how to think statistically and how to understand and interpret statistical findings; the importance of quantitative methods in supporting healthcare decision-making and developing evidence-based practices; bivariate and multivariate statistical methods for analyzing data and testing hypotheses; and how to use an industry-standard data analysis and statistical software in developing and reporting analytic findings.

Max Credits: 3
Min Credits: 3

32.511 Health Care Finance

Course Details: 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.

Max Credits: 3
Min Credits: 3

32.512 Operations Analysis for Quality Improvement

Course Details: This course teaches a multi-disciplinary approach to operations analysis, process redesign and quality improvement in healthcare. Students study the history, development and principles of quality improvement in healthcare; how quality improvement processes have been used in various healthcare settings; the tools and processes used in quality improvement; how to structure and implement a quality improvement program; and how to collect, analyze and interpret quality improvement data.

Max Credits: 3
Min Credits: 3
32.514 Health Care Management

Course ID: 33130

Course Details: This course provides a framework for addressing management problems in health care organizations. It provides students with an overview of the manner in which health care institutions are organized and governed, the role of management, physicians, nurses and other clinical and support staff in these organizations, and the management systems designed for their efficient and effective operation.

Max Credits: 3  
Min Credits: 3

32.515 Applied Health Economics

Course ID: 33127

Course Details: Students study basic economic concepts and how they are applied to healthcare and gain a broad familiarity with the health economics and related health services research literature, as well as experience using economics to analyze health policy issues.

Max Credits: 3  
Min Credits: 3

32.527 Healthcare Planning and Marketing

Course ID: 33041

Course Details: Students learn the fundamentals of planning and marketing and how they are applied to the different aspects of the health care system.

Max Credits: 3  
Min Credits: 3

32.531 Health Informatics

Course ID: 33129

Course Details: The course provides healthcare professionals with a conceptual and practical understanding of information and communication systems, and how they are used. It also addresses the systems analysis, development and implementation challenges in optimizing today's complex healthcare systems designs to improve both use and clinical outcomes. Students learn the theory, techniques and systems used for transforming clinical data into information useful for decision-making. The current and future role of the health care informatics professional is discussed.

Max Credits: 3  
Min Credits: 3

32.593 Independent Study

Course ID: 34586

Course Details:

Max Credits: 9  
Min Credits: 1

32.606 Quantitative Methods Health Services

Course ID: 4506

Course Details:

Max Credits: 3  
Min Credits: 3

32.607 Healthcare Information Systems
Course ID: 4507

Course Details: This is the introductory, first-recommended course in health informatics. It provides a broad-ranging overview of the healthcare information systems industry, its history, recent developments and continuing challenges, and a practical understanding of healthcare information systems acquisition and implementation. Topics include meaningful use, EMR, CPOE, and health information exchange.

Max Credits: 3
Min Credits: 3

32.616 Law and Ethics in Healthcare

Course ID: 4513

Course Details: 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.

Max Credits: 3
Min Credits: 3

32.625 Health Policy

Course ID: 4520

Course Details: 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.

Max Credits: 3
Min Credits: 3

32.626 Leadership and Change

Course Details: The strategic planning and management of health care organizations is covered. Development and implementation of strategic plans is covered. Alternative theories of organizations and change are explored. The capstone experience for the major.

Max Credits: 3
Min Credits: 3

32.627 Socioeconomic Inequalities in Health

Course ID: 4522

Course Details: 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.

Max Credits: 3
Min Credits: 3

32.632 Health Information System Planning

Course ID: 4527

Course Details: A course examining contemporary healthcare information system requirements and focusing on the design, implementation, and modification of these systems. Actual or hypothetical health system related projects are used to support the theoretical framework.
32.633 Healthcare Database Design

Course Details: 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.

Max Credits: 3
Min Credits: 3

32.634 Healthcare Database Development

Course Details: The course is designed to introduce the student to a Relational Database Management System (RDBMS) used to create and manage a Database. Students will use the database designed in 32.633 Healthcare Database Design to develop a working database system that can be used to manage data. No prior knowledge of a particular RDBMS application is required.

