2024-25

MEDICAL PHYSIOLOGY

Degree Offered: Master of Medical Physiology

Program Description

The Master's in Medical Physiology Program at MCW is a one-year special Master's program designed to help college graduates strengthen their academic credentials for medical school. Our program includes the first-year medical student curriculum at MCW, courses and exams, providing students with experience comparable to MCW medical students. Our program also offers an MCAT course in collaboration with Wisconsin Lutheran College. We maintain a small cohort size to ensure each student receives the personalized academic advising and career development they need to succeed. Graduates of this program have a solid foundation for medical school, graduate school, and jobs in academia, industry, or government positions, as supported by our strong placement data.

Admission Requirements

In addition to the general Graduate School admission requirements, this program has additional specific requirements.

This program recommends applicants submit MCAT scores with their applications. MCAT scores are preferred, but other health professional school test scores (e.g., GRE, DAT, or PA-CAT) can be used if MCAT scores are not available.

Credits Required to Graduate

32.5 credits

Required Courses

MMPY 41100 Foundations of Medicine. *6 credits.*

The goal of the Foundations of Medicine Block is to establish a strong, broad foundation of basic scientific knowledge to prepare Phase 1 learners for future systems-based units. This block integrates concepts of biochemistry, cell biology, genetics, physiology, anatomy, microbiology, pharmacology, and biostatistics to form a wide base of knowledge related to cell and tissue biology, organ systems, patients and communities, which are applied to solve clinical problems in the context of patient-based scenarios. Learning experiences are reinforced with small group discussions, interpretation of molecular diagnostic tests, and laboratory activities.

MMPY 41110 Hematology/Immunology. *5 credits.*

The Hematology/Immunology block is designed to teach medical students the biochemical, genetic, and physiological etiology of hematological and immunological pathologies and physiological responses to infection. This course will be anchored in hematopoiesis and concern the biology of hematopoietic stem cell progeny. This will include the physiology and pathophysiology of red blood cells, white blood cells and platelets, and related pathologies including: immune system disorders, autoimmunity, leukemia and lymphoma, and clotting

disorders. This course will be divided into three sections: (i) immunology, (ii) leukemia and

lymphoma, and (iii) hematology. Basic science content will be provided in parallel to small group case-based learning sessions and histopathology laboratories, which will be designed to emphasize and expand upon the pathophysiology.

MMPY 41120 Musculoskeletal/Skin. *4 credits.*
MSS will introduce students to the foundational science of muscle, bone and skin anatomy through didactics which will include online pre-work, in class lectures, case-based discussion and lab sessions. Integrated case studies will examine the development, structure and function of skin, skeletal muscle, cartilage, ligament and bone anatomy through examination of pathology, radiology, immunology, cell biology, pharmacology, anatomy, physiology, and developmental biology. Additionally, students will learn about neoplasms, injuries, infections, and degenerative disorders commonly seen for each system. At the conclusion of the unit, students will recognize common skin and musculoskeletal disease states and communicate effectively using accepted anatomical terminology. This course involves pre-work in the form of webcasts, narrated PowerPoints, reading assignments and quizzes via Brightspace. Following weekly case discussions, there will be a summative session to ensure students understand the main takeaways from the discussion. Additional opportunities to reinforce major concepts may be available through online quizzes and post-work assignments.

MMPY 41130 Gastroenterology and Nutrition. *5 credits.*
The Gastrointestinal and Nutrition block is a four-week course that describes and defines the normal structural components of the digestive system and reviews the physiologic processes of the cells and tissues of those organs. That foundational knowledge of gastrointestinal system functions will be expanded upon to describe the genetic, nutritional, and immunological mechanisms that underlie human gastrointestinal diseases. This course integrates foundational cell and molecular biology, immunology, pharmacology, pathology, anatomy, and physiology concepts to provide learners with an understanding of gastrointestinal system tissue functions. Knowledge of these concepts will also aid learners in recognizing and identifying the presentation and abnormal physiology of gastrointestinal components during various disease states. Learning activities in the gastrointestinal unit include synchronous and asynchronous didactic sessions, gross anatomy, histology, and pathology laboratory sessions, and small group case-based discussions focused on various gastrointestinal pathologies and disease states.

