PHYSIOLOGY (PIOL)

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PIOL 301 Functions of the Human Body (5 Credit Hours)
This course explores major organ systems in an integrative fashion covering all aspects from physiology to metabolic biochemistry. Emphasis is placed on understanding key concepts of normal physiological and biochemical systems in healthy humans.

PIOL 401 Physiology (4 Credit Hours)
This course integrates the contents of two sections of the medical school (M1) course Function of the Human Body course (PIO L301); with additional meetings to present discuss papers at graduate level (2 paper presentations per graduate student). In the Fall semester, students will review cell physiology and autonomic neuroscience, and will learn cardiovascular and renal physiology in depth. The course topics will include introductory cell & neurophysiology, skeletal and smooth muscle, cardiac electrophysiology, EKG, cardiac muscle mechanics, circulation, special circulations, and renal physiology. In the Spring semester, students will learn pulmonary, acid-base balance, gastrointestinal, endocrine, and reproductive physiology. Instructor Consent Required.
Outcomes:
Students familiar with introductory physiology are expected to learn and understand cardiovascular, reproductive and endocrine systems in an integrative fashion in this course; Emphasis will be placed on understanding key concepts of normal physiological and biochemical systems in healthy humans; Selected aspects of pathophysiological processes will be discussed to illustrate how an understanding of normal function can be applied to clinical medicine

PIOL 410 Intro to Research (1-3 Credit Hours)
This course provides an introduction to a wide variety of commonly used techniques in cell and molecular physiology research, with concomitant laboratory rotations to learn those techniques.

PIOL 412 Research (1-6 Credit Hours)
Independent research for thesis or dissertation under the supervision of a faculty research advisor. Credit varies based upon assigned effort and time spent in the laboratory. Students receive a letter grade from their research advisor.

PIOL 414 Graduate Colloquy (1-8 Credit Hours)
Special advanced topics course with variable credit. Paper discussion and instructor-led presentations.

PIOL 416 Research Seminar (1 Credit Hour)
Seminar presentation on PhD candidate's dissertation topics advance.

PIOL 417 Cellular Physiology (3 Credit Hours)
Pre-requisites: Restricted to Master of Physiology Program students
The major goal of the Cellular Physiology course is to define the molecular and cellular basis of systems Physiology and Pathophysiology. The course consists in distinct sessions of teaching, problem solving, and reviews.
Outcomes:
- Understand the relationships among molecular, cellular and systems physiology; - Understand membrane structure and function; - Understand distinct metabolic and signaling pathways

PIOL 418 Teaching of Physiology (0 Credit Hours)
Teaching training and practice opportunities for upper level PhD candidates.

PIOL 420 Methods/Technical in Physiological Research (2 Credit Hours)
This course is intended for students seeking advanced knowledge of cutting-edge experimental approaches currently used in cardiovascular, metabolic, and neuroscience research. These topics will be discussed in both a technical/methodological sense, and in the context of the current scientific literature.

PIOL 421 Function of the Human Body I (4 Credit Hours)
This course will present the basic concepts and principles of human physiology. The course topics will include: introductory cell & neurophysiology, skeletal and smooth muscle, cardiac electrophysiology, EKG, cardiac muscle mechanics, circulation, special circulations and pulmonary physiology. The format will be lectures, simulations, small group problem sessions and scheduled reviews. Small group problem sessions will be held after each subject area and will focus on clinical application and integration of conceptual information presented in lectures. Small group sessions and reviews also will provide the student with the opportunity to obtain clarification from instructors of any outstanding questions and are designed to encourage active learning, as well as develop critical thinking and problem solving skills. Students will be evaluated by multiple choice and essay exams given after each of the 5 major topic areas. Course material will be geared toward non-thesis Masters students. Given that physiology is the basis of medicine, this course will prepare students with the basic science knowledge to successfully continue their professional development in future biomedical programs.
Outcomes:
Students will be able to describe the cellular mechanisms responsible for cardiac, skeletal and smooth muscle contraction and the factors that regulate their activity

PIOL 422 Function of the Human Body II (4 Credit Hours)
Enrollment limited to Masters of Science in Physiology students. This course presents the basic concepts and principles of human physiology. The course will be presented over one semester and the topics include: renal, acid-base balance, gastrointestinal, endocrine, and reproductive physiology. The format will be lectures, small group problem sessions and scheduled reviews.
Outcomes:
Students will be able to explain the cellular mechanisms responsible for normal renal, acid-base, endocrine, gastrointestinal and reproductive physiology

PIOL 423 Biochemical Physiology (3 Credit Hours)
Biochemical Physiology will give students knowledge of foundational processes that dictate cellular physiologic processes. Topics include the structure and properties of nucleic acids, amino acids, protein structure and folding, enzyme kinetics, metabolic pathways and intracellular signal transduction. The course will present the biochemical physiology.
Outcomes:
Student completing this course should: - Understand the biochemical mechanisms which underlie physiological processes; - Understand protein structure dynamics and how these structures are dictated by second

PIOL 425 Physiology of Aging (3 Credit Hours)
Pre-requisites: BMSC 410, BMSC 412, BMSC 416
The focus of this special topics course is on the unique physiological changes that occur with aging. Didactic instruction will be supplemented with readings from current primary literature in the field. Students will be responsible for reading and presenting articles for group discussion.
Outcomes:
1) Acquire advanced knowledge of aging processes; 2) Identify key gaps in knowledge in the aging field; 3) Engage in transformational/critical discussion of seminal papers in the aging field

PIOL 426 Biophysical Research Methods (3 Credit Hours)
Pre-requisites: IPBS Core curriculum The focus of this special topics course is to introduce students to the field of biophysics, with special focus on practical applications of biophysical methods in research Didactic instruction will be supplemented with readings from current primary literature in the field. Students will be responsible for reading and presenting articles for group discussion.
Outcomes:
Demonstrate a general understanding of the field of biophysics; Demonstrate deep knowledge and understanding of fundamental aspects cell mechanics, muscle mechanics, and integrated biomechanics; Demonstrate knowledge of current biophysical methods used in research; Demonstrate knowledge of fluorescence spectroscopy; Demonstrate knowledge of microscopy; Demonstrate understanding of computational biology approaches; Critically evaluate biophysical data from the literature; Interpret biophysical data for a general audience and effectively communicate biophysical information in both oral and written forms; Incorporate high standards of ethics into data interpretation and presentation

PIOL 430 Basic Human Anatomy (2 Credit Hours)
Enrollment limited to Masters of Science in Physiology students. This course will provide students with the basic concepts and facts of human gross anatomy as they related to physiology and function. Specific sections include the musculo-skeletal components of the extremities, trunk and head, the peripheral nervous system to include both the somatic and autonomic systems, the cardiovascular system, respiratory system, digestive system, urinary system and reproductive system. Each system will integrate embryology, radiology and basic clinical applications.
Outcomes:
Students will be able to describe and integrate basic human anatomy of the major organ systems to physiology and clinical medicine

PIOL 446 Cardiovascular Journal Club (1 Credit Hour)
Presentation and discussion of original research papers with focus on cardiovascular physiology topics.

PIOL 450 Fundamentals Of Neurophysiology (4 Credit Hours)
This course imparts the basic concepts and fundamentals of Neurophysiology, with emphasis on concepts relevant to human neuroscience. Students will learn Neurophysiology fundamentals at the cellular, structural and physiological levels of various complex systems in the brain, with specific discussion of clinical correlates of Pathophysiological conditions.
Outcomes:
Students successfully completing this course will be able to understand and explain neurophysiological mechanisms relevant to normal and abnormal conditions

PIOL 461 Introduction to Human Pathophysiology (5 Credit Hours)
Restricted to students in the Masters of Science in Physiology program. This course presents the basic concepts and principles of human pathophysiology. The course will be presented over one semester and the topics include: clinical evaluation of cardiac structure and function followed by a review of the major disorders of cardiovascular function.
Outcomes:
Students will be able to critically evaluate basic pathophysiological mechanisms underlying the most common forms of adult human cardiovascular disease

PIOL 468 Neurophysiology Journal Club (1 Credit Hour)
Presentation and discussion of original research papers with focus on neurophysiology topics.

PIOL 470 Excitability & Ion Transport (1-4 Credit Hours)
The course focuses on basic concepts of the physical movement of ions during activation of voltage- and ligand- gated ion channels.

PIOL 472 Structure/Function Membrane Proteins (3 Credit Hours)
The course explores basic and advanced concepts of membrane proteins structure, cell biology and function.

PIOL 500 Professional Development I (3 Credit Hours)
Must be enrolled in the MSP program. Professional Development will meet once/month throughout the one-year MSP program. Students will receive information about the options available for a career in the health sciences and will enhance their professional portfolio by participating in a variety of workshops designed to better equip them for a health science career.
Outcomes:
Students will be able to understand the curriculum and admission requirements of the various professional health programs and gain an understanding of the interview process

PIOL 501 Professional Development II (1 Credit Hour)
Pre-requisites: PIOL 500
Professional Development will meet and have self-directed study time throughout the spring semester of the MSMP program. Students will receive bi-weekly, specific individualized one-on-one mentoring from their academic advisors and also meet with the course director for specific lectures on their AMCAS and AACOMAS applications for medical and DO schools. Students will continue to enhance their knowledge of the admissions process by having general lectures and individual sessions discussing their motivation, enhancing their self-awareness, writing their personal statements, their selection of appropriate medical schools, selection of activities (community and medical volunteering, health care exposure (shadowing, scribing, etc.), research for their application, overall discussions on writing their secondary statements, choice of letters of recommendation, etc. MSMP students only.
Outcomes:
Following successful completion of this course, the MSMP student will: 1) Demonstrate enhanced ability for self-awareness and analysis regarding their medical school application; 2) Demonstrate self-reflection in the selection of target medical schools, discussing their fit in terms of each medical school's mission statement; 3) Continue working with their academic advisor to prepare a well-written personal statement appropriately tailored to the professional program of choice; 4) Demonstrate understating of the application process and preparation of application forms

PIOL 595 Thesis Supervision (0 Credit Hours)
Supervised research and writing leading to the completion of the masters of science thesis and degree.

PIOL 600 Dissertation Supervision (0 Credit Hours)
Supervised research and writing leading to the completion of the Ph.D. dissertation and degree.
Course equivalencies: BMSC600/MIIM600/PIOL600

PIOL 605 Physiology Study (0 Credit Hours)
Must be enrolled during fall semester of MS program in Physiology. Holding course to keep the student active in the program while completing MS degree requirements.