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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>PGY 206</td>
<td>ELEMENTARY PHYSIOLOGY. (3)</td>
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<td>An introductory survey course in basic human physiology. Prereq: One semester of college biology.</td>
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<td>PGY 207</td>
<td>CASE STUDIES IN PHYSIOLOGY. (1)</td>
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<td>Group discussions of clinical cases and clinical applications relevant to human physiology. Prereq: PGY 206 or its equivalent. May be taken concurrently.</td>
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<td>PGY 412G</td>
<td>PRINCIPLES OF HUMAN PHYSIOLOGY LECTURES. (4)</td>
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<td>Intermediate level human physiology course emphasizing applied concepts. Prereq: One year biology or PGY 206.</td>
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<td>PGY 502</td>
<td>PRINCIPLES OF SYSTEMS, CELLULAR AND MOLECULAR PHYSIOLOGY. (5)</td>
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<td>Advanced survey of major mammalian physiological systems at the systems, cellular and molecular level; lectures, assigned reading, advanced texts or monographs, demonstrations and problem oriented study questions. Prereq: One year each, physics, general chemistry; PGY 206 or its equivalent. (Same as BIO 502.)</td>
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<td>PGY 504</td>
<td>INDEPENDENT WORK IN PHYSIOLOGY. (2-4)</td>
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<td>A study of some advanced problems in physiology under the direct supervision of the instructor. Discussion period, one hour; laboratory, four hours. May be repeated to a maximum of eight credits. Prereq: Consent of instructor.</td>
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<td>PGY 535</td>
<td>COMPARATIVE NEUROBIOLOGY AND BEHAVIOR. (3)</td>
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<td>The course consists of an introduction to neurophysiology and study of the neural basis of sensory processing and motor patterns. A comparative analysis of the neurobiological basis of behavioral responses will be made, utilizing a broad range of vertebrates and invertebrates. Prereq: BIO 350 or consent of instructor. (Same as BIO 535.)</td>
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<td>PGY 560</td>
<td>PATHOPHYSIOLOGY: INTEGRATIVE STUDY IN PHYSIOLOGY AND MEDICINE. (1)</td>
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<td>This course aims at the development of an integrative conception of the human organism, and involves the study of medical case histories. The complex network of physiologic interactions which underlie disease states is investigated. The physiologic bases of health, illness, dying, and death are explored. May be repeated to a maximum of three credits. Prereq: PGY 412G, PGY 502 or consent of instructor.</td>
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<td>PGY 590</td>
<td>CELLULAR AND MOLECULAR PHYSIOLOGY. (4)</td>
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<td>This course will focus on the cellular and molecular physiology of inter-and intracellular communication. In particular, it will provide an overview of established and emerging intracellular signaling mechanisms which utilize i) cyclic nucleotides (cAMP; cGMP), ii) calcium (phosphatidylinositol metabolism: cyclic ADP-ribose), iii) transmembrane ion fluxes (voltage- and receptor-operated channels), iv) tyrosine kinases, and v) nuclear transcription factors. The material will be presented in a number of formats including didactic lecture and group discussions of selected readings. Prereq: PGY 412G, PGY 502 or consent of instructor. (Same as MI 590.)</td>
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<td>PGY 601</td>
<td>MAMMALIAN ENDOCRINOLOGY. (3)</td>
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<td>An introduction to the basic anatomy, physiology and biochemistry of endocrine systems with emphasis on mechanisms of hormone synthesis, secretion and action. Lectures and reading assignments will focus on endocrine function in mammalian species, including laboratory animals, humans and livestock. Prereq: BCH 401G and BIO 350 or equivalents. (Same as ASC 601.)</td>
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<td>PGY 602</td>
<td>READINGS IN SYSTEMS, CELLULAR AND MOLECULAR PHYSIOLOGY. (3)</td>
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<td>A critical evaluation at the advanced level of the literature of the major mammalian physiological systems at the organ, cellular and molecular level. The course is intended to be taken with and to complement PGY 502. It includes a critical reading of the primary literature. Prereq: One year each of physics, general chemistry; PGY 206 or equivalent.</td>
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<td>PGY 603</td>
<td>DESIGN AND ANALYSIS. (3)</td>
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<td>This course focuses on skills necessary to critically evaluate the methodology of biological experiments. Participants evaluate research design problems which may or may not have serious design errors or inappropriate statistical inferences or invalid conclusions. Participants also prepare similar design problems in their research area. Prereq: Statistics course; consent of instructor.</td>
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<td>PGY 604</td>
<td>ADVANCED CARDIOVASCULAR PHYSIOLOGY. (3)</td>
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<td>The objective of this course is to examine in-depth the various functions of the cardiovascular system and their proposed mechanisms. Prereq: PGY 502 or consent of instructor.</td>
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PGY 605 PRINCIPLES OF NEUROBIOLOGY. (4)
The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a ‘Journal Club’ format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents. Prereq: Introductory biochemistry course, or equivalent, and/or consent of instructor. (Same as ANA/BCH/NEU/PHA 605.)