MMPY 41150 Medical Humanities I: Foundation of Character Development. *0.5 credits.*
The goal of this course is to provide the knowledge, skills and expertise necessary to promote Master's in Medical Physiology (MMP) student personal and professional identities formed by character and caring and the autonomous practice of human flourishing. This course is largely consistent with the first 5 weeks of The Good Doctor course in the MCWfusion curriculum (INTE 12103), but with some content and assessments adapted for MMP students. This course includes competencies pertaining to character and professional development, ethics, wellbeing, health equity, communication, and interprofessional practice. This course is predominantly for content requiring a degree of psychological safety. This course will be operationalized both through learning communities as well as through large group and small group lecture and asynchronous learning activities. MMP students will be assessed through participation, reflective writing, and individualized learning plans.

MMPY 41151 Medical Humanities II: Ethics, Communication, Leadership, & Wellbeing. *2 credits.*
The goal of this course is to provide the knowledge, skills and expertise necessary to promote Master's in Medical Physiology (MMP) student personal and professional identities formed by character and caring and the autonomous practice of human flourishing. This course is largely

consistent with the second 18 weeks of The Good Doctor course in the MCWfusion curriculum (INTE 12103), but with some content and assessments adapted for MMP students. This course includes competencies pertaining to character and professional development, ethics, wellbeing, health equity, communication, and interprofessional practice. This course is predominantly for content requiring a degree of psychological safety. This course will be operationalized both through learning communities as well as through large group and small group lecture and asynchronous learning activities. MMP students will be assessed through participation, reflective writing, and individualized learning plans.

MMPY 41200 Graduate Human Anatomy. *4 credits.*
The Graduate Human Anatomy course teaches students the structural aspects of the human body and their clinical correlates. Students explore the macroscopic anatomy and three-dimensional relationships of organs, organ-systems, regions of the body, cross-sections, and spaces. Learning experiences are reinforced with cadaveric dissection and a variety of clinical imaging techniques, including plain films (X-rays), CT and MRI scans. Aside from medical knowledge, the course nurtures teamwork, interpersonal and communication skills, and professionalism. The course continues the anatomy component of the Phase 1 MCWfusion curriculum, specifically the Cardiovascular, Respiratory, Renal, and Endocrine/Reproductive Blocks. The course comprises webcast lectures and body donor dissections and is graded on letter scale.

MMPY 41280 Career Development Training. *2 credits.*
The goal of the MMP Career Development Training course is to increase your skills and readiness for medical school and graduate school applications. To achieve this goal, you will be working with your peers, current medical and graduate students, and diverse range of faculty to write an application cycle calendar, personal statement, and CV/resume, and to execute individual and group mock interviews. Importantly, this course has been designed specifically for MMP students, and does not overlap with other graduate or medical school courses at MCW. Ultimately, MMP Career Development Training will provide timely and important preparation for applying to medical or graduate school, and for your continuing education and careers in science and medicine.

PHYS 08275 Special Problems in Physiology. *1 credit.*
Readings and/or research under direction of a faculty member in a specialized field of physiology. Under specific circumstances, may be substituted for formal courses.

BIOE 10222 Ethics and Integrity in Science Course. *1 credit.*
This course provides the basis for understanding the ethical issues related to basic scientific and medical research, including animal and human subject research, fraud, and misconduct, and governmental, institutional, and researcher responsibilities. Bioethics 10222 is offered during the spring and summer terms only.

INBS 16265 Organ Systems Physiology. *2 credits.*
Introduction to Organ Systems Physiology is a first-year elective course that focuses on the classic topics in physiology – the science of regulation and control systems – including the Physiology of Cells, Muscle, Cardiovascular, Pulmonary, Renal, GI, Endocrine, and Reproduction. It will also introduce the students to animal models in physiological research appropriate for the topic at hand.

PHYS 08295 Reading and Research. *1-9 credits (elective)*.
The course of study for Reading and Research is designed by each student with his/her advisor to focus on readings in literature in the student's field, to build bibliographic resources for the dissertation, and to conduct supervised, independent research.

INBS 16271 Fundamentals in Neuroscience. *3.5 credits (elective)*.
Fundamentals of Neuroscience follows a multidisciplinary approach to current knowledge about the structural and functional properties of the nervous system. The mechanisms of the nervous system are described at the molecular, cellular, systems and complex brain function levels. The course includes in-class lectures, seminars from prominent scientists (video archives), and written assignments. The purpose of this course is to introduce 1st year graduate students to the structure and function of the human nervous system.

INBS 16278 Functional Genomics. *3 credits (elective)*.
This course will use a variety of didactic lecture, paper discussions, and hands on bioinformatics learning to provide students with fundamentals in genomics, transcriptomics, proteomics, genetic manipulation, epigenetics, protein modeling and molecular simulation. Theory, practical applications, and analysis methods will be taught.