

BIOMEDICAL SCIENCES (BIOM)

BIOM 5000 Research & Thesis

Prerequisites: Consent of major adviser.

Description: Research in biomedical sciences for MS degree. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

Credit hours: 1-6

Contact hours: Contact: 1-6 Other: 1-6

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 5003 Statistics for Medical Residents

Prerequisites: Employed as a medical resident or permission of instructor

Description: Survey of statistical methodology relevant to health care professionals. Basic understanding of statistics presented in recent medical literature. Hypothesis testing, ANOVA techniques, regression, categorical techniques. Same course as STAT 5003.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5010 Special Topics in Biomedical Sciences

Description: Provides an overview of current issues in biomedical sciences. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.

Credit hours: 1-3

Contact hours: Lecture: 1-3 Contact: 1-3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5013 Medical Biostatistics

Prerequisites: Graduate standing.

Description: Fundamentals of biostatistics, including parametric and non-parametric statistical methods with applications to biomedical research, clinical epidemiology and clinical medicine.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5020 Biomedical Sciences Seminar

Prerequisites: Graduate standing.

Description: Literature and research problems in biomedical sciences. Offered for variable credit, 1-15 credit hours, maximum of 15 credit hours.

Credit hours: 1-15

Contact hours: Lecture: 1-15 Contact: 1-15

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5116 Clinical Anatomy

Prerequisites: Graduate standing in the biomedical sciences program.

Description: Presents gross structure of the human body using a regional approach. Topics include topographical and functional anatomy, clinical correlations, and introduction to radiology. The course provides the descriptive basis for understanding human structure and function encountered in succeeding courses and medical practice. Previously offered as BIOM 5118.

Credit hours: 6

Contact hours: Contact: 6 Other: 6

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 5121 Biomedical Sciences Journal Club

Description: Each week students will read and discuss a recent peer-reviewed research article in a respected biomedical journal. The objectives are to learn to critically evaluate published research, develop scientific communication skills, and learn about recent scientific findings from a variety of fields in a group setting.

Credit hours: 1

Contact hours: Contact: 1 Other: 1

Levels: Graduate

Schedule types: Discussion

Department/School: Biomedical Sciences

BIOM 5122 Introduction and Survey of Human Structure

Description: This is an introductory survey course aimed at presenting an overview of structures and functions of the body's systems using a regional approach. Discover the human body through recorded lectures and virtual dissections of cadaveric specimens using 3D anatomy software. Seven online modules will cover introductory survey information from all regions of the human body. The course is suitable for students interested in learning human structure in a self-paced, online environment.

Credit hours: 2

Contact hours: Lecture: 1 Lab: 3 Contact: 4

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Biomedical Sciences

BIOM 5124 Systems Histology & General Pathology

Description: Introduction to the histophysiology and general pathology of the basic tissues and includes the cardiovascular, respiratory, hematology, lymphatic, genitourinary, endocrine, reproductive, integumentary, and gastrohepatic systems. Lecture, lab, and group discussions are used as the main means of presenting the material. Students will learn how structure relates to physiology and how pathology disrupts cell processes and the normal architecture.

Credit hours: 4

Contact hours: Lecture: 4 Contact: 4

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5133 Neuroanatomy

Prerequisites: Graduate standing in the biomedical science program.

Description: A continuation of gross anatomy to include anatomy of the head region. Emphasis on neuroanatomy. Laboratory sessions on head and brain dissection and special demonstrations. The relation of basic principles with osteopathic medicine and neurology in clinical correlation sessions. Previously offered as BIOM 5132.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5215 Medical Biochemistry

Description: Broad survey of the chemical classes and metabolic processes that are consistent with the normal functions of biosystems. Functions and interrelationships of these processes in human metabolism to provide a foundation for understanding the chemistry of disease states when discussed in the second-year program.

Credit hours: 5

Contact hours: Lecture: 5 Contact: 5

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5316 Medical Microbiology and Immunology

Prerequisites: BIOM 5215.

Description: Similarities and differences among pathogenic microorganisms. Characteristics, pathogenesis and control of medically important microorganisms and disorders of the immune system. Laboratory exercises on the basic serological and microbiological procedures used in the diagnosis of infectious diseases.

Credit hours: 6

Contact hours: Lecture: 6 Contact: 6

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5616 Graduate Biomedical Physiology

Description: This course provides a comprehensive study of the regulatory mechanisms within the major organ systems that enable the human body to maintain homeostasis. The fundamentals of physiology are emphasized in discussions of the integration of structure and function in all systems of the body, along with the integration of function among systems. Problem-solving activities are utilized to develop student understanding and enhance subsequent learning — both in the basic and clinical sciences.

Credit hours: 6

Contact hours: Lecture: 6 Contact: 6

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5621 Introduction to Translational Research

Description: Focuses on biomedical and clinical research from bench to bedside and back. Provides examples of how basic science and clinical observations lead to translational research.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5631 Disease Research in Medicine

Prerequisites: Biomedical Foundations or equivalent. Permission of instructor.

Description: Introduction to selected diseases of priority in medicine and to funding agencies. Includes discussing current clinical and research challenges.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5641 Cornerstones of Vertebrate Paleontology

Description: In-depth discussion of topics in Vertebrate Pathology, emphasizing critical thinking skills. Based on evaluation of the primary literature, and covering diverse methodological approaches to interdisciplinary research questions.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5653 Evolutionary Physiology

Description: Survey course that covers the basic physiology of, primarily, mammalian species. Uses an evolutionary approach that integrates form with function by outlining the evolutionary sequences thought to have resulted in modern organ structures.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5663 Graduate Pharmacology

Description: Provides an enriched understanding of the mechanism of actions of pharmacological agents used to treat human diseases.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5672 Scientific Outreach Training for Graduate Students

Description: Provides interactive opportunities with elementary school-aged children with a particular emphasis on developing an understanding of the scientific method as a strategy for real-life problem-solving.

Credit hours: 2

Contact hours: Lecture: 2 Contact: 2

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5683 Chronic Inflammation and Cancer Development

Description: Provides insight that describes the issues of chronic inflammation, auto-immune and cancer development.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5693 Principle Concepts of Cellular and Molecular Immunology

Description: Introduces and explores basic concepts of immunology with cellular and molecular components that play a role in normal and disease states.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5963 Case Studies in Medical Smart Garment Engineering

Prerequisites: BIOM 4893 or DHM/IEM 4893 or consent of instructor.

Description: Designed to activate critical thinking skills needed for problem solving in wearable sensing system development. Same course as DHM 5963.

Credit hours: 3

Contact hours: Lecture: 1 Lab: 4 Contact: 5

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Biomedical Sciences

BIOM 5983 Principles of Neuroscience

Prerequisites: Science or Psychology major and permission of instructor.

Description: This course examines foundational theories and principles related to the neural mechanisms controlling physiological processes and behavior. Topics covered include cellular neurobiology, neuronal signaling, neural development and plasticity, comparative neuroanatomy, and neurobiology of complex brain functions such as sensory processing, arousal, emotions learning, and memory. Previous coursework in physiology recommended. Same course as BIOL 5073 and PSYC 5073. May not be used for degree credit with BIOL 4073 or PSYC 4073.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 5984 Capstone in Medical Smart Garment Engineering

Prerequisites: BIOM or DHM 5963 and three credits of chosen emphasis area.

Description: Project-based where interdisciplinary teams identify a wearable sensing application and collaborate to engineer a prototype that addresses a defined need. Industry collaboration encouraged. Same course as DHM 5984.

Credit hours: 4

Contact hours: Lecture: 1 Lab: 6 Contact: 7

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Biomedical Sciences

BIOM 5993 Principles of Neuroanatomy

Prerequisites: Science or psychology major and permission of instructor.

Description: Comprehensive overview of the normal structure and function of the nervous system and its divisions under conditions of normal health as well as disease. Designed for graduate students neuroscientists, pre-medical, and health professions students. An introduction to clinically-oriented neurological assessment will be provided.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6000 Research and Dissertation

Prerequisites: Consent of major adviser.

Description: Research in biomedical sciences for PhD degree. Offered for variable credit, 1-15 credit hours, maximum of 45 credit hours.

Credit hours: 1-15

Contact hours: Contact: 1-15 Other: 1-15

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6010 Topics in Biomedical Sciences

Prerequisites: Consent of instructor.

Description: Tutorials in areas of biomedical sciences not addressed in other courses. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.

Credit hours: 1-9

Contact hours: Lecture: 1-9 Contact: 1-9

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6013 Educational Methods in the Biomedical Sciences

Prerequisites: Graduate standing.

Description: Introduces graduate students to a full range of faculty roles and responsibilities related to instructional methods used at the health sciences center.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6023 Research Methods And Design

Prerequisites: Graduate standing.

Description: Introduction to concepts of research design, methodology, sampling techniques, internal and external validity, and the scientific method.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6173 Molecular Epigenetics

Prerequisites: BIOM 6743, and/or BOM 6762.

Description: Designed to introduce students to concepts of epigenetics and how different epigenetic factors modulate gene expression and heritable phenotypes without changing the underlying gene sequences. This course will also discuss the underlying epigenetic mechanisms for different human diseases.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6175 Molecular And Cellular Biology**Prerequisites:** Consent of course coordinator.**Description:** Cell biology, including cellular macromolecules, energetics, metabolism, regulation, organization and function of cellular organelles, flow of genetic information, and the regulation of selected cell activities.**Credit hours:** 5**Contact hours:** Lecture: 5 Contact: 5**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6183 Cellular and Molecular Biology of Pain****Prerequisites:** BIOM 5133 or BIOM 5616.**Description:** An understanding of the cellular and molecular events that occur in the initiation and transmission of nociceptive (painful) sensory signaling.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6193 Paleomammalogy****Description:** The study of mammalian paleobiology through seminars and field work. Field trips are required.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6200 Neurobiology of Addiction****Prerequisites:** Graduate Standing, Instructor permission.**Description:** A broad review of the foundations for understanding of what occurs when a drug enters the body and the brain, how your brain changes, and how this process can make recovering from addiction a challenge. Special attention will be paid to the neuroanatomy and circuitry of reward, basic concepts and definitions involving substance use disorders, neural dysfunction under addiction, the stages of addiction and implications for treatment. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.**Credit hours:** 1-3**Contact hours:** Lecture: 1-3 Contact: 1-3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6214 Advanced Topics in Medical Biochemistry****Prerequisites:** BIOM 5215 or concurrent enrollment.**Description:** Chemical basis of protein, carbohydrate, lipid, nucleic acid, steroid and porphyrin structure, function, and metabolism as related to health and disease. Offered for variable credit, 3-15 credit hours, maximum of 15 credit hours.**Credit hours:** 4**Contact hours:** Lecture: 4 Contact: 4**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6233 Enzyme Analysis****Prerequisites:** BIOM 6214.**Description:** Characteristics, separation, detection, assays, kinetics, mechanisms of catalysis, inhibition or inactivation, and clinical applications of enzyme analysis.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biomedical Sciences**BIOM 6243 Human Nutrition****Prerequisites:** BIOM 5215.**Description:** Role of vitamins and minerals in maintaining normal metabolism, role of nutrients in providing athletic and immune system performance, and pathophysiology associated with nutrient deficits and nutrient excesses. Role of drugs in inducing cancer and increasing nutrient requirements.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biomedical Sciences**BIOM 6263 Techniques in Molecular Biology****Prerequisites:** BIOM 5215, BIOM 5316, consent of instructor.**Description:** Transformation of bacterial and mammalian cells; purification of nucleic acids; cloning of DNA fragments; labeling of nucleic acids with non-radioactive probes; analysis of DNA and RNA by electrophoresis and hybridization; DNA sequencing; design, synthesis and use of oligonucleotides; site-directed mutagenesis; detection of rare nucleic acids by the polymerase chain reaction and expression of proteins.**Credit hours:** 3**Contact hours:** Lecture: 1 Lab: 4 Contact: 5**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biomedical Sciences**BIOM 6333 Immunology****Prerequisites:** Introductory Biochemistry, and Microbiology, e.g. BIOM 5215 and BIOM 5316, or equivalents. Permission of instructor is required.**Description:** Fundamental concepts of immunology, including immunobiology and immunopathology, with an introduction to its experimental basis.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6343 Microbial Physiology****Prerequisites:** BIOM 5215, BIOM 5316.**Description:** The chemical composition, growth and metabolism of prokaryotic organisms including regulation and control of metabolic pathways with emphasis on metabolism unique to microbes.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biomedical Sciences

BIOM 6353 Molecular Virology

Prerequisites: BIOM 5215, BIOM 5316, consent of instructor.

Description: The fundamental molecular biology of the virus life cycle using one virus as a model to examine penetration, gene regulation, replication, assembly and egress, as well as host immunological response and epidemiology.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 2 Contact: 4

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Biomedical Sciences

BIOM 6363 Immunobiology of Infectious Disease

Prerequisites: Biochemistry, Medical Microbiology and Immunology.

Description: Graduate course to provide an understanding of cellular and molecular events that occur during the initiation of immune response to main causes of human pathogens.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6413 Graduate General Pathology and Laboratory Medicine

Prerequisites: Graduate standing and BIOM 5215; permission of the instructor is required; BIOM 5616 and BIOM 5316 are recommended.

Description: An introduction for biomedical researchers to disease processes, from etiologies to cell and tissue responses that manifest as diseases.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6513 Neuropharmacology

Prerequisites: BIOM 5983.

Description: This course covers the pharmacology of agents affecting CNS function, the interaction of drugs with their targets, and the actions of endogenous neuromodulators at CNS sites. This course emphasizes molecular mechanisms underlying the action of neuropharmacological agents used in treating various neurological/psychiatric diseases (e.g., drug dependence, depression, schizophrenia), and will provide basic knowledge while enhancing reasoning skills, literature searches, teamwork, and presentations.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6523 Cardiovascular Physiology and Pharmacology

Prerequisites: BIOM 5513, BIOM 5523.

Description: Physiologic and pharmacologic mechanisms of cardiac and vascular smooth muscle function and control at the molecular, cellular, tissue and organ system levels.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6543 Environmental Toxins in the Brain

Description: Introduces the fundamental aspects of neurotoxicology using both cellular and molecular approaches in neurochemistry and toxicology.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6551 CT Techniques in Evolutionary Anatomy

Prerequisites: Graduate standing, some experience (academic or professional) with either anatomy or 3D visualization.

Description: The analysis of computed tomography (CT) scans has become a standard practice in evolutionary anatomy. This course will introduce students to many of the techniques used in the analysis and segmentation of CT scans. Students will be given a small scan of their own to work on over the course.

Credit hours: 1

Contact hours: Lecture: 1 Contact: 1

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6583 Neuroinflammation

Prerequisites: Graduate standing.

Description: Provides an understanding of inflammation in the central nervous system through discussion of current and experimental pharmacologic strategies designed to modulate neuroinflammation.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6613 Environmental Physiology

Prerequisites: BIOM 5616.

Description: Environmental parameters, including barometric pressure, temperature, light, gravity, noise, and crowding, having an impact on homeostatic mechanisms in the normal human with special emphasis on acute and chronic adaptations in response to changes in environmental parameters.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6643 Neurophysiology

Prerequisites: BIOM 5616.

Description: Fundamental concepts of the motor and sensory components of the nervous system with emphasis on integrative mechanisms.

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6653 Graduate Seminar In Signal Transduction

Credit hours: 3

Contact hours: Lecture: 3 Contact: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6662 Research Ethics and Survival Skills for the Biomedical Sciences**Prerequisites:** Graduate standing.**Description:** Provides a basic framework for scientific conduct and practice and the skills needed for a career in the biomedical sciences.**Credit hours:** 2**Contact hours:** Lecture: 2 Contact: 2**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6663 Neuroethology****Prerequisites:** Permission of instructor.**Description:** This course is designed to provide an analysis of the neuroendocrine basis of behavior. Lectures will serve as the format of presentation to provide a sound understanding of the neuroethological concepts discussed.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6673 Genomics****Prerequisites:** BIOM 6175.**Description:** The course begins with a review of molecular biology and then proceeds to the structure and organization of eukaryotic, prokaryotic, and organelle genomes. Techniques in dividing, sequencing, annotating, and mapping genomes are studied as well as those of global gene expression profiling. The course finishes with a look at the many applications of genomics in biomedical science and disease.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6705 Advanced Gross Anatomy****Prerequisites:** Consent of course coordinator.**Description:** General and specific concepts of regional human anatomy. The primary focus is the range of normal for all organ systems and interrelationships. Provides an advanced descriptive basis for understanding human structure and function encountered in succeeding courses and in the practice of teaching gross anatomy to graduate and medical students.**Credit hours:** 5**Contact hours:** Lecture: 3 Lab: 4 Contact: 7**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biomedical Sciences**BIOM 6723 Field Techniques in Vertebrate Paleontology****Description:** This course introduces students to techniques and tools necessary to conduct field work in vertebrate paleontology. The primary techniques will include mapping, prospecting and collecting both micro- and macrofossil vertebrate remains. Processing of rock matrix with microvertebrates will be emphasized, but preparation of macrofossil remains for transportation to the research lab will be taught.**Credit hours:** 3**Contact hours:** Contact: 3 Other: 3**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6733 Human Microbiome in Health and Disease****Prerequisites:** BIOM 6793 Foundations in Medical Microbiology or BIOM 5316 Medical Microbiology and Immunology.**Description:** An in-depth discussion of the interactions of the microbiome with the human host. The course focuses on current research and provides a comprehensive overview on metagenomic and multi-omics analyses used in model systems and clinical studies to elucidate the role of the microbiome in human health and disease.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6743 Foundations in Medical Genetics, Molecular Biology and Development****Description:** Human genetics and development, including structure and function of nucleic acids, gene regulation, basis of inheritance, and development of the human embryo.**Credit hours:** 3**Contact hours:** Contact: 3 Other: 3**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6752 Foundations in Medical Cell and Tissue Biology****Description:** Structure and function of cells within tissues as it relates to human health and disease, including cell transport, cell-to-cell communication and organ system control.**Credit hours:** 2**Contact hours:** Contact: 2 Other: 2**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6762 Foundations in Medical Biochemistry****Description:** Biochemistry in human health and disease, including protein structure and function, bioenergetics, metabolism, nutrition, and membrane structure and function.**Credit hours:** 2**Contact hours:** Contact: 2 Other: 2**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6771 Foundations in Medical Pharmacology****Description:** General principles of pharmacokinetics and pharmacodynamics of drugs used to treat human disease.**Credit hours:** 1**Contact hours:** Contact: 1 Other: 1**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6781 Foundations in Medical Immunology****Description:** Immune system in human health and disease, including antibody and cell-mediated immune responses, inflammation, immune responses to infectious agents and allergens, immunodeficiencies and malignancies of the immune system.**Credit hours:** 1**Contact hours:** Contact: 1 Other: 1**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences

BIOM 6793 Foundations in Medical Microbiology

Description: Infectious agents, including viruses, bacteria, fungi and parasites, their structure, genetics and mechanisms of pathogenesis in human disease. Previously offered as BIOM 6791.

Credit hours: 3

Contact hours: Contact: 3 Other: 3

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6800 Critical Readings in Biomedical Sciences

Description: Provides experience with the primary literature in biomedical sciences, with training in evaluation methodologies, experimental design, data presentation, and statistical designs. Previously offered as BIOM 6802. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.

Credit hours: 1-3

Contact hours: Lecture: 1-3 Contact: 1-3

Levels: Graduate

Schedule types: Lecture

Department/School: Biomedical Sciences

BIOM 6810 Structure and Function of the Human Cardiovascular System

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the human cardiovascular system. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

Credit hours: 1-6

Contact hours: Contact: 1-6 Other: 1-6

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6820 Structure and Function of the Human Gastrointestinal/Hepatic System

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the human gastrointestinal and hepatic systems. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

Credit hours: 1-6

Contact hours: Contact: 1-6 Other: 1-6

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6830 Biomedical Perspectives on Human Hematology

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the human blood and lymphatics, and associated disorders. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.

Credit hours: 1-5

Contact hours: Contact: 1-5 Other: 1-5

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6840 Structure and Function of the Human Musculoskeletal System

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the human musculoskeletal system and associated disorders. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.

Credit hours: 1-5

Contact hours: Contact: 1-5 Other: 1-5

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6843 Vertebrate Osteology

Description: Students learn to identify skeletal elements of Vertebrata.

Focus is on extant vertebrates, but fossil taxa may also be used. Foci include: assessing at what taxonomic level an identification may be made; synapomorphies, homoplasies, and inference of ecology from skeletal elements; reading differential diagnoses and writing useful osteological description, and; distinguishing co-occurring taxa. Students will also receive some training in using and building osteological collections.

Credit hours: 3

Contact hours: Lecture: 1 Lab: 4 Contact: 5

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Biomedical Sciences

BIOM 6850 Structure and Function of the Human Renal System

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the human renal system. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.

Credit hours: 1-5

Contact hours: Contact: 1-5 Other: 1-5

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6860 Structure and Function of the Human Reproductive Systems and Reproductive Biology

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the male and female human reproductive systems and reproductive biology. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.

Credit hours: 1-5

Contact hours: Contact: 1-5 Other: 1-5

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6870 Structure and Function of the Human Respiratory System

Prerequisites: Permission of Instructor.

Description: Provides integrated biomedical study of the human respiratory system. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.

Credit hours: 1-5

Contact hours: Contact: 1-5 Other: 1-5

Levels: Graduate

Schedule types: Independent Study

Department/School: Biomedical Sciences

BIOM 6880 Biomedical Perspectives on Psychiatry**Prerequisites:** Permission of Instructor.**Description:** Permission of Instructor. Provides clinical presentation, differential diagnosis, etiology (including pathophysiological etiologies), basic pharmacology of medications used to treat the disorder, clinical pharmacology, and psychosocial treatments. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.**Credit hours:** 1-3**Contact hours:** Contact: 1-3 Other: 1-3**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6893 Fundamentals of Medical Smart Garment Engineering****Prerequisites:** 90+ hours or Graduate standing.**Description:** Students will gain elementary knowledge in focus areas of health science, biomedical sensing and analysis, and apparel design necessary to undertake the development of wearable electronic sensing systems. Lecture and laboratory based instruction. May not be used for degree credit with DHM 4893 or IEM 4893 or 5893.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biomedical Sciences**BIOM 6900 Structure and Function of the Human Endocrine System****Description:** Provides integrated biomedical study of the human endocrine system, and associated disorders. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.**Credit hours:** 1-5**Contact hours:** Contact: 1-5 Other: 1-5**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6910 Structure and Function of the Human Nervous System****Description:** Provides integrated biomedical study of the human nervous system. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.**Credit hours:** 1-6**Contact hours:** Contact: 1-6 Other: 1-6**Levels:** Graduate**Schedule types:** Independent Study**Department/School:** Biomedical Sciences**BIOM 6922 Scientific Communication in Biomedical Sciences****Description:** Provides experience in scientific writing and oral presentations.**Credit hours:** 2**Contact hours:** Lecture: 2 Contact: 2**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6933 Cornerstones of Graduate Biomedical Sciences****Description:** Discussion of topics in the foundational courses of biomedical sciences, emphasizing critical thinking skills and diverse methodological approaches in understanding interdisciplinary research questions and in evaluations of the primary literature. Intended to be taken concurrently with foundation courses.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6943 Advanced Vertebrate Paleontology****Prerequisites:** Comparative anatomy or human anatomy, and assumes an undergraduate level understanding of vertebrate paleontology, biology, and evolution.**Description:** Explores vertebrate evolution in a phylogenetic, ontogenetic, and stratigraphic framework. Students discuss recent ideas in paleontology from scientific literature and/or instructor-led exercises. Appreciation of homologies and autapomorphies is gained through exploration of extant vertebrate anatomy. Communication skills are developed through oral presentations and writing. Students will demonstrate a synthesis of concepts by integrating a chosen evolutionary theme into these activities.**Credit hours:** 3**Contact hours:** Lecture: 1 Contact: 3 Other: 2**Levels:** Graduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Biomedical Sciences**BIOM 6952 Paleohistology Techniques****Prerequisites:** Undergraduate level understanding of biology, evolution, and histology.**Description:** Recognize and interpret modern and fossil bone tissue microstructures. The contributions of paleohistology to understanding extinct vertebrate physiology will be explored through discussions of peer reviewed articles. Students will receive hands-on training in paleohistology techniques.**Credit hours:** 2**Contact hours:** Lecture: 2 Contact: 2**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6962 Evolutionary Biomechanics****Prerequisites:** BIOM 5116 or HHP 2654 or ZOOL 3114.**Description:** Evaluation of topics covering the application of engineering principles to biological systems in an evolutionary framework. Topics will examine the material properties of anatomical tissues, how forces act internally and externally on organisms and their structures, kinematics, and biomechanical model systems. Primary literature and experimental designs will also be explored.**Credit hours:** 2**Contact hours:** Lecture: 1 Contact: 2 Other: 1**Levels:** Graduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Biomedical Sciences

BIOM 6972 Role of Nicotinic Acetylcholine Receptors in Neuropsychiatric Disorders**Prerequisites:** BIOM 6513 Neuropharmacology.**Description:** An in-depth review of physiological aspects of nicotinic acetylcholine receptors (AChRs), its involvement in neuropsychiatric (depression, drug addiction) neurological (Alzheimer's disease), and non-neurological (inflammation) diseases, and as targets for pharmacotherapy. This course is designed to emphasize self-learning and team-learning in the form of student seminars to address new pharmacological and neurological evidence supporting novel pharmacotherapies.**Credit hours:** 2**Contact hours:** Lecture: 2 Contact: 2**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biomedical Sciences**BIOM 6973 Evolutionary Development of Vertebrates****Description:** Beginning with human embryology we ask: Why does human anatomy look the way it does? This course follows this question into broader inquiries on metazoan origins, diversification, and vertebrate morphologies. This is a flipped course teaching embryology and developmental genetics in an explicitly evolutionary framework with particular focus on the diversity of living vertebrates and the interpretation of fossil vertebrates.**Credit hours:** 3**Contact hours:** Lecture: 2 Contact: 3 Other: 1**Levels:** Graduate**Schedule types:** Discussion, Combined lecture & discussion, Lecture**Department/School:** Biomedical Sciences