PGY 606 ADVANCED NEUROPHYSIOLOGY. (3)
Electrical analysis of nerve fibers and synapse; nerve impulse theories, reflexes, metabolism and central nervous function are considered from the cybernetic viewpoint. Prereq: PGY 502 or consent of instructor.

PGY 607 HORMONAL CONTROL MECHANISMS (Subtitle required).

PGY 608 ADVANCED RENAL PHYSIOLOGY. (3)
This course will examine in-depth the physiology and pathophysiology of the renal system, as well as provide an understanding of advanced renal physiological techniques. Prereq: PGY 412G, PGY 502 or consent of instructor.

PGY 609 ADVANCED RESPIRATORY PHYSIOLOGY. (3)
This course will examine in-depth the physiology and pathophysiology of the respiratory system. Prereq: PGY 412G, PGY 502 or consent of instructor.

PGY 610 EXPERIMENTAL PHYSIOLOGY. (4)
This course will introduce students to the nature of physiological experimentation, and provide an opportunity to gain first-hand experience in conducting experiments which illustrate fundamental physiological concepts. Laboratory, eight hours per week. Prereq: PGY 502 or consent of instructor.

PGY 611 BIOLOGY OF AGING. (3)
A multidisciplinary discussion of how the process of aging affects biological systems. Coverage will be quite broad and includes topics such as subcellular and cellular aging, genetics, immunology, anatomy and physiology, animal model of aging, etc. Prereq: Enrollment in a graduate program of a biomedical science department or consent of instructor. (Same as ANA/BIO/GRN 612.)

PGY 612 BEHAVIORAL ECOLOGY AND COMPARATIVE NEUROBIOLOGY. (2)
This course introduces students to major topics in behavioral ecology and comparative neurobiology with an emphasis on interrelationships between these fields. Topics to be covered vary each semester, but typically include: the optimality approach to understanding behavior, predator-prey behavior, mating and social behavior, behavioral genetics, neural circuits and behavior, sensory biology, neural development, and neural plasticity. Prereq: Permission of the instructor. (Same as ANA/BIO/ENT/PSY 613.)

PGY 613 TECHNIQUES IN BEHAVIORAL ECOLOGY AND COMPARATIVE NEUROBIOLOGY. (2)
This course provides students with instruction and experience in the experimental research techniques employed in the study of behavioral ecology and comparative neurobiology with an emphasis on the integration of these approaches for understanding animal behavior. Each student will carry out three small research projects in the laboratories of three of the participating faculty. Techniques to be covered include: molecular and genetic methods, neuroanatomical and neurophysiological techniques, and field and laboratory methods for quantifying behavior and studying effects of social and environmental influences on behavior. Prereq: Permission of the instructor. (Same as ANA/BIO/ENT/PSY 614.)

PGY 614 SEMINAR IN TEACHING MEDICAL SCIENCE (MED SCIENCE TEACHING I). (2)
A two (2) credit seminar course in which issues related to the theory and practice of life science education are discussed in a Socratic manner. May be repeated to a maximum of three credits. Prereq: Current enrollment in a life science graduate program. (Same as GRN 615.)

PGY 615 SEMINAR IN TEACHING MEDICAL SCIENCE (MED SCIENCE TEACHING II). (2)
A two (2) credit experimental course in which students will directly participate in the teaching of Physiology under supervised conditions. May be repeated to a maximum of six credits. Prereq: PGY 615 may be taken concurrently.
PGY 618 MOLECULAR NEUROBIOLOGY. (4)
This course provides knowledge base and analytical skills in the field of molecular neurobiology. An in-depth introduction to current technologies, their rationale and limitations, will be the focus to address normal brain function and neuropathological conditions. Prereq: BCH 501, 502, NEU 605, or consent of instructor. (Same as ANA/BIO/MI 618.)

PGY 627 PROSEMINAR IN PHYSIOLOGICAL PSYCHOLOGY. (3)
An intensive examination of theories, methods of investigation, and current developments in the field of physiological psychology. Prereq: Graduate standing or consent of instructor. (Same as PSY 627.)

PGY 630 ADVANCED TOPICS IN PHYSIOLOGY. (1-3)
Contemporary topics in physiology. Course designed to utilize the special research interests of resident and visiting faculty. May be repeated to a maximum of six credits. Prereq: PGY 502 or consent of instructor.

PGY 638 DEVELOPMENTAL NEUROBIOLOGY. (3)
An explanation of the processes which contribute to the development of the nervous system. Neurophysiological, cell biological and molecular approaches to cell differentiation, neuronal pathfinding and synapse formation and stabilization will be explored and discussed. Examples will be drawn from both vertebrate and invertebrate preparations. Prereq: BIO 535 or consent of instructor. (Same as ANA/BIO/PSY 638.)

PGY 650 ANIMAL PHYSIOLOGY LABORATORY. (2)
Hands-on laboratory exercises in animal physiology. Prereq: Previous or concurrent enrollment in BIO 550. (Same as BIO 650.)

PGY 660 BIOLOGY OF REPRODUCTION. (3)
Advanced study of current topics in reproductive biology. The course is comprised equally of student-led discussions and lectures given by faculty with research expertise in selected topics. Readings will be taken from current and classic literature. Topics covered include (but are not limited to) molecular and cellular endocrinology, hormone receptors and mechanism of action, reproductive neuroendocrinology, reproductive behavior, gametogenesis, fertilization, sexual differentiation, puberty, menopause and environmental effects on reproduction. Emphasis will be placed on the analysis and understanding of the experimental basis for current concepts in reproductive biology. Prereq: ASC/PGY 601 and ASC 364 or BIO/PGY 502 or consent of instructor. (Same as ANA 660 and ASC 660.)

PGY 710 AGING OF THE NERVOUS SYSTEM. (3)
This course will examine the alterations in the brain that occur with aging and in neurodegenerative disorders such as Alzheimer’s disease. The emphasis will be on human aging although the relevance of animal models to studies of human aging will be a recurrent theme. The course will examine aging at several levels, including molecular, cellular, organismic, and behavioral. Prereq: GRN 620. A strong background in the basic sciences. (Same as ANA/GRN/PHA 710.)

PGY 748 MASTER’S THESIS RESEARCH. (0)
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

PGY 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

PGY 767 TOPICAL SEMINAR IN BEHAVIORAL NEUROSCIENCE. (3)
A study of selected topics in behavioral neuroscience with emphasis on recent research and theory. May be repeated to a maximum of nine credits. Prereq: Consent of instructor. This course may be elected to fulfill requirements in the psychology and physiology graduate programs. (Same as PSY 767.)

PGY 768 RESIDENCE CREDIT FOR THE MASTER’S DEGREE. (1-6)
May be repeated to a maximum of 12 hours.

PGY 769 RESIDENCE CREDIT FOR THE DOCTOR’S DEGREE. (0-12)
May be repeated indefinitely.
PGY 771 PROSEMINAR IN CELL PHYSIOLOGY. (2)
A comprehensive discussion of topics in cellular physiology and biophysics using advanced texts and readings in the original literature. Includes such topics as biological membranes, transport mechanisms, effects of hormones on membranes. Prereq: Graduate student in physiology and biophysics or consent of Director of Graduate Study.

PGY 774 GRADUATE SEMINAR IN PHYSIOLOGY. (1)

PGY 791 RESEARCH IN PHYSIOLOGY. (1-15)
May be repeated to a maximum of 15 credits. Prereq: Consent of instructor.

PGY 813 NEUROPHYSIOLOGY. (1)
The brain uses electrical signals to process all information it receives and analyzes. Individual neurons encode complex information into simple electrical signals; the meaning behind these signals is derived from the specific interconnections of neurons. The purpose of neurophysiology is to describe how the neuron produces electrical and chemical signals and illustrate how these signals are involved in the functional organization of neural circuits. This course also describes how the central nervous system analyzes and integrates the various inputs, elicits command decisions that determine the motor and/or endocrine responses. Lecture: three hours per week for five weeks. Prereq: Admission to the College of Dentistry, or consent of the Course Director. (Same as OBI 813.)

PGY 814 PRINCIPLES OF HUMAN PHYSIOLOGY FOR DENTAL STUDENTS. (4)
This course enables student dentists to understand the basic principles of human physiology, especially as it relates to the practice of dentistry. The introduction of the course presents the basic physiology of cells, conducting and contracting tissues, lining and secretory tissues, and other special tissues. The course focuses on the major physiological systems and presents them at the system, cellular, and molecular levels; and emphasizes those aspects particularly relevant to dentistry — dentin sensitivity, dental and pulpal pain, muscle dysfunction, ischemic and, hypertensive heart disease, oral manifestations of endocrine abnormalities, temperature regulation, calcium-phosphate homeostasis, and the dental mineralized tissues. Upon successful completion of the course, student dentists will be able to rationally and scientifically apply basic cell, tissue, organ, and organ system function to clinical decision-making. Lectures with assigned reading: 68 hours. Prereq: OBI 812 or consent of the course director. (Same as OBI 814.)

PGY 818 HUMAN FUNCTION. (8)
This course provides in-depth instruction on the physiological mechanisms of body function from the single cell to the organism level. The course is taught by medical scientists and clinicians. Teaching methodologies include didactic and Socratic lectures, small group discussions, demonstrations and live model and computer simulated laboratories. Lecture, 20 hours per week. Prereq: For MD 818/PGY818: Admission to medical school (first year). For OBI 814: Admission to the Dental School and OBI 812. (Same as MD 818/OBI 814.)

PGY 825 SECOND-YEAR ELECTIVE, PHYSIOLOGY. (1-4)
With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Physiology and Biophysics. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

PGY 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)
With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

Approved elective:
PGY 850 RESEARCH IN PHYSIOLOGY