Max Credits: 3
Min Credits: 3

32.635 Healthcare Project Management

Course ID: 35735

Course Details: 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 specific focus on health information technology.

Max Credits: 3
Min Credits: 3

32.638 Strategic Planning in Healthcare and HIT (Health Information Technology)

Course ID: 36675

Course Details: A graduate-level course introducing healthcare professionals to strategic planning for the information systems organization. Skills learned in this course will enable the student to work effectively with and support the information systems planning effort and assure business alignment.

Max Credits: 3
Min Credits: 3

32.639 Electronic Health Record Systems

Course ID: 37456

Course Details: The course addresses Electronic Health Records (EHR) integration with patient care flow, clinical decision making and patient engagement, as well as clinical quality reporting. The students also learn core EHR functions. The course uses industry-leading EHR software as a learning tool to demonstrate how electronic health record technologies are used in a clinical setting.

Max Credits: 3
Min Credits: 3

32.671 Comparative Health Systems

Course Details: The course explores and compares national health systems (public health and healthcare). Each will be examined to understand its orientation and capacity to promote health, prevent morbidity and premature mortality, and provide primary healthcare for all. Analysis will address the political, economic, and social contexts within which the system functions, as well as their underlying
principles. Systems will include the U.S., European nations, and developing nations from Latin America, Asia, and Africa. Criteria put forward in health promotion charters and declarations developed through World Health Organization sponsored meetings will be used to assess each system's strengths and limitations. Students will be able to competently articulate the principles, criteria for effectiveness, and policies and practices that can establish successful achievement of strong international public health indicators as a foundation for sustainable social development.

Max Credits: 3
Min Credits: 3

32.672 Socioeconomic Inequalities and Health

Course ID: 33720

Course Details: 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 social 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. Permission of instructor.

Max Credits: 3
Min Credits: 3

32.705 Supervised Teaching Health Services Administration

Course ID: 4532

Course Details:

Max Credits: 0
Min Credits: 0

32.733 Capstone Project

Course ID: 4533

Course Details: Near the end of one's Master's Degree program, students register for Capstone Project and complete an independent study under faculty supervision. The Capstone Project applies concepts and skills learned in the program. It involves research and development, and culminates in a substantial (20 pages or more) business-type report. Many working professionals develop projects related to work assignments. Students are also required to present their Capstone Projects to students, faculty and alumni at a semester-end student recognition event.

Max Credits: 3
Min Credits: 3

32.743 Master's Thesis

Course ID: 4536

Course Details: Each student is required to complete a thesis or project under the supervision of a faculty member. The project is intended to integrate the concepts and skills learned in previous courses, should be original, and make a contribution to the field. Thesis must meet the requirements of the Graduate School and receive permission of the coordinator.

Max Credits: 3
Min Credits: 3

32.763 Continued Graduate Research

Course ID: 4537

Course Details:

Max Credits: 3
Min Credits: 3
32.776 CPT Co-op

Course ID: 35276

Course Details:

Max Credits: 1

Min Credits: 0

33.691 Advanced Musculoskeletal Conditions I Practicum

Course ID: 35762

Course Details: 168 contact hours (32 hours of class on-campus lab, 36 hours on-line seminar, & 100 hours of clinical practicum) Through lab, seminar, and clinical experiences this course will focus on assessment in orthopedic advanced practice nursing. Issues in advanced practice are discussed. The practicum will focus on the complete musculoskeletal exam. orientation to operating room and RN first assist procedures, interpreting diagnostic studies, musculoskeletal deformities, use of prosthetics and orthotics, non-surgical interventions, and selected radiologic interpretation. Selected clinical experiences will be directed toward assessing chronic conditions in spinal, joint replacement and reconstructive surgery, physiatry and rehabilitation settings. Clinical experiences will consist of inpatient, outpatient, or operating room settings with surgeons, physiatrists and/or advanced practice clinicians.

Max Credits: 3

Min Credits: 3

33.692 Advanced Orthopedic and Rehabilitation Nursing

Course ID: 35763

Course Details: This course focuses on topics pertinent to the nursing care and treatment of acute and chronic musculoskeletal conditions across the lifespan. Content will include pharmacology for orthopedics & rehabilitation, soft tissue, bone, joint, neuromuscular and metabolic conditions, as well as developmental, preventive, therapeutic and restorative interventions. The advanced practice nursing role in holistic care, pain management, leadership, research, publication, and utilization of community resources will be explored.

