# GENETICS, CELL BIOLOGY & ANATOMY (GCBA)

**GCBA 804 GROSS ANATOMY OF THE HUMAN NERVOUS SYSTEM 3 Credit Hours**
This course uses lectures, assignments and interactive activities to introduce students to the gross anatomy of the nervous system. Students will learn the names, locations and basic functions of different parts of the nervous system including: peripheral and cranial nerves; the spinal cord, the medulla; the pons; the cerebellum; the midbrain; the thalamus; the hypothalamus; the basal ganglia and the cerebral cortex. The nervous system vascular and ventricular systems will be described and related to each of these areas. A select subset of possible lesions/diseases will be studied and discussed to facilitate an understanding of the function of the human nervous system.
Instructor: Robert Norgren, Matthew Vilburn, Megan Perry
Typically Offered: FALL/SP/SU

**GCBA 805 SENSORY SYSTEMS OF THE NERVOUS SYSTEM 3 Credit Hours**
This course uses lectures, assignments and interactive activities to introduce students to the sensory systems of the human nervous system. Students will learn the pathways and function of sensory systems including the: somatosensory; gustatory; olfactory; auditory and visual systems. Students will also learn about diseases and lesions which can affect these sensory systems in patients.
Prerequisite: GCBA 804
Typically Offered: SPRING

**GCBA 807 MOTOR SYSTEMS OF THE HUMAN NERVOUS SYSTEM 3 Credit Hours**
This course uses lectures, assignments and interactive activities to introduce students to the motor systems of the human nervous system. Students will learn the pathways and function of motor systems including: the neuromuscular synapse; lower motor neurons; reflexes; upper motor neurons; secondary motor cortices; control of eye movements; basal ganglia; and cerebellum. Students will also learn about diseases and lesions which can affect these motor systems in patients.
Prerequisite: GCBA 804
Typically Offered: SPRING

**GCBA 808 LIMBIC SYSTEM, HYPOTHALAMUS AND CONTROL OF THE AUTONOMIC NERVOUS SYSTEM 3 Credit Hours**
This course uses lectures, assignments and interactive activities to instruct the students in the limbic system, hypothalamus and autonomic nervous system. Students will learn the pathways and function of the limbic system, hypothalamus and autonomic nervous system including: the prefrontal cerebral cortex; the cingulate gyrus; the hippocampal formation; the Papez circuit; the nucleus accumbens; the amygdala; the supraoptic and paraventricular nuclei; and the mammillary bodies. In addition, students will learn the function of the: hypothalamic-pituitary-gonadal axis; hypothalamic-pituitary-adrenal axis; growth hormone axis. The student will learn about abnormal functioning these systems including: feeding disorders, stress and dysautonomia.
Prerequisite: GCBA 804
Typically Offered: SPRING

**GCBA 809 HIGHER CORTICAL FUNCTION AND BEHAVIORAL NEUROSCIENCE 3 Credit Hours**
This course uses lectures, