

# PARKINSON SCHOOL OF HEALTH SCIENCES AND PUBLIC HEALTH

Loyola University Chicago's Parkinson School of Health Sciences and Public Health brings together our call as a Jesuit institution to go to the frontiers of education, research, and practice, and help people who live at the margins.

An established leader in health care education with the Stritch School of Medicine and the Marcella Niehoff School of Nursing, the Parkinson School of Health Sciences and Public Health draws on those strengths to address today's public health challenges and train the next generation of experts in public health, health systems and informatics, dietetics, exercise science, and medical laboratory science.

Flexible degree programs and certificates are available as listed below that meet student, community, and industry needs. The Parkinson School includes programs for undergraduate and graduate students, as well as career professionals who seek additional skills or a career change. Innovative and accessible program formats for adult learners along with traditional undergraduates include online instruction and hybrid learning programs on Loyola's Health Sciences Campus and Lakeshore campuses. Insight into the student experience (<https://www.luc.edu/features/stories/parkinson/>).

## Graduate Programs

- Clinical Certificate in Blood Banking (<https://catalog.luc.edu/graduate-professional/health-sciences/clinical-certificate-blood-banking/>)
- Clinical Certificate in Hematology (<https://catalog.luc.edu/graduate-professional/health-sciences/clinical-certificate-hematology/>)
- Clinical Certificate in Microbiology (<https://catalog.luc.edu/graduate-professional/health-sciences/clinical-certificate-microbiology/>)
- Clinical Research Methods and Epidemiology (MS) (<https://catalog.luc.edu/graduate-professional/health-sciences/clinical-research-methods-epidemiology-ms/>)
- Dietetic Internship Certificate (<https://catalog.luc.edu/graduate-professional/health-sciences/dietetic-internship-certificate/>)
- Dietetics (MS) (<https://catalog.luc.edu/graduate-professional/health-sciences/dietetics-ms/>)
- Exercise Science (MS) (<https://catalog.luc.edu/graduate-professional/health-sciences/exercise-science-ms/>)
- Health Informatics (MS) (<https://catalog.luc.edu/graduate-professional/health-sciences/health-informatics-ms/>)
- Health Informatics Certificate (<https://catalog.luc.edu/graduate-professional/health-sciences/health-informatics-certificate/>)
- Healthcare Administration (MHA) (<https://catalog.luc.edu/graduate-professional/health-sciences/healthcare-administration-mha/>)
- Medical Laboratory Science (MS) (<https://catalog.luc.edu/graduate-professional/health-sciences/medical-laboratory-science-ms/>)
- Medicine/Public Health (MD/MPH) (<https://catalog.luc.edu/graduate-professional/dual-degree-programs/medicine-public-health-md-mph/>)
- Public Health (MPH) (<https://catalog.luc.edu/graduate-professional/health-sciences/master-public-health-mph/>)

- Public Health Certificate (<https://catalog.luc.edu/graduate-professional/health-sciences/public-health-certificate/>)
- Social Work/Public Health (MSW/MPH) (<https://catalog.luc.edu/graduate-professional/dual-degree-programs/social-work-public-health-msw-mph/>)

## Graduate & Professional Standards and Regulations

Students in graduate and professional programs can find their Academic Policies in Graduate and Professional Academic Standards and Regulations (<https://catalog.luc.edu/academic-standards-regulations/graduate-professional/>) under their school. Any additional University Policies supersede school policies.

## Exercise Physiology (EXCM)

### EXCM 401 Applied Physiology of Exercise (4 Credit Hours)

This course focuses on biologic system responses at rest, during exercise, and as the result of training. Major emphasis is placed on bridging gaps between introductory concepts of exercise physiology and the contemporary research evidence that further advances the field of exercise science. The effect of environmental systems and factors on the regulatory response to exercise is addressed. The history and major milestones associated with the development of the science of exercise physiology are presented. Future developments in the field of exercise physiology, such as the role of genetics and genomics are integrated into the course. Laboratory and field experiences provide students with opportunities to apply theory to practice.

*Outcomes:*

1) Describe major milestones, influences, and future directions in the development of the science of exercise physiology; 2) Explain the importance of the physiological adaptations that occur as a result of properly designed training programs; 3) Analyze measures of the physiology of respiration, circulation, energy production, metabolism, and muscle function in rest and exercise states; 4) Interpret research findings focused on cardiovascular, respiratory, metabolic and neuromuscular physiology in exercise science; 5) Perform selected laboratory and field tests of physiological function and physical fitness; 6) Interpret results from laboratory and field tests of physiological function and physical performance; 7) Differentiate positive training changes and signs and symptoms of overtraining among healthy individuals throughout the life cycle

### EXCM 424 Motor Learning and Performance (3 Credit Hours)

The course provides instruction in how humans control locomotion and how they learn/re-learn motor skills. Specifically, the course emphasizes the observable behavioral aspects of motor control/learning while detailing the neurophysiological and biomechanical processes that result in motor behaviors. Major course concepts include information processing and decision making; speed, accuracy, and coordination; and knowledge and skill acquisition and transfer.

*Outcomes:*

1) Understand theoretical approaches that drive motor control and motor learning research; 2) Analyze principles and processes underlying movement skilled performance; 3) Analyze the human motor system and how it supports the acquisition and retention of complex movement skills; 4) Adapt instruction situations to achieve maximum performance and retention of learned skills; 5) Relate information processing and decision-making models to performance and movement

**EXCM 435 Health Promotion and Wellness Theories and Frameworks (3 Credit Hours)**

This course emphasizes health promotion in diverse and changing cultures and societies. Determining and influencing factors of health are examined from a cultural competence perspective. Major health promotion, wellness, behavioral, and lifestyle theories that influence the professional practice of exercise science in community settings are integrated throughout the course. The role of the exercise scientist in health education for the prevention and treatment of health problems, health promotion, and enhancing quality of life is emphasized.

*Outcomes:*

1) Relate concepts of health, health promotion, and wellness that influence individual and group health and quality of life; 2) Assess the health education and health promotion needs of individuals and groups in diverse populations; 3) Design culturally congruent health education, wellness, and behavioral modification programs, focused on improved health and quality of life, in community-based settings; 4) Implement health education, wellness, health promotion, and behavioral modification programming for diverse populations; 5) Evaluate health education, wellness, health promotion and behavioral modification programming in a variety of settings, using an outcomes-oriented approach; 6) Identify cultural, social, economic, and political influences on decision making and action in health and wellness

**EXCM 444 Strength Training and Conditioning (3 Credit Hours)**

This course focuses on the analysis of theory in the improvement of athletic performance, with specific emphasis on assessment and implementation of resistance training programs. Foundational knowledge in human physiology and biomechanics is applied to principles of speed, agility, power, flexibility, and technique development specific to individuals' goals. Principles of anaerobic and aerobic metabolism in relation to strength training and conditioning are a major focus in the course. This course provides foundational preparation for students interested in taking the National Strength and Conditioning Association Certified Strength and Conditioning Specialist's exam.

*Outcomes:*

1) Analyze the relation between resistance training and human performance; 2) Incorporate appropriate exercises, such as resistance training, medicine ball, balance, plyometric, and linear and lateral movement exercises into exercise prescriptions; 3) Differentiate between general fitness prescriptions and specific training to enhance athletic performance; 4) Evaluate biomechanical aspects of efficiency and performance; 5) Apply performance enhancement training principles to individuals' specific needs and goals

**EXCM 450 Nutrition, Health and Performance (3 Credit Hours)**

This course focuses on advanced concepts of nutrition as these relate to health, exercise, fitness, and performance. The role of micronutrients and macronutrients in major dimension of health and fitness are addressed. Advanced concepts in nutrient selection, metabolism, and timing are integrated into plans for supporting and improving health and performance. Collaborative practice with dietetics professionals and the interprofessional team in optimizing health, fitness, and performance capacity is a major unifying concept of the course.

*Outcomes:*

1) Attribute major functions of macronutrients and micronutrients to health, exercise, fitness and performance; 2) Apply principles of evidence-based nutrition to the food habits and practices of diverse individuals and populations; 3) Analyze energy and nutrient intake based on level of training and type of sport and exercise; 4) Understand roles and domains of practice of collaborating professions in promoting health, fitness and performance; 5) Develop interprofessional competencies to collaborate with nutrition professionals in optimizing nutrition for health, fitness, and performance

**EXCM 454 Applied Sports Science (3 Credit Hours)**

This course focuses on the application of science in the study of elite athlete sports performance. Advanced aspects of physiological monitoring, along with other athlete assessment tools will be examined. Special emphasis will be placed on the evidence-based, practical application of these various techniques, enabling a holistic approach to improving athlete health and performance.

*Outcomes:*

Identify the relation between cumulative stress and human performance; Plan periodized practices of strength and conditioning, sport training, nutrition, and psychological preparation to optimize performance in individual and team sport

**EXCM 458 Cardiac and Pulmonary Disease and Rehabilitation (3 Credit Hours)**

This course focuses on two prevalent areas of public health concern for the exercise scientist: cardiac and pulmonary health and disease. Emphasis is placed on prevention, etiology, pathophysiology, and understanding the diagnosis and treatment of cardiac and pulmonary disease. The role of the clinical exercise scientist in preventive and rehabilitative exercise intervention and programming to promote cardiac and pulmonary health is emphasized. Key factors in the development, management, and evaluation of cardiopulmonary rehabilitation programs are integrated into the course.

*Outcomes:*

1) Understand anatomy and physiology associated with cardiopulmonary health and disease; 2) Relate pathophysiology changes in cardiac and pulmonary disease to exercise prescription; 3) Explain diagnostic tests and procedures used in exercise assessment and intervention in cardiac and pulmonary health and disease; 4) Understand essential elements and phases of cardiac and pulmonary rehabilitation; 5) Design preventive exercise prescriptions for cardiac and pulmonary health in individuals and groups; 6) Design rehabilitative exercise prescriptions for patients with cardiac and pulmonary health alterations

**EXCM 468 Application of Advanced Clinical Exercise Testing & Prescription (4 Credit Hours)**

This course emphasizes theory, techniques, and procedures of clinical exercise stress testing for diagnostic and functional assessment of individuals. Students will develop competencies in clinical testing skills ranging from electrocardiography to graded exercise and physical performance testing. Data from diagnostic testing and functional assessments will be integrated into individualized exercise prescriptions, based on risk assessment and stratification. Responses to emergency situations in the exercise environment are addressed.

*Outcomes:*

1) Understand the signs, symptoms and scope of cardiovascular conditions, respiratory conditions, and metabolic conditions, and the development of these pathologies; 2) Apply risk assessment and stratification models in the diagnostic and functional assessment of individuals; 3) Evaluate the indications and contraindications of subject selection for testing, considering safety precautions, indications for test termination, and emergency procedures for conducting a graded exercise stress test; 4) Interpret results of exercise stress tests; 5) Differentiate normal and abnormal electrocardiographic responses to exercise of varying duration and intensity; 6) Design appropriate exercise test mode and protocols in consideration of client characteristics; 7) Understand responses to various emergency situations that may occur in exercise settings

**EXCM 475 Exercise Applications in Special Populations (3 Credit Hours)**

This course focuses on the advanced knowledge and competencies needed to evaluate health behaviors and risk factors in special populations across the lifespan. The administration of fitness assessments and the design, implementation, and evaluation of exercise programs in special populations are addressed. Exercise is approached as a therapeutic and treatment modality for individuals and groups with a variety of anatomic, physiologic, cognitive and sensory alterations.

*Outcomes:*

1) Understand the advanced physiology of growth and development, aging, and the pathophysiology of health conditions, disease and disability in special populations; 2) Analyze the effects of exercise training and nutrition on the underlying etiology and pathophysiology of acute and chronic conditions; 3) Prescribe exercise activities to optimize health and performance in special populations; 4) Adapt exercise prescriptions based on the individualized needs of individuals with anatomic, physiologic, or sensory challenges; 5) Evaluate the effectiveness of adaptations to exercise prescriptions and programming in special populations

**EXCM 478 EKG Interpretation (3 Credit Hours)**

This course will help students master the practical competencies of electrocardiography (EKG), including performing a 12-lead EKG, ambulatory monitoring, and the concepts of monitoring and interpreting an EKG with and without exercise stress testing. Additionally, this course will present content related to the cardiac cycle, EKG abnormalities, ectopy, and dysrhythmias, and identifying ischemia. Students will perform hands-on 12-lead EKG analysis at rest and with exercise and the steps required for ambulatory monitor testing.

**EXCM 480 Advanced Exercise Assessment and Programming (3 Credit Hours)**

This course focuses on principles of periodization applied to a performance enhancement setting. Major dimensions of the course include cycles and periods, peaking for competition, and rest and recovery. Periodization models and theories are examined, with a special emphasis on contemporary research findings that are applied to enhance athletic training and physical performance. Assessment of training programs based on performance requirements are a major emphasis throughout the course.

*Outcomes:*

1) Apply periodization models in the optimization of athletic or physical training and performance; 2) Analyze the relationship between training volume and intensity over time; 3) Analyze principles of program design for performance enhancement; 4) Evaluate testing approaches to the assessment of strength and conditioning; 5) Generate exercise program modifications for individuals based on youth development, injuries, and inexperience; 6) Relate variables of overload, variation, and specificity to strength and conditioning training

**EXCM 482 Research Methods and Evidence in Exercise Science (3 Credit Hours)**

This course prepares the student to understand scholarly inquiry, evaluate research evidence, develop evidence-based practices/ protocols, and generate knowledge for evidence-based practice in exercise and fitness. Methods of operationalizing scholarly inquiry include: understanding relations among theory, research, and practice; formulating research questions; identifying and appraising existing literature; critically evaluating research methodologies used in the study of an issue or problem; and applying research findings to exercise science practice. Social, cultural, political and ethical issues related to research are addressed, including special considerations of research conducted in exercise settings.

*Outcomes:*

1) Understand scholarly inquiry processes in relation to evidence-based practice and knowledge generation in the field of Exercise Science; 2) Formulate research questions that address clinical, educational, administrative, or policy issues for evidence-based practice in Exercise Science; 3) Understand the elements of various quantitative research designs; 4) Assess the adequacy of selected quantitative and qualitative designs in answering research questions in Exercise Science; 5) Evaluate extant evidence and theories relevant to knowledge gaps in the field of exercise science; 6) Analyze ethical issues and concerns in research related to Exercise Science

**EXCM 485 Applied Biomechanics (4 Credit Hours)**

This course will provide an analytical approach to the study of the human nervous system and human motion as applied to kinematic and kinetic analysis, study of anatomy, physiology, and mechanics.

*Outcomes:*

Students will use and apply laboratory measurement techniques commonly used in exercise science

**EXCM 490 Special Topics in Exercise Science (1-3 Credit Hours)**

Contemporary research, literature, projections and views as applied to fitness, nutrition, health, and well-being. Much of the learning that occurs in this course will be the result of group discussion. The topic areas covered will include fitness, nutrition, health, aging, obesity, and injuries. However, topics covered will largely be determined by student interests. Pre-requisites: Restricted to Parkinson School of Health Sciences and Public Health students.

*Outcomes:*

1) Understand research findings and scholarly writings in a specific topical area of Exercise Science; 2) Evaluate scientific and theoretical literature in a specific topic area of Exercise Science; 3) Direct scholarly discussion in a topical area of exercise science, with a focus on the individual, family, and community

**EXCM 495 Advanced Exercise Science Internship (4 Credit Hours)**

This course is designed to provide 200 hours of practical experience working with diverse individuals and populations under the supervision and guidance of a preceptor. Settings may include those which provide cardiac and pulmonary care, physical rehabilitation or sports performance. Required seminars focus on program planning and evaluation, and human and fiscal resource management. 1 credit hour is 50 clock hours of internship.

*Outcomes:*

1) Apply specialized skills and knowledge acquired in exercise science core courses in a practicum setting; 2) Work collaboratively with the interprofessional team; 3) Participate in planning sessions, meetings, and other activities of the professional staff in the field setting; 4) Evaluate the effectiveness of the exercise science interventions on the individuals or populations served

**EXCM 499 Independent Study (1-4 Credit Hours)**

*Pre-requisites:* Restricted to Parkinson Exercise Science students

This is a directed study course in exercise science for approved students, supervised by a member of the faculty. Students must have an assigned professor, written objectives, planned outcomes, and timelines. Permission of the Program Director required.

*Outcomes:*

Students will be able to articulate a general understanding of the selected topic

## Food and Nutrition (FONU)

**FONU 400 Role Development in Dietetic Practice (1 Credit Hour)**

*Pre-requisites:* Admission to the dietetic internship

This course includes concepts and resources related to professional practice as a registered dietitian. Ethical issues, licensure, and scope of practice will be explored. Professional development will be discussed from entry-level to advanced practice. Fiscal aspects of professional practice, such as reimbursement and compensation, will also be considered.

*Outcomes:*

Students will define ethical issues, licensure requirements, increase professional development, and learn about fiscal aspects of the practice, such as reimbursement and compensation

**FONU 410 Nutrition Focused Physical Assessment (2 Credit Hours)**

This course focuses on physical and laboratory assessment skills necessary for the dietitian's practice, particularly in nutritional assessment and medical nutrition therapy. Emphasis is placed on skill development relevant to nutrition care of the individual, and/or for nutrition program delivery or evaluation. This course incorporates both classroom and lab activities. Master of Science in Dietetics major, or instructor permission

*Outcomes:*

Demonstrate competence in conducting a nutrition-focused physical assessment; Demonstrate skills for assessment and care of the patient receiving specialized nutrition support; Measure common physiologic parameters used in medical nutrition therapy

**FONU 420 Transition to Supervised Practice in the Dietetic Internship (1 Credit Hour)**

*Pre-requisites:* admission to LDI

This course begins skill development in preparation for the transition from the classroom environment to supervised practice in dietetics. Topics include ethical, legal, and safety issues for novice dietetic practice such as OSHA, HIPPA, IDPH, and standards of other regulatory agencies in health care. The nutrition care process including nutrition diagnostic language, planning and implementation of medical nutrition therapy (MNT) interventions are discussed. Basic familiarity and use of evidence-based practice protocols related to common conditions such as hypertension, diabetes, cardiovascular, renal, and/or gastrointestinal disorders, provision of specialized nutrition support and others. Medical terminology mastery is expected. Emphasis is placed on synthesis and application of undergraduate material, and effective clinical resource application.

**FONU 422 Medical Nutrition Therapy Theory (3 Credit Hours)**

*Pre-requisites:* FONU 420

This course includes the study of medical nutrition therapy (MNT) theory for dietetic practice including acute care, long term and outpatient environments. Complex medical conditions including trauma, burns, transplant, oncology, diabetes mellitus, sepsis, cardiovascular, gastrointestinal, neurological, and renal disorders. Alternate modalities of nutrition supported are included. The course includes theoretical foundations of patient care protocols, synthesis of research findings, and trends in health care related to practice protocols. This course should be taken in conjunction with FONU 423 for current Loyola dietetic interns.

**FONU 423 Supervised Practice (SP) in Medical Nutrition Therapy (2 Credit Hours)**

*Pre-requisites:* FONU 420 and admission to the Loyola Dietetic Internship This course requires the student to complete 480 hours of dietetic SP in health care environments that provide acute care and renal replacement therapy. Students work collaboratively with preceptors in hosting agencies. This accompanies FONU 422. Dates, hours and locations are arranged by the LDI faculty. Evaluation is based on practice performance, and assignments. Additional seminars are required as assigned by faculty.

**FONU 424 Public Health Nutrition and Research Theory for Dietetic Practice (3 Credit Hours)**

*Pre-requisites:* FONU 420 and admission to the Loyola Dietetic Internship

This course includes the study of nutritional epidemiology, general principles of public health, major public health nutrition programs, research for beginning dietetic practitioners and professional development issues. Nutritional surveillance, program evaluation, and methods are discussed through lecture and review of professional literature.



**FONU 425 Supervised Practice Public Hlth Nutrition, Rsrch, Prof Dvlpmnt & Marketing (2 Credit Hours)**

*Pre-requisites:* FONU 420 and admission to the Loyola Dietetic Internship  
This course includes 480 hours of dietetic SP in public health nutrition, research, marketing and an elective professional development area. Students work collaboratively with preceptors in hosting agencies. This accompanies FONU 424. Dates, hours and locations are arranged by the LDI faculty. Evaluation is based on practice performance, and assignments. Additional seminars are required as assigned by faculty.

**FONU 426 Food Management Theory: Geriatric Nutrition (1 Credit Hour)**

This course provides study of food management theory including food systems, operations, resource management (human, food, financial), quality improvement, safety and sanitation. Geriatric nutrition care and management theory is also revised from perspectives of medical care and facility management including regulatory agency standards.

**FONU 427 Supervised Practice: Food Management, Geriatric Nutrition (1 Credit Hour)**

This course requires the student to complete 240 hours of SP in food management and geriatric nutrition/long term care environments. Students work collaboratively with preceptors in hosting agencies. This accompanies FONU 426. Dates, hours and locations are arranged by the LDI faculty. Evaluation is based on practice performance, and assignments. Additional seminars are required as assigned by faculty.

**FONU 499 Independent Study (1-4 Credit Hours)**

*Pre-requisites:* Restricted to Parkinson Exercise Science students  
This is a directed study course in exercise science for approved students, supervised by a member of the faculty. Students must have an assigned professor, written objectives, planned outcomes and timelines. Permission of the Program Director.

*Outcomes:*

Students will be able to articulate a general understanding of the selected topic

**FONU 501 Writing and Communications in Nutrition and Dietetics (3 Credit Hours)**

This course focuses on scientific writing and communication skills essential to dietetic practice. Emphasis will be placed on clarify, consistency and translation of scientific evidence into effective messages for diverse populations. Standards for publication of practice and research based papers understanding and responding to peer review process will be discussed. Master of Science in Dietetics major, or instructor permission

*Outcomes:*

Create proposals, scientific reports and/or articles using writing skills of planning, drafting, revising and editing to incorporate appropriate evidence tailored to different audiences, publications and media formats

**FONU 503 Dietetic Theories & Research Methods (3 Credit Hours)**

This course analyzes theories of health and disease with implications for dietetic practice. Principles of research will be examined with a focus on methods to assess food, nutrients and related physical or biochemical parameters.

**FONU 505 Trends in Dietetic Practice (2 Credit Hours)**

*Pre-requisites:* admission to the MS in Dietetics, Dietetic Internship or FONU Program Director permission

This course includes emerging scientific research in the dietetics field as it relates to consumer food choices, evaluating the safety and health of the food supply, functional foods, vegetarian diets, food allergics and weight management. The course will focus on theoretical foundations, and synthesis of research trends into practice protocols. Mock counseling sessions will also occur utilizing up to date counseling methods including motivational interviewing for behavior change.

*Outcomes:*

Student will demonstrate knowledge in emerging areas related to dietetic practice

**FONU 507 Behavioral Change for Health Promotion (3 Credit Hours)**

This course focuses on concepts and theories of health and behavior related to food, nutrition and other behaviors. Evidence to support select skills and techniques for health will be evaluated and applied. The impact of interventions will be analyzed to provide evidence-based frameworks for behavioral change in individuals and groups. Master of Science in Dietetics major, or instructor permission.

*Outcomes:*

Incorporate evidence-based behavioral change interventions into nutrition care plans; demonstrate skill in a behavioral change encounter in a simulation, analyze major approaches and influences of health promotion (eg policy, community engagement, advocacy and social marketing)

## Health Informatics & Data Science (HIDS)

**HIDS 401 Foundations of Health Informatics (3 Credit Hours)**

This course offers students a broad overview of health informatics as a foundation for further study of the topic. Designed as a survey of informatics domains as well as primer of informatics methods, this course serves as an introduction for anyone interested to ask good informatics questions, employ informatics tools, or design informatics systems across a broad range of biomedical applications.

*Outcomes:*

Understand the differences between data, information, and knowledge, and analyze the processes to transform data into actionable knowledge in the context of health and biomedical domains; Understand the particular nature of data, information, and knowledge in health, analyze the importance and limitations of coding standards; Analyze and evaluate the role of health informatics and its societal impact; Analyze the current trends and current issues in health informatics

**HIDS 411 Clinical Data Science (3 Credit Hours)**

Clinical Data Science provides students with an introduction to a broad range of concepts and methods in data science, as they pertain to biomedical research. The focus of the class is on introducing key methods ranging from data collection and storage, to probabilistic methods, etc.

*Outcomes:*

Understand and describe the steps in the life cycle in biomedical and clinical research; Understand the key principles of data management; Apply, analyze, and evaluate data structures, standards, and quality of data in large biomedical databases and clinical research; Analyze and evaluate key data analytics concepts as they apply to biomedical research; Analyze ethical and legal issues when dealing with biomedical and clinical data

**HIDS 412 Translational Bioinformatics (3 Credit Hours)***Pre-requisites:* HIDS 411 Clinical Data Science

This course covers the fundamentals of bioinformatics and how they apply to translational and clinical problems. The purpose of this course is to give students a broad overview of the field of bioinformatics, and the tools commonly used, as well as the applications to practical biomedical issues, diseases, population health, drug discovery, etc. The students will also be exposed to a variety of open-source software for sequence alignment, SNPs discovery, and on how to access and analyze data from large biological databases, for translational and clinical research.

*Outcomes:*

Understand and apply a range of bioinformatics algorithms, and their computational efficiency; Apply and analyze informatics techniques to retrieve, store, and analyze 'omics' data; Apply and analyze open-source tools and open access databases to find and analyze data of translational and clinical importance; Analyze the current trends and problems in bioinformatics and how they relate to clinical issues, population and public health

**HIDS 421 Security and Privacy in Healthcare (3 Credit Hours)**

This course provides students with a broad exposure to concepts, policies, and methodologies in security and privacy, as they pertain to healthcare research and practice. Information security and data privacy are essential components of biomedical and clinical research, and therefore, it is critical for students to understand security guidelines.

*Outcomes:*

Understand the role of information security and data privacy in healthcare; Apply basic principles of computer security, such as confidentiality, integrity, and availability; Apply and analyze security principles in research data management; Analyze and evaluate the ethical and legal considerations associated with biomedical and clinical data; Understand and analyze the importance and role of the Institutional Review Board and its function with respect to protecting human subjects

**HIDS 422 Ontologies in Healthcare (3 Credit Hours)**

This course provides students with essential concepts of ontologies, building ontologies, and knowledge representation as they pertain to health care, and biomedical research. With the ubiquitous nature of computer systems, and information-based systems in health care (and everywhere!) there is a critical need to be able to represent information.

*Outcomes:*

Understand the role of ontologies in knowledge representation; Understand the differences between realist and anti-realist ontologies; Understand and describe the importance of propositional and predicate logic in knowledge representation and discovery; Understand basic principles of developing ontologies in health care; Build ontologies using computer ontology-building tools; Understand and describe how ontologies affect biomedical informatics systems and how we discover new knowledge

**HIDS 431 Introduction to Natural Language Processing in Health (3 Credit Hours)***Pre-requisites:* HIDS 401 Foundations of Health Informatics and HIDS 411 Clinical Data Science

The objective of this course is to present a broad overview of methodologies to analyze and mine biomedical text automatically. Students will be exposed to some of the common and state-of-the-art software, algorithms and techniques to extract content and knowledge from biomedical texts. A particular emphasis will be placed on how these methodologies are used in the context of health care, clinical records and narratives, and how extracted information can be used to improve care.

*Outcomes:*

Understand and apply artificial intelligence methodologies and software to automatically extract information from unstructured text; Assess and evaluate advantages and disadvantages of such methodologies; Understand and analyze how machine learning tools are used in a clinical context; Analyze how NLP techniques enrich structured data, improve accuracy of diagnosis, and their role in learning health systems

**HIDS 441 Human Centered AI for Healthcare (3 Credit Hours)**

This is a survey course of AI user-facing systems for healthcare, that demonstrates the practical use of seminal algorithms in machine learning and AI, as well as principles of interaction design and user center design. In addition, the course focuses on how these design principles and algorithms can be blended to generate impactful systems that help bridge health disparities.

*Outcomes:*

Analyze the factors that influence a successful human interaction with computer systems for healthcare; Compare and contrast the opportunities and limitations of AI infused technologies for healthcare applications; Develop evaluation and testing plans for eHealth applications/devices that use AI; Design applications/devices that satisfy a healthcare need using principles of AI and human factors

**HIDS 495 Independent Study (1-4 Credit Hours)**

This is a directed study course in health informatics for approved students, supervised by a member of the faculty. Students must have an assigned professor, written objectives, planned outcomes and timelines.

*Outcomes:*

Students will be able to articulate a general understanding of the selected topic

**HIDS 499 Health Informatics Capstone (1-3 Credit Hours)***Pre-requisites:* Students in the HIDS program must have completed 2 semesters of course work

Development of an informatics project, including research question, literature review, and assessment.

*Outcomes:*

Development of a scholarly paper and presentation

## Healthcare Administration (MHA)

### **MHA 405 U.S. Health Systems Management (3 Credit Hours)**

This course provides a foundation for understanding the contribution of formal US healthcare services to the nation's health. Content includes how the structure of healthcare in the US healthcare impacts operational management of provider systems focus on how care is organized, delivered, financed and regulated. Major challenges that impact healthcare cost, quality and access are examined with underpinnings of social justice and impact on communities served. Emphasis is placed on management of quality, patient safety and information technology as centerpieces of the modern health care environment.

#### *Outcomes:*

Distinguish roles, functions and responsibilities of healthcare system components; Analyze the interaction of social, political and economic forces shaping healthcare delivery and impact on cost, quality and access

### **MHA 415 Culture of Quality & Safety in Health Care (3 Credit Hours)**

Developing, managing healthcare safety and quality programs by demonstrating strategic importance of concepts inside healthcare organizations and clients. Discussion of safety science, high reliability organizations, trends in patient safety, healthcare quality, practices in different healthcare environments, development of organizational cultures, safety & quality, tools for monitoring performance improvement will be examined.

#### *Outcomes:*

Students will explain forces driving safety and quality in healthcare, evaluate strategies for improving safety/quality in healthcare, describe influence of systems on outcomes; Analyze role of various systems, factors in creating safe environments of care; Explain "just culture" thinking on safety, quality improvement; Develop plan for improvement of safety/quality

### **MHA 430 Managerial Epidemiology (3 Credit Hours)**

Introduces epidemiological principles, tools pertinent to population health management, delivery of healthcare services, fundamentals of epidemiologic inquiry, population health, community health needs assessment introduced. Methods to effective planning, monitoring, and evaluation of healthcare services. Emphasis given to practical applications, decision-making in healthcare administration, planning, management, financing, outcome evaluation, within healthcare organizations.

#### *Outcomes:*

Students will distill the central role of population health management in healthcare administration, epidemiology in evidence-based management, basic principles/methods of descriptive epidemiology to healthcare, administration functions

### **MHA 440 Healthcare Management and Ethics (3 Credit Hours)**

This course deepens insights into profession of healthcare administration, presents key principles, practices of management within healthcare organizations. Emphasis given to knowledge, skills necessary to effectively manage healthcare organizations. The interplay between management and the larger environment of internal/external stakeholders explored, ethical issues common to healthcare management examined. Provides foundation for developing effective management.

#### *Outcomes:*

Students will differentiate key principles of management, articulate the governance and management structure of healthcare organizations, synthesize core functions of healthcare manager; Identify/frame/evaluate healthcare management challenges, define strategies for addressing challenges

### **MHA 450 Research Literacy for Health Decision Makers (3 Credit Hours)**

This course explores the research process and the regulatory requirements in health sciences research. The fundamentals of research design, methodology, interpretation, and critical appraisal are introduced. The course requires critical thinking and analysis to determine the relevance of novel research. Emphasis is given to practical applications to decision-making in healthcare administration including planning, management, assessment, and outcome evaluation, within healthcare organizations. Students will present a critical analysis of multiple types of research studies. 2) Describe research governance, ethical doctrine and regulations impacting human participant protection. 3) Assess study design and describe appropriate measures and data collection techniques. 4) Discuss regulatory and policy factors that impact health-related research. 5) Critically evaluate health-related research, including analysis and conclusions. 6) Evaluate the relevance and implementation challenges of novel research. 7) Determine how ethical healthcare leaders impact innovation and research.

#### *Outcomes:*

1) Explain the scientific method as it relates to research

### **MHA 451 Healthcare Finance I (3 Credit Hours)**

This course provides a basic understanding of financial management principles with emphasis on the not-for-profit entity. Foundational accounting concepts are explored with a focus on risk, financial statements, capital investments, debt and equity financing.

#### *Outcomes:*

Students will be able to recognize the three main corporate financial statements and explain in lay terms the information contained therein

### **MHA 452 Healthcare Finance II (3 Credit Hours)**

*Pre-requisites:* MHA 451

Building on the foundational learning from Healthcare Finance I, this course focuses on for-profit entities within the health care sector and reimbursement methods. Financial concepts, discounted cash flow analysis, risk, financial performance evaluation, capital investments, capital budgeting, debt, equity financing will be explored. Description, assessments of reimbursement methodologies, strategies will be explored.

#### *Outcomes:*

Engage in long-term financial forecasting and planning; Differentiate various reimbursement strategies/ methodologies; Complete comprehensive financial forecast for a healthcare organization

**MHA 460 Strategy & Leadership in Healthcare Organizations (3 Credit Hours)**

This course examines competitive strategy, leadership in current healthcare environment. Content emphasizes formulation, execution & management, critical evaluation of organizational strategy. Key challenges faced by U.S. healthcare organizations and strategic responses are introduced. The relationship between strategic outcomes and leadership is explored emphasizing values-based leadership and individual qualities that define effective leaders. 2) Evaluate strategic options for a healthcare organization. 3) Formulate a strategy for a healthcare organization. 4) Manage the execution of a defined strategy. 5) Evaluate the performance of a strategic plan. 6) Compare theoretical concepts of leadership.

*Outcomes:*

1) Analyze the internal and external environment to which a strategy must respond

**MHA 468 Healthcare Data Analytics & Business Intelligence (3 Credit Hours)**

This course explores the use of data analytics, mining, visualization, tools to support data-driven decisions in healthcare organizations. Students develop a comprehensive view of data, use data to drive outcomes and efficiencies in healthcare. Commonly used methods/challenges in data analytics discussed. Multiple sources are explored including patient-generated data, electronic health records, administrative databases.

*Outcomes:*

Students will discuss the role of data analytics in health care organizations, demonstrate conceptual and practical knowledge, share structuring of health and healthcare data, retrieve data, perform descriptive analyses on healthcare datasets

**MHA 480 Topics in Post-Acute Care (3 Credit Hours)**

*Pre-requisites:* MHA 405, MHA 415, MHA 430, MHA 451, MHA 452, MHA 491, and MHA 492

This course acquaints students with services delivered following traditional acute-care episodes or stays, providing comprehensive overview of programs, policies, services specific to post-acute care providers, facilities. The operating environment is examined with emphasis on regulations, reimbursement, care delivery, alternative delivery systems. Timely issues, challenges, dilemmas confronting long term care management explored.

*Outcomes:*

Demonstrate understanding of the basic operations of the continuum of post-acute care services, including delivery systems, consumers, providers, competitors; Discuss legal, regulatory environment surrounding post-acute care; Delineate role of financing/reimbursement

**MHA 484 Capstone I-Healthcare Decision Support (3 Credit Hours)**

*Pre-requisites:* Instructor Permission required

The course focuses on understanding decision support systems and how they are used to inform leadership decision-making across healthcare organizations. 2) Evaluate strategic options for a healthcare organization. 3) Formulate a strategy for a healthcare organization. 4) Manage the execution of a defined strategy. 5) Evaluate the performance of a strategic plan. 6) Compare theoretical concepts of leadership.

*Outcomes:*

1) Analyze the internal and external environment to which a strategy must respond

**MHA 489 Human Resources and Professionalism (3 Credit Hours)**

Human Resources and Professionalism is designed to equip students with the knowledge and skills to effectively manage human resources in the dynamic healthcare industry. Students will explore the role of human resources in healthcare, understanding the success of any healthcare organization is heavily dependent on workforce planning, recruitment, selection and retention. This course introduces the technical and legal aspects of human resources management (HRM) from a strategic business perspective and examines how HRM best practices can be applied to health services organizations (HSOs). The course examines how to manage human resources effectively in the dynamic legal, social, and economic environment currently constraining health care organizations. 2) Develop talent management processes including; recruitment plans, selection, engagement, and retention, and performance appraisal of employees. 3) Identify laws and policies affecting and protecting healthcare workers. 4) Determine effective strategies for conflict identification and management. 5) Discuss ethical leadership, codes of conduct and professional responsibilities. 6) Develop a plan for continued professional development, network expansion, and service to the profession.

*Outcomes:*

1) Evaluate HR management practices

**MHA 490 Research and Innovation in Healthcare Administration (3 Credit Hours)**

This course explores the research process and the regulatory requirements in drug, device, and biological product development. The fundamentals of research design, methodology, interpretation, and critical appraisal are introduced. The course requires critical thinking and analysis to determine the relevance of novel research. Emphasis is given to practical applications to decision-making in healthcare administration including planning, management, assessment, and outcome evaluation, within healthcare organizations.

*Outcomes:*

1) Outline the research and drug, device, and biologic development processes; 2) Discuss regulatory and policy factors that impact health-related research; 3) Critically evaluate health-related research; 4) Evaluate academic and industry contributions to innovation; 5) Evaluate the relevance and implementation challenges of novel research; 6) Determine how ethical healthcare leaders impact innovation and research

**MHA 491 Systems Thinking for Healthcare Leaders (1 Credit Hour)**

This two-day immersion will serve as an introductory course for the MHA program. Students will explore the concepts of systems thinking and develop practical skills for its application in healthcare settings. Students will be provided with supplemental reading materials and participate in simulations and exercises to hone their skills in this critical leadership competency.

*Outcomes:*

Students will define systems thinking as a leadership model and Apply relevant components of systems thinking in real-world healthcare setting



**MHA 492 Policy in Health Systems (1 Credit Hour)**

This Immersion provides students with policy, economic, and governance framework for understanding healthcare delivery systems. Selected theoretical models will be used to analyze existing and proposed health policies from the perspective of relevant stakeholders. Critical appraisal of selected national and global programs including their underlying values, socio-political, and economic issues, is a focus. This critical appraisal, based on the political, economic, legal, social, and ethical forces which impact the health policy-making process will be examined against the backdrop of US healthcare delivery systems. Implications for research and practice aimed at improving health outcomes of a student's target population will be a focus of this course. 2) Define various governance models and their relationships to governing regulatory bodies. 3) Use selected theoretical models to critically analyze health policies and related issues from multiple stakeholder perspectives, including underrepresented populations.

*Outcomes:*

1) Describe the policy development and implementation processes in the United States

**MHA 493 Healthcare Performance Management (1 Credit Hour)**

This two-day immersion helps students build practical skills for ongoing performance management and monitoring of strategically aligned key performance indicators. Students will explore use of scorecards, dashboards as tool for ongoing outcomes monitoring, management within health systems. Students will be provided with supplemental reading, guest lecturers, participate in simulations, exercises.

*Outcomes:*

Students will build outcome monitoring scorecards and dashboards, effectively communicate outcomes and performance metrics

**MHA 494 Multi-disciplinary Teams in Healthcare (1 Credit Hour)**

Two-day immersion provides students with practical lessons, recognizing and optimizing the multi-disciplinary nature of healthcare workforces. Focus on building cross-functional teams, recognizing potential strengths/weaknesses of team members from different educational/practice backgrounds. Team building exercises, small group theories will be incorporated to demonstrate practical value of multi-disciplinary teams. Course includes supplemental reading materials, guest lecturers, simulations, exercises to hone skills in critical leadership competency.

*Outcomes:*

Students will identify opportunities, challenges facing healthcare workforce; will effectively build multi-disciplinary teams of health care workers from a variety of specialties and fields

**MHA 495 Capstone II (3-6 Credit Hours)**

*Pre-requisites:* MHA 484 \*Students without work experience or looking to gain more confidence and skill may take a 2nd capstone course, either concurrently or after the first capstone

This course provides students with the direction and support to complete an independent capstone project relative to an area of professional interest. Students develop a 1) workable problem statement; 2) a precise and targeted literature review on the topic of interest; and 3) propose an interventional capstone project to address the identified need/problem using the principles of Six Sigma DMAIC (Define, Measure, Analyze, Implement, and Control). Students identify a community-based partner organization and secure commitment from the organization and individual preceptor willing to facilitate the project. A written plan of execution is submitted in the form of the Capstone Project Plan. Upon faculty approval, students may begin the implementation of the project. The second capstone provides more experiential learning opportunities and allow for greater interaction with the partner organization and problem-solving methodology. 2) Demonstrate analytic, critical thinking, and problem-solving capabilities by proposing an administrative solution to a healthcare problem.

*Outcomes:*

1) Examine a relevant healthcare problem or knowledge gap by executing and synthesizing a professional research and literature review

**MHA 499 Independent Study in Healthcare Administration (1-3 Credit Hours)**

*Pre-requisites:* Course open to MHA students; Permission of the Program Director

This is a directed study course in healthcare administration for approved students, supervised by a member of the MHA faculty. Students must have assigned professor, written objectives, planned outcomes and timelines.

*Outcomes:*

Students will be able to articulate a general understanding of the selected topic

## Implementation Science (MIS)

**MIS 400 Implementation Science Theories (3 Credit Hours)**

The course will review the major theories used in implementation science.

*Outcomes:*

Students will be able to define, explain and determine in what situations the various theories of implementation science best apply

**MIS 402 Implementation Science Research Methods (3 Credit Hours)**

This course will review research methods used in conducting implementation science research.

*Outcomes:*

Students will be able to define, explain and apply various research methods to different study questions

**MIS 404 Qualitative Methods for Implementation Science Research (3 Credit Hours)**

This course will review various qualitative methods including interviews, focus groups and other strategies.

*Outcomes:*

Students will be able to create an interview guide and focus group script, and understand basics of coding qualitative data

**MIS 406 Community-Engaged Research (3 Credit Hours)**

This course will review various qualitative methods including interviews, focus groups and other strategies.

*Outcomes:*

Students will be able to create an interview guide and focus group script, and understand basics of coding qualitative data

**MIS 408 Dissemination Strategies (1 Credit Hour)**

This brief course will demonstrate how to present key findings in the most understandable and usable formats.

*Outcomes:*

Students will be able to prepare key findings and messages in understandable and usable formats

**MIS 410 Field Practicum in Implementation Science (6 Credit Hours)**

*Pre-requisites:* MIS 400, MIS 402, MIS 404, MIS 406, MIS 408

This practicum will provide students with hands on experience in developing and leading a pilot implementation project.

*Outcomes:*

Students will present their findings as a requirement for completion of their MS

## Master of Public Health (MPBH)

**MPBH 400 Determinants of Population Health (3 Credit Hours)**

This course will introduce students to the public health perspective population perspective. A major focus of the course is understanding the fundamentals of health disparities and how they are produced and reproduced, and how simple solutions to our most pressing public health problems are unlikely to succeed. Graduate standing in the MPH or Public Health Certificate Program, or permission of instructor.

**MPBH 401 Environmental Health (3 Credit Hours)**

This course is designed as an introduction to environmental public health issues, laws, regulations, research, and advocacy. Environmental factors including biological, physical and chemical factors that affect the health of a community will be presented. The environmental media (air, water and land) and various community exposure concerns will also be presented. The course will utilize available internet resources to access environmental data, and focus related research. A team project will be completed requiring literature review and presentation and critical assessment of a successful (or unsuccessful) environmental advocacy campaign.

*Course equivalencies:* X-ENVS301/PUBH301/MBPH401

**MPBH 402 Public Health Practice and Management (3 Credit Hours)**

This course will provide an introduction to public health practices and cover management basics as applied to the public health field. The topics covered in the course will be examined through the lenses of prevention, social justice and the role of governmental public health. In Part I of the course, we will study basic public health concepts, core public health functions and practices, public health infrastructure at the local, state and federal levels, and the major areas of public health services and interventions. In Part II, we will cover management principles and functions such as planning, organizing, controlling and leading. We will apply these concepts to the administration of public health organizations.

*Outcomes:*

Assess population needs, assets and capacities that affect communities' health; Apply awareness of cultural values and practices to the design or implementation of public health policies or programs; Design a population-based policy, program, project or intervention; Explain basic principles and tools of budget and resource management; Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making

**MPBH 403 Introduction to Epidemiology (3 Credit Hours)**

Epidemiology is the study of the distribution and determinants of disease in populations and remains the basic science of public health. This methodology is unique to epidemiology, and in some cases, has even been appropriated by other fields. The objective of this course is to familiarize students with the range of tools used to conduct epidemiologic analysis, including design and measures of association. This course will be taught as an online course combined with an intensive interactive session with faculty and students one weekend in Spring.  
*Course equivalencies:* X- PUBH 303/ENVS 303/MPBH 403

**MPBH 404 Biostatistics for Health and Biological Science (3 Credit Hours)**

Introductory course allows students to utilize SAS software to perform analytical methods including Graphical and Numerical Descriptive Statistics, Probability calculations and distributions with emphasis on the binomial(discrete) and normal (continuous) distributions, Inferential Statistics: Point Estimation, Interval Estimation and Hypothesis Testing, Nonparametric statistical methods and Sample Size Calculation.  
*Course equivalencies:* CRME420/BMSC402/MPBH404

**MPBH 407 Public Health Policy: Concepts and Practice (3 Credit Hours)**

*Pre-requisites:* Open for registration for MPH students; All other students require department approval  
No course description is available  
*Course equivalencies:* PUBH 307/MPBH 407

**MPBH 409 Biostatistics I (3 Credit Hours)**

*Pre-requisites:* Introductory course  
Introductory biostatistics course which allows students to utilize STATA software and perform/ operate analytic methods. Course provides outline of tests of statistical significance and probability theory. Students will conduct statistical hypothesis testing using methods presented in class.

**MPBH 410 MPH Practicum (1-3 Credit Hours)**

All MPH students are required to complete at least 1 credit of a practicum (internship) to gain a better understanding of a public health practice, directly utilize their own MPH training, and network with public health professionals in the field. Students need to provide a signed agreement and must be in the process of completing 21 credit hours, including at least four core courses.

**MPBH 411 MPH Capstone (1-3 Credit Hours)**

The goal of the Capstone project is to provide students the opportunity to demonstrate knowledge and skills acquired in the academic coursework and through practicum experience. The objective is to enable the student to work on a project which translates both general and discipline specific information into public health practice. Students should complete the core, program specific courses. We recommend to split credits over last two semesters and register 1 credit each semester.

*Outcomes:*

The Capstone will provide the students an opportunity to exhibit their proficiency in public health skills through a written report and oral presentation

**MPBH 412 Intro to Statistical Computing for Public Health (1-3 Credit Hours)**

*Pre-requisites:* This course is designed for students who have taken or are taking Introduction to Epidemiology (MPBH 403) and Biostatistics I (MPBH 404 or 409)

This course introduces students to statistical computing. The emphasis is on manipulating data sets and basic statistical procedures such as t-tests, chi-square tests, and correlations. The course currently focuses on the use of SAS and STATA software packages., data importation from various sources, cleaning, validation, subsetting, merging, and transforming datasets); Construct clear and concise documentation of newly created datasets; Use SAS data-step programming, macros, and built-in procedures for statistical analysis and visualization (i.e., PROC MEANS, FREQ, SGPLOT, and UNIVARIATE); Demonstrate the ability to use descriptive techniques to summarize public health data (i.e., t-tests, chi-square tests, and basic regression models); Describe the results of basic statistical analyses.

*Outcomes:*

Execute data management techniques to create public health analytical datasets (i.e

**MPBH 413 The Epidemiology of Obesity: An Energy Balance Perspective (3 Credit Hours)**

*Pre-requisites:* MPBH 403 or department consent

This course is a survey course designed to expose MPH and other interested inter-professional students, e.g., nursing and dietetic students, to the multiple domains of the worldwide obesity epidemic. The course will explore determinants, outcomes and public health policy associated with obesity from the perspective of energy balance, i.e., that ultimately all determinants and outcomes of obesity.

*Outcomes:*

Describe the concept of energy balance and how it is related to the development, treatment and prevention of overweight and obesity; Explain the scope and historical trends of obesity prevalence among children and adults in both the industrialized and developing worlds

**MPBH 414 Introduction to Global Health (3 Credit Hours)**

Introduction to Global Health is an introductory course to global health, both epidemiology and policy aspects, focusing on health disparities on the international level.

*Course equivalencies:* X-HSM210/PUBH314/ENVS385

**MPBH 415 Non-Communicable Disease Epidemiology (3 Credit Hours)**

*Pre-requisites:* MPBH 403 or consent of instructor

This course covers public health topics related to non-communicable diseases (NCDs). The course explores topics such as: burden of NCDs in populations; the conceptual frameworks for studying chronic disease causation and control; the epidemiology of cardiometabolic diseases as well as the epidemiologic transition in relation to risk factors for the major chronic diseases (e.g. nutrition, obesity, physical exercise, alcohol and tobacco use) as well as upstream factors impacting on diseases such as food policy and the built environment; integrated healthcare services and public health interventions; and, the study designs used to assess associations between exposures and NCDs.

*Outcomes:*

Apply frameworks to understand social and ecological determinants of non-communicable diseases, as well as the biological and behavioral risk factors across the life-course; Articulate the methodological issues in the study of non-communicable diseases including tools for surveillance, the limits of observational evidence, life-course epidemiology and genetic associations, assessment of risk and risk scores, burden of disease estimates; Explain the drivers of non-communicable disease epidemiology; Discuss interventions to prevent and control non-communicable diseases low-middle income countries

**MPBH 416 Health Services Research Methods (3 Credit Hours)**

This course introduces students to the scope of health services research by addressing issues central to understanding and applying modern research to public health and health policy. Formulate questions and develop studies using primary data collection approach that are timely and relevant to contemporary organization, financing, and delivery of U.S. public health.

*Outcomes:*

Determine health services research's scope

**MPBH 417 Global Maternal & Child Health (3 Credit Hours)**

*Pre-requisites:* MPBH 414 Introduction to Global Health and MPBH 403 Introduction to Epidemiology; This course will be required for the newly approved Global Health Equity track of the Master in Public Health Program

No course description is available

*Course equivalencies:* X-HSM210/PUBH314/ENVS385

**MPBH 420 Public Health Law: Theories and Cases (3 Credit Hours)**

This course explores how the law can be utilized to promote, or impede, proposed public health interventions at the local, state, federal level. Students review key theories of public health law that examine the role of the legislature, executive agencies, and the courts in crafting, executing, reviewing public health policy. This course is geared towards MPH students in Public Health Policy and Management track, and no prior training in law or legal analysis is assumed.

*Outcomes:*

Describe the inter-dependence of law and public health; Identify areas of law applicable to promoting public health; Articulate the legal, ethical and practical conflicts that arise in approaching public health through law

**MPBH 421 Biostatistics II (3 Credit Hours)**

*Pre-requisites:* MPBH 409 Biostatistics I Students will utilize text on Biostatistics for Public Health

Course will cover linear and logistic regression and ANOVA. Students will utilize STATA software for hypothesis testing.

*Outcomes:*

Students will conduct statistical hypothesis testing using methods presented in class

**MPBH 422 Population Health Planning & Management (3 Credit Hours)**

This course prepares students to confront—thoughtfully and systematically—resource allocation decisions by developing the knowledge, tools, and skills needed to plan, implement, and evaluate programs, interventions, and services that address public health problems, improve population health, and reduce inequities.

**MPBH 423 Intermediate Epidemiology (3 Credit Hours)**

*Pre-requisites:* MPBH 403 Introduction to Epidemiology and MPBH 412 Introduction to Statistical Computing for Public Health Research  
Intermediate Epidemiology focuses on analysis of observational data. Students should have completed Introduction to Epidemiology and Biostatistics I prior to enrolling in this course.

**MPBH 424 Health Economics and Healthcare Financing (3 Credit Hours)**

This course will examine selected topics in health economics with major implications for healthcare delivery, healthcare financing and clinical and public health research. Essential economic theories and methods for exploring each topic will be discussed along a review of existing empirical research.

*Outcomes:*

Describe the US health delivery and financing system; Apply essential economic theories/methods to study consumer behavior and healthcare demand, healthcare market and supply of services, and medical cost-effectiveness analysis

**MPBH 425 Policy Analysis (3 Credit Hours)**

This course will provide an introduction to the issues and methods of health policy analysis. Health policy analysis requires several distinct sets of skills: technical understanding of analytical tools, understanding the policy and managerial context within and outside of your organization, and the ability to produce and communicate practical advice. This is a track-specific requirement for MPH Graduates in the Health Policy track.

*Outcomes:*

Students will develop a good working understanding of the methods specific to these issues examined through this course and will also learn how to apply these to specific problems

**MPBH 426 Infectious Disease Epidemiology (3 Credit Hours)**

*Pre-requisites:* Introduction to Epidemiology (MPBH 403)

This course will introduce the basic methods for infectious disease epidemiology and review case studies of important disease syndromes and entities. Important terminology and definitions for infectious disease epidemiology will be reviewed, including nomenclature related to outbreak investigations, disease surveillance, laboratory diagnosis, molecular epidemiology, disease transmission and susceptibility.

**MPBH 427 Advanced Statistical Methods (1-3 Credit Hours)**

*Co-requisites:* MPBH 421 (or prior completion of a two-semester course sequence in Biostatistics) and one course in statistical computing such as MPBH 412

This course covers a broad overview of statistical models and estimation methods for outcome variables (normal and non-normal) that are clustered or measured repeatedly in time or space. The focus is on applications and computer software methods for correlated regression models, including ANOVA based methods, hierarchical linear models, etc.

*Outcomes:*

Apply generalized linear models to regress a set of explanatory variables against non-normally distributed outcomes, including binary outcomes (logistic regression), multinomial outcomes (ordinal and multinomial logistic regression), and count outcomes (Poisson and negative-binomial regression); Identify and employ appropriate methods for the analysis of repeated measures, including the use of generalized estimating equations (GEE models) and/or mixed-effects models for nested and hierarchical data; Analyze data using Parametric methods for time-to-event data; Conduct Bayesian estimation for unknown parameters; Employ multivariate methods to solve real-world problems and dimensionality reduction; Use statistical programming to apply learned statistical models and estimation methods; Explain the results of statistical analyses

**MPBH 430 Environmental Health Policy (3 Credit Hours)**

This course provides an introduction overview of the health consequences associated with climate change and the local, federal, and global response to mitigate these negative health outcomes. During the course students will be expected incorporate course content and develop a realistic response public health plan to climate change for a locality of their choosing. This course is offered both online and in-person.

*Outcomes:*

1) Outline fundamental public health concerns that have been associated with climate change; 2) Identify and critique future steps forward to reduce public health concerns of climate change

**MPBH 431 Grant Writing (3 Credit Hours)**

This course will provide an overview of the NIH extramural funding process, with additional information on funding opportunities outside NIH. Students will learn the key components of successful grants and factors that may lead to grants not being reviewed favorably. The focus will be on grant writing skills.

*Outcomes:*

Students will be required to write a 10-12 page R01-style grant proposal (application), as described in the NIH guidelines

**MPBH 432 Health Impact Assessment (3 Credit Hours)**

This course is an introduction to health impact assessment which is a decision-support tool that uses a combination of procedures, methods, and approaches to determine how a policy, project/program may affect the health of a community, and the distribution of those effects within the population of the community.

**MPBH 433 Clinical Trials (3 Credit Hours)**

Clinical Trials course is designed for students interested in the design, implementation and management of clinical trials and their ethical and clinical implications. Topics include trial design, randomization, recruitment and sample size, monitoring and analysis. Students should have completed Introduction to Epidemiology and Biostatistics I prior to enrolling in this course.



**MPBH 434 Systematic Review and Meta-Analysis (3 Credit Hours)**

Meta analysis course provides instruction on methods for synthesizing clinical research information and how to assess the strength of the evidence for policy development and clinic contexts. The course is designed to highlight rigorous systematic review methods while students complete a systematic review on a topic of their choice. Students should have completed Introduction to Epidemiology and Biostatistics I prior to enrolling in this course.

**MPBH 449 Biostatistics for Public Health Interventions (3 Credit Hours)**

This course targets the application of sophisticated statistical methodologies to enhance the efficacy and precision of public health interventions. At the heart of this course is a rigorous examination of strategies for reducing bias in observational studies through advanced techniques such as imputation for missing data and propensity scores. The curriculum is expanded to include psychometric analysis, providing essential tools for the evaluation of measurement instruments, and ecological analysis, which aids in the interpretation of population-level health outcomes. A significant addition to this course is the analysis of screening and diagnostic tests, focusing on studying measures of accuracy and agreement critical for evaluating the performance of these tests in public health. The course also explores the complexities of survey design, offering insights into managing and analyzing data from multifaceted study designs to ensure the reliability and validity of intervention assessments.

*Outcomes:*

Apply advanced statistical techniques including imputation for missing data, and propensity score analysis to reduce bias in observational studies; Evaluate the design of public health research studies and interventions for methodological soundness; Apply psychometric principles to evaluate the reliability and validity of measurement instruments used in public health research; Use ecological analysis to interpret population-level health outcomes, understanding the impact of environmental and social factors on public health

**MPBH 450 Biostatistics for Electronic Health Record (EHR) Data (3 Credit Hours)**

*Pre-requisites:* Students must have completed MPBH 449

This course delves into the analysis and interpretation of data from Electronic Health Records (EHRs), a cornerstone of clinical, epidemiologic, and translational research. Emphasizing a hands-on approach, it covers EHR system fundamentals, data extraction and cleaning, privacy standards, case identification, study design, and advanced statistical analysis. Students will learn to navigate EHR data structures, medical vocabularies, and relational databases, applying these skills to design research studies and create patient cohorts. The goal is to equip students with the ability to harness EHR data for innovative healthcare solutions., ICD, CPT, NDC, SNOMED, and LOINC codes) for accurate case identification; Develop skills in constructing patient cohorts and extracting relevant data; Identify controls and apply propensity score matching in observational research; Design robust matched case-control and retrospective cohort studies using EHR data; Recognize privacy and security standards, including HIPAA regulations; Apply advanced statistical methods to analyze EHR data and assess research findings critically.

*Outcomes:*

Explain relational database and data warehouse models pertinent to EHR data; Use medical vocabularies and ontologies (i.e

**MPBH 460 Public Health Data Visualization and Reporting (3 Credit Hours)**

*Pre-requisites:* Students must have completed MPBH 421 (Biostatistics II) or equivalent experience in biostatistical methods and public health principles

This course is designed to navigate the intersection of public health data, visual communication, and ethical representation, focusing on creating impactful visuals that cater to diverse audiences including patients, healthcare providers, policymakers, and the broader community. It emphasizes the ethical considerations in data visualization, tackling potential biases, and ensuring visuals are both informative and accessible. Through practical applications, students will learn to craft infographics, community health maps, dashboards, and effective manuscript tables, all while understanding the unique needs of different user groups. The course will explore advanced visualization techniques like heatmaps, interaction visuals, and temporal data displays, equipping students with the skills to present complex health data.

*Outcomes:*

Develop the ability to create impactful and ethically responsible visual representations of public health data tailored to diverse audiences, including patients, healthcare providers, policymakers, and the general public; Explore advanced data visualization techniques, including heatmaps, interactive visuals, and temporal data displays, to effectively present complex health information; Apply ethical considerations in data visualization, addressing potential biases and ensuring that visuals are accurate, accessible, and inclusive; Design visual communication strategies into public health research and reporting to enhance the impact and understanding of data-driven insights

**MPBH 495 Special Topics (1-3 Credit Hours)**

This course covers a specific topic in public health. Restricted to students in the Master of Public Health (MPH) program, or with permission of the instructor. Outcome: students will be able to articulate a general understanding of the selected topic.

**MPBH 499 Public Health in Action (3 Credit Hours)**

Public Health in Action prepares MPH students for the real world through practical hands-on learning that addresses the cross-disciplinary competencies in advocacy, leadership, budgeting, planning and implementing programs with limited resources, building a shared vision and mission, setting priorities and goals, contributing on inter-professional teams, advancing cultural diversity and inclusiveness in community health efforts, building partnerships, leading community initiatives, and communicating to media. It is intended students will take this course at the end of the MPH program. Enrollment Conditions: Graduate standing in the MPH Program and graduating in the current or following semester, or permission of instructor. Students should have completed at least 18 credit hours of coursework, including all other core courses. MD/MPH students may take this course in the spring of their first year in the program.

## Medical Laboratory Science (MLS)

### MLS 401 Laboratory Fundamentals (2 Credit Hours)

Introduction to life in the clinical laboratory. Safety practices, laboratory mathematics, statistical analysis, and fundamental laboratory training in phlebotomy, pipetting, microscopy and calibrations.

#### *Outcomes:*

Demonstrate and identify safe and professional knowledge consistent with the field of Medical Laboratory Science, including use of universal precautions and ability to decipher Safety Data Sheets; Accurately perform skills needed in medical laboratory science including phlebotomy, processing of specimens, pipetting, microscopy, and calibrations; Demonstrate competency in use of laboratory calculations; Understand the history and role Medical Laboratory Scientists play in health care

### MLS 410 Clinical Immunology (2 Credit Hours)

This course focuses on principles and procedures of immunology and serology. Emphasis will be on the role of the immune system in health and disease and developing an understanding of the role of both humoral and cellular immunity. Admission to M.S. in Medical Laboratory Science program. Upon completion, students will demonstrate understanding of the discipline of immunology and apply theoretical concepts to differentiate patient health and disease states.

### MLS 415 Urinalysis and Body Fluids (2 Credit Hours)

Theoretical and applied concepts related to the formation, collection, processing, and evaluation of urine and body fluids. Study of urine and body fluids including chemical, physical, and microscopic properties. This course also encompasses the evaluation of normal fluid characteristics, and those that reflect abnormality or disease. Restricted to students in the M.S. in Medical Laboratory Science program. Upon completion, students will be able to explain the formation of fluids in the human body and correlate normal and pathological states associated with chemical, physical and microscopic findings.

### MLS 420 Molecular Diagnostics (2 Credit Hours)

This course is will provide students with an understanding of the processes which have been collectively referred to as molecular biology as they relate to laboratory medicine. Instruction emphasizes molecular methodologies and current applications of molecular diagnostics utilized in the clinical laboratory. Upon completion of this course students will gain a background in molecular biology which will promote critical thinking and problem solving as it relates to clinical molecular diagnostics.

### MLS 430 Clinical Chemistry I (3 Credit Hours)

*Pre-requisites:* Admission to M.S. in Medical Laboratory Science program  
This course is designed for medical laboratory science students to gain an understanding of the analytical principles and components of instrumentation utilized in clinical chemistry laboratories.

#### *Outcomes:*

Upon completion of this course, students will describe chemical constituents of bodily fluids, their regulation and laboratory methods of analysis for compounds including electrolytes, carbohydrates, lipids and proteins

### MLS 440 Clinical Chemistry II (2 Credit Hours)

Advanced course in clinical chemistry/biochemistry which continues study of measurement and interpretation of chemical constituents in human blood and body fluids. Topics include endocrinology, organ systems, therapeutic drug monitoring, toxicology, tumor markers and nutritional chemistry. This course will prepare students for their clinical practicum in Clinical Chemistry. Enrollment Condition: Admission to the M.S. in Medical Laboratory Science program

#### *Outcomes:*

Upon completion, students will be able to identify interrelated human metabolic functions in normal and disease states, analyze laboratory data, interpret results, and utilize information to determine a diagnosis

### MLS 450 Hematology (4 Credit Hours)

Study of formed elements of blood including normal and abnormal conditions. Recognition and correlation of pathological changes in cells of the peripheral blood and bone marrow to disease states. This course will prepare students for a clinical practicum in Hematology. Admission to the M.S. in Medical Laboratory Science program required. Identification of morphological characteristics for normal and abnormal cellular elements of blood and associations to disease states.

#### *Outcomes:*

Students will describe the physiology, development of cells, and process of hematopoiesis

### MLS 455 Hemostasis (2 Credit Hours)

This course will cover the mechanisms by which blood coagulates. Topics explored include the pathophysiology of hemostatic disorders and the antithrombotic therapies utilized to manage them. Focus on examination of the coagulation system and correlations of laboratory results to clinical findings in the classification of disorders. Admission to the M.S. in Medical Laboratory Science program. Upon completion of this course students will apply knowledge of the process of coagulation to interpret laboratory results as they relate to hemostatic dysfunctions and treatment of clinical disease.

### MLS 460 Immunohematology (5 Credit Hours)

Focus on principles of the antigen/antibody reactions and their relevance to Immunohematology. ABO/Rh and major blood group systems, regulation, procedures, adverse reactions, and donation of blood components are all studied as integral parts to the practice of transfusion medicine. This course prepares students for a clinical practicum in Immunohematology. Enrollment Condition: Admission to the M.S. in Medical Laboratory Science program.

#### *Outcomes:*

Upon completion of this course students will be able to apply theoretical concepts and techniques to analyze and determine Immunohematology results

### MLS 465 Laboratory Leadership I (1 Credit Hour)

*Pre-requisites:* Admission to the M.S. in Medical Laboratory Science program

This first of three courses in the leadership series, prepares the student for an entry-level laboratory position by developing skills in basic laboratory management practices including principles of leadership, functions of a manager, and personnel management.

#### *Outcomes:*

Upon completion of this course students will be able to utilize leadership theories to evaluate and demonstrate effective management through evaluation of common clinical laboratory issues

**MLS 466 Laboratory Leadership II (1 Credit Hour)**

The second installment in the three course Leadership series prepares the student for a laboratory position by developing skills in basic laboratory management practices including financial considerations, laboratory regulations, and laboratory operations. Admission to the M.S. in Medical Laboratory Science program. Upon completion of this course students will exhibit knowledge of the financial requirements needed for effective laboratory management and the role of laboratorians in regulation and accreditation of laboratories.

**MLS 467 Laboratory Leadership III (1 Credit Hour)**

The final installment in the Leadership series of courses prepares the student for a laboratory position by developing skills in career planning, introduction to professional development, grant writing, and process improvement planning. Completion of MLS 466 Laboratory Leadership II and good academic standing as defined by the M.S. in Medical Laboratory Science handbook. Upon completion of this course students will exhibit skills needed for effective laboratory management including departmental improvement planning, professional development and performance feedback.

**MLS 470 Bacteriology and Virology (5 Credit Hours)**

*Pre-requisites:* Admission to the M.S. in Medical Laboratory Science program

Introduction to bacteria and viruses, with a focus on organisms that are medically relevant to humans. Specimen collection, processing, identification techniques, and recognition of key diagnostic features will be emphasized. Students will correlate clinical features to laboratory findings. This course will prepare students for their clinical practicum in Microbiology.

*Outcomes:*

Upon completion, students will be able to identify bacterial or viral organisms by characteristic clinical features of infections through laboratory testing

**MLS 475 Clinical Parasitology and Mycology (2 Credit Hours)**

Study of parasites and fungi that are medically relevant to humans. This course introduces students to the taxonomy and identification of morphologic and microscopic characteristics of parasites and fungi. Diagnosis of disease states based upon laboratory findings will be emphasized. Admission to the M.S. in Medical Laboratory Science program. Upon completion of this course, students will be able to identify the pathogenesis, symptomatology, laboratory diagnosis, and treatment for the parasites and fungi included in the course.

**MLS 481 Clinical Practice in Hematology (3 Credit Hours)**

*Pre-requisites:* Completion of MLS 410, MLS 415, MLS 450, MLS 466 and good academic standing as defined by the M.S. in Medical Laboratory Science Handbook

Clinical experience in Hematology under the guidance of qualified medical laboratory professionals. Students will apply knowledge and clinical skills gained in their first year courses. This course focuses on the acquisition of manual and automated laboratory skills, laboratory safety, understanding the principles of test procedures, instrumentation, and quality control.

*Outcomes:*

Upon completion of this course students will provide evidence of possessing the knowledge and skills necessary to perform Hematology testing in a medical laboratory

**MLS 482 Clinical Practice in Chemistry (3 Credit Hours)**

*Pre-requisites:* Completion of MLS 440, MLS 466, and good academic standing as defined by the M.S. in Medical Laboratory Science Handbook

Clinical experience in Chemistry under the guidance of qualified medical laboratory professionals. Students will apply knowledge and clinical skills gained in their first year courses. This course focuses on the acquisition of manual and automated laboratory skills, laboratory safety, understanding the principles of test procedures, instrumentation, and quality control.

*Outcomes:*

Upon completion of this course students will provide evidence of possessing the knowledge and skills necessary to perform Chemistry testing in a medical laboratory

**MLS 483 Clinical Practice in Immunohematology (3 Credit Hours)**

Clinical experience in Immunohematology under the guidance of qualified medical laboratory professionals. Students will apply knowledge and clinical skills gained in their first year courses. This course focuses on the acquisition of manual and automated laboratory skills, laboratory safety, understanding the principles of test procedures, instrumentation, and quality control. Completion of MLS 455, MLS 460, MLS 466, and good academic standing as defined by the M.S. in Medical Laboratory Science Handbook. Upon completion of this course students will provide evidence of possessing the knowledge and skills necessary to perform Immunohematology testing in a medical laboratory.

**MLS 484 Clinical Practice in Hemostasis and Body Fluids (1-2 Credit Hours)**

*Pre-requisites:* MLS 415, MLS 455, MLS 466, and good academic standing as defined by the M.S. in Medical Laboratory Science Handbook

Clinical experience in Hemostasis, Urinalysis, and other Body Fluid analyses under the guidance of qualified medical laboratory professionals. Application of knowledge and clinical skills gained from first year courses. Focus on acquisition of manual and automated laboratory skills, laboratory safety, principles of test procedures, instrumentation, and quality control.

*Outcomes:*

Upon completion of this course students will demonstrate evidence of possessing the knowledge and skills necessary to perform Hemostasis, Urinalysis, and Body Fluid analyses testing in a medical laboratory

**MLS 485 Clinical Practice in Microbiology (3 Credit Hours)**

*Pre-requisites:* Completion of MLS 470, MLS 475, and good academic standing as defined in the M.S. in Medical Laboratory handbook

Clinical experience in Microbiology under the guidance of qualified medical laboratory professionals. Students will apply knowledge and clinical skills gained in their first-year courses. This course focuses on the acquisition of manual and automated laboratory skills, laboratory safety, understanding the principles of test procedures, instrumentation, and quality control.

*Outcomes:*

Upon completion of this course students will provide evidence of possessing the knowledge and skills necessary to perform Microbiologic testing in a medical laboratory

**MLS 486 Clinical Practice - MLS Special Topics (1-2 Credit Hours)**

Clinical experience in specialty areas of laboratory medicine under the guidance of qualified medical laboratory professionals. Students will actively engage in applying the medical knowledge and clinical skills gained in the didactic and student training laboratory courses in Molecular Diagnostics, Flow Cytometry, HLA testing, and laboratory administration. Completion of MLS 420, MLS 466, and good academic standing as defined in the M.S. in Medical Laboratory Science handbook. Upon completion of this course students will provide evidence of possessing the knowledge and skills needed to enter into specialty areas of a medical laboratory.

**MLS 490 MLS Educational Practice and Review (2 Credit Hours)**

*Pre-requisites:* Completion of MLS 466 and good academic standing as defined by the M.S. in Medical Laboratory Science handbook

This course will prepare students for taking a Medical Laboratory Science certification exam. Students will gain basic educational and pedagogical approaches needed to train others in the field of Medical Laboratory Science. Application of theories demonstrated through presentation of review lectures and assisting in kinesthetic instruction for laboratory sessions.

*Outcomes:*

Upon completion of this course students will be able to utilize effective teaching strategies to plan and present a lecture unit, including writing objectives and assessment strategies

**MLS 495 Medical Laboratory Science Capstone (1-2 Credit Hours)**

*Pre-requisites:* Completion of MLS 466 and good academic standing as defined by the M.S. in Medical Laboratory Science handbook

The MLS Capstone exposes students to leadership and ancillary niche aspects beyond those of a standard Medical Laboratory Science curriculum. Students will create a Capstone project to reflect on their unique experience in the field and demonstrate the capacity to utilize knowledge and make evidence-based decisions regarding laboratory medicine.

*Outcomes:*

This course will provide students the opportunity to demonstrate knowledge and skills acquired in the academic coursework, professional practice, and their Capstone Experience