Max Credits: 3

Min Credits: 3

33.693 Advanced Musculoskeletal II Practicum

Course ID: 35764

Course Details: This course will focus on management of musculoskeletal conditions and builds on previous course work in orthopedic and rehabilitation nursing. Issues in advanced practice are discussed. Clinical experiences, demonstrations and learning experiences will focus on joint injections and aspirations, casting and splinting, internal and external fixation, treatment of fractures and other musculoskeletal conditions. Selected acute care clinical experiences will occur in trauma, pediatric, hand, spinal injury, and/or sports settings. Practicum experiences may have inpatient, outpatient, and/or operating room components, with surgeons and/or advanced practice clinicians.

Max Credits: 3

Min Credits: 3

33.718 Independent Study

Course ID: 36594

Course Details:

Max Credits: 1

Min Credits: 1

33.733 Graduate Project - Nursing

Course ID: 4637

Course Details: 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.
Max Credits: 3  
Min Credits: 3  

33.737 Advanced Qualitative Methods  
Course ID: 37486  
Course Details: 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.

Max Credits: 3  
Min Credits: 3  

33.738 Mentored Research Experience  
Course ID: 37485  
Course Details: In this course students participate in a mentored research experience. Opportunities are provided for the application of research skills using an interdisciplinary approach. Students conduct health promotion research and undertake a leadership role in the dissemination of culturally competent scholarship to improve nursing and health promotion practice.

Max Credits: 3  
Min Credits: 3  

33.775 DNP Practicum  
Course ID: 37476  
Course Details: In this course the student will be involved in individualized practical experiences to assist in meeting doctoral competencies. The foci may include direct clinical care practicum, or non-clinical practicum experiences with populations, systems, organizations, and/or policy.

Max Credits: 3  
Min Credits: 3  

34.660 Directed Research  
Course ID: 35040  
Course Details: Directed Research toward the DPT degree.

Max Credits: 2  
Min Credits: 2  

36.707 Drug Metabolism  
Course ID: 37846  
Course Details: This course provides an overview of the structure, function and regulation of major drug metabolic enzymes and transporters.

Max Credits: 3  
Min Credits: 3  

36.708 Mechanisms of Drug Action  
Course ID: 37845  
Course Details: This course reviews the general principles of drug action and the pharmacological activities of various classes of drugs. The major focus is on the molecular mechanisms of drug action, with a detailed discussion of one or more prototypes of each drug class. Selected examples of drug discovery and development are also discussed. At the completion of the course, students will have knowledge of the molecular basis of pharmacological activity, the mode of action of major classes of therapeutic agents and familiarity with rational approaches to drug design.
36.709 Pharmacogenomic Principles and Applications

Course ID: 37847

Course Details: Pharmacogenomics utilizes knowledge related to the variability in the human genome to understand and predict the differences in drug response and toxicity of pharmaceutical agents. This includes not only the determination of pharmacologically relevant genes that alter individual pharmacokinetic and pharmacodynamic response but also those polymorphisms and other mutations that predispose a person to development of various diseases. Personalizing therapies based on genotypic information should increase efficacy and decrease toxicity of agents. Current applications covered include anti-cancer and anti-viral therapies and anticoagulation.

Max Credits: 3
Min Credits: 3

36.710 Nutrigenomics

Course ID: 37844

Course Details: The elucidation of the human genome has created a unique opportunity to study and understand how nutrients and bioactive food components influence gene expression and product activity. This knowledge will allow for a better understanding of how these interactions vary with individual genetic diversity in the development of chronic disease states. The goal will be to improve the quality of life through the use of diet in the prevention and treatment of human disease. This includes the use or restriction the specific nutrients and food compounds to maintain homeostasis in the body from the biochemical level to organ systems. The ability for nutritionists and healthcare professionals to create and optimize diets requires and understanding of the interactions between nutrients and genes, proteins and metabolic pathways in regulation of disease pathways.

Max Credits: 3
Min Credits: 3

36.770 Professional Internship and Seminar

Course ID: 35788

Course Details: A Professional Internship is required for students in the Professional Sciences Option of the Clinical Laboratory Sciences Masters Program. It is expected to be a minimum of 350 hours and have 3-6 month duration. The internship is designed to provide students with an opportunity to obtain real-world experience in business, government agencies, non-profit organizations or research laboratories. Internships or research project experiences will typically take place in Clinical, Pharmaceutical, Diagnostic, Biotechnological or Medical Device Companies or Institutions. Research experience can also be obtained at the University or other Research Centers. All students will be required to submit a final written report and give oral presentation on their work at a Seminar that all post-internship students participate in. To be eligible for the Professional Internship, students will be required to have 1) completed a minimum of 12.0 credits of STEM courses, 2) completed a minimum of 6.0 credits of PLUS courses, 3) attained an overall minimum GPA of 3.0, and 4) Department Permission.

Max Credits: 1
Min Credits: 1

PHSC.610 Principles of Pharmaceutical Sciences

Course ID: 37990

Course Details: 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 and will gain laboratory experience. This course provides a foundation in pharmaceutical sciences along with theoretical, practical, regulatory, and professional issues in the pharmaceutical sciences.

Max Credits: 4
Min Credits: 4

PHSC.620 Pharmacokinetics

Course ID: 37932
Course Details: 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.

Max Credits: 3  
Min Credits: 3

**PHSC.630 Pharmaceutical Research Design and Ethics**

Course ID: 37985

Course Details: 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.

Max Credits: 3  
Min Credits: 3

**PHSC.640 Pharmaceutical Analysis**

Course ID: 37992

Course Details: 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.

Max Credits: 4  
Min Credits: 4

**PHSC.641 Drug Delivery**

Course ID: 37931

Course Details: 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.

Max Credits: 3  
Min Credits: 3

**PHSC.710 Advanced Topics in Pharmaceutical Sciences**

Course ID: 37993

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

Max Credits: 2  
Min Credits: 2

**PHSC.711 Clinical Research Design and Methodology**

Course ID: 37994

Course Details: Experimental research methodologies and the ethical issues in clinical pharmaceutical research will be analyzed. Principles of translational research will be discussed. Students will develop a pharmaceutical clinical trial protocol.

Max Credits: 3  
Min Credits: 3

**PHSC.712 Pharmacoepidemiology**

Course ID: 37996

Course Details: In this course the student applies epidemiological knowledge, reasoning, and research methods to the examination of the use and effectiveness of pharmacotherapy in human populations.
PHSC.713 Applied Clinical Pharmacokinetics

Course Details: This course reviews the major methods, models, and equations used in pharmacokinetics with their physicochemical and physiological assumptions and limitations. Current graphic and computer methods of applying pharmacokinetics experimental and clinical data will be explored. Clinical research literature and approaches to the design of studies will be explored.

Max Credits: 3
Min Credits: 3

PHSC.714 Nanotechnology and Drug Delivery

Course Details: A multidisciplinary course covering nanotechnology based drug delivery, materials and processes for novel drug delivery systems, synthesis of biocompatible nanoparticles for healthcare, product design, products today and regulatory issues.

Max Credits: 3
Min Credits: 3

31.514 Program Management in Health

Course Details: The concepts of program planning, development, budgeting and evaluation, which are essential functions for individuals working in health care agencies, are presented. Starting with the mission of the organization, the steps of conceptualizing, designing, implementing, budgeting and evaluating health programs are covered. Students will be expected to develop a grant proposal for an agency. This course is a capstone experience and resources from all other relevant coursework will be called upon. Seniors only.

Max Credits: 3
Min Credits: 3

19.591 Co-Op Internship CPT

Course Details: Practical training course for students to perform CPT.

Max Credits: 1
Min Credits: 0

19.770 Directed Readings: Epidemiology Biostatistics

Course Details: 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.

Max Credits: 3
Min Credits: 3

19.695 Chemical Process/Sustainability

Course Details: 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.

Max Credits: 3
Min Credits: 3
19.759 Doctoral Dissertation/Work Environment

Course ID: 3675
Course Details: Minimum of 18 semester hours of graduate courses at an acceptable level; approval of a written proposal outlining the extent and nature of proposed research work.
Max Credits: 9
Min Credits: 1

32.775 Capstone/Thesis Review

Course ID: 35254
Course Details:
Max Credits: 1
Min Credits: 1

33.611 Adult/Gerontological Nursing II

Course ID: 4581
Course Details: The focus of this course is on the advanced practice nursing role in the holistic assessment and management of health problems of the adult with a special focus on older adults 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.
Max Credits: 4
Min Credits: 4

33.612 Adult/Gerontological Nursing III

Course ID: 4582
Course Details: 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.
Max Credits: 4
Min Credits: 4

33.689 Scholarly Project/Capstone

Course ID: 35746
Course Details: 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.
Max Credits: 3
Min Credits: 3

34.604 Neuroscience: Physiology/Neurology

Course ID: 4687
Course Details: 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.

Max Credits: 3  
Min Credits: 3

**34.609 Medical/Surgical Pathology**

Course ID: 4692  

Course Details: 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, and cell death are reviewed. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3  
Min Credits: 3

**34.611 Professional Issues/Clinical Practice**

Course ID: 4694  

Course Details: This course will be divided into two sections. The first course section will provide an overview of physical therapy as a profession. Student Generic Abilities will be introduced as they apply to classroom instruction and clinical practice. The APTA (American Physical Therapy Association) Standards of Practice, Code of Ethics, disciplinary Process, The Scope of Physical Therapy Practice and The Massachusetts Practice Act will be discussed. The second course section will emphasize the development of effective teaching and learning strategies as it applies to physical therapy in the clinical setting. Discussions and exercises will center on the concepts of motivation and compliance in learning, learning/teaching styles, documentation, designing measurable goals, clinical teaching methods/techniques and tools, the art of effective communication, reinforcement strategies, principles of evaluation and giving effective feedback. Emphasis is placed on creating a climate that encourages learning. A teaching experience will be planned, implemented and evaluated by each student group. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3  
Min Credits: 3

**34.639 Medical/Surgical -Orthopedics**

Course ID: 4722  

Course Details: Medical Surgical conditions (Orthopedics) presents topics related to the pathology and medical-surgical treatment of musculoskeletal disorders. All physical therapy graduate courses (number 34.) are restricted to PT majors only.

Max Credits: 3  
Min Credits: 3

**32.514 Healthcare Management**

Course ID: 33130  

Course Details: This course provides a framework for addressing management problems in healthcare organizations, providing an overview of how healthcare institutions are organized and governed, the role of the management, physicians, nurses and other clinical and support staff in these organizations, and the management systems designed for their efficient and effective operation.

Max Credits: 3  
Min Credits: 3

**32.527 Planning and Marketing in Healthcare**

Course ID: 33041  

Course Details: The course examines the history, principles and methodologies of health services planning and marketing. Students learn how to develop various types of health plans (e.g., community and regional, strategic, business and marketing plans). They also learn about the research process and data resources required to support health services planning and marketing. Practical approaches to health care problems are studied using case analysis of actual healthcare projects and programs.
32.626 Leadership in Healthcare

Course ID: 4521

Course Details: 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.

Max Credits: 3
Min Credits: 3

32.776 Curricular Practical Training (CPT)

Course ID: 35276

Course Details: 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 students field of study and contain a curricular component.

Max Credits: 1
Min Credits: 0

33.739 Mentored Research Experience

Course ID: 4641

Course Details: 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.

Max Credits: 3
Min Credits: 3

PUBH.501 Social and Behavioral Determinants of Health

Course ID: 38621

Course Details: This course provides a foundation for the analysis of social and behavioral influences on public health. Planning, implementation, and evaluation of initiatives designed to improve public health are discussed. The course reviews prominent concepts in the social and behavioral sciences and provides examples of their impact on public health. Psychosocial theories of health promotion and how they inform public health practice are analyzed. Public health competencies in social and behavioral sciences provide a foundation for the course content.

Max Credits: 3
Min Credits: 3

PUBH.601 Health Policy and Management

Course ID: 38618

Course Details: The course provides students with a foundation of public health practice and management. Topics include critical issues for the future of healthcare in the U.S., leadership and politics in public health, partnerships to improve public health, leading and managing change in public health organizations, and improvement in public health practice. The course also provides an overview of the U.S. healthcare system, its organization, management and financing, current policy issues (e.g., cost, quality and access) and healthcare reform activity.

Max Credits: 3
Min Credits: 3
PUBH.603 Global Development and Health

Course ID: 38622

Course Details: 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.

Max Credits: 3
Min Credits: 3

PUBH.604 Geographic Information Systems (GIS) for Health

Course ID: 38619

Course Details: Geographic information systems (GIS) are of growing importance for analyzing health and environmental data. GIS is a spatial analysis system for the organization, storage, retrieval, and analysis of public health and many other types of data. The course will provide an overview of spatial analysis of data of importance to environmental and public health issues and students will analyze implications of spatial data analysis for public health.

Max Credits: 2
Min Credits: 2

PUBH.613 Environmental Epidemiology

Course ID: 38623

Course Details: An advanced course in modern epidemiologic methods as applied to physical and chemical hazards in the environment. Students read and critique some of the classic studies that have led to recognition of the effects of the environment on health, as well as some current topics of intense and active research. Major topics covered include: air pollution and lung disease, water pollution and infectious disease, ionizing radiation and cancer, outbreak investigation for foodborne infectious agents, lead poisoning, and endocrine disruption. Through reading the literature, students strengthen their skills in study design and analysis, while learning about important aspects of environmental health.

Max Credits: 3
Min Credits: 3

PUBH.614 Occupational Epidemiology

Course ID: 38620

Course Details: An advanced course in modern epidemiologic methods as applied to occupational health risks and interventions. Students read and critique numerous studies in the field, and learn the particular methods and difficulties of conducting epidemiologic studies in the work environment. Major topics covered include: causal inference in epidemiology, point and interval estimation for cohort and case control studies, exposure assessment for epidemiology, multivariate linear and logistic models for control of confounding.

Max Credits: 3
Min Credits: 3

34.637 Integrating Clinical Practice

Course ID: 4720

Course Details: This course will focus on integrating clinical reasoning skills in physical therapy with an emphasis on evidence-based research and current concepts of disablement. Students will share clinical experiences focusing on utilization of best practices and Clinical Practice Guidelines. Students will evaluate the use of diagnostic imaging in making clinical decisions based on evidence. Finally, students will utilize knowledge of functional movement deficits in developing effective patient evaluation and management strategies.

Max Credits: 3
Min Credits: 3

34.640 Professional Prep in PT
34.642 Health Policy & Admin

Course Details: 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 health initiatives, social responsibility, effective application of technology, and health services research.

Max Credits: 3
Min Credits: 3

34.646 Complex Cases in Physical Therapy

Course Details: This online course which runs concurrently with Clinical Education Experience III (34.653) is designed to promote evidence-based practice, professional correspondence, and further socialization into the profession of physical therapy through sharing of complex clinical cases encountered during the clinical experience. Students will describe their clinical placement setting as well as several complex cases through Blackboard while following the confidentiality guidelines as set forth in the Health Insurance Portability and Accountability Act (HIPAA).

Max Credits: 3
Min Credits: 3

34.653 Clinical Education Experience III

Course Details: The final, full-time, twelve-week clinical experience is designed to promote full socialization into the profession of physical therapy. Students are expected to function as independently as possible utilizing 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 is emphasized. Settings in pediatrics, neurological rehabilitation, outpatient orthopedics and acute care facilities are appropriate for this experience.

Max Credits: 3
Min Credits: 3

34.643 Evidence Directed Care

Course Details: This course presents the role of evidence in the development and critical analysis of physical therapy clinical practice guidelines and practice recommendations. Students are guided through the process of analyzing, weighting, comparing and integrating sources of evidence. Methods of integrating various forms of evidence that will be specifically covered include literature reviews, meta-analyses, systematic reviews, clinical prediction rules and clinical practice guidelines.

Max Credits: 3
Min Credits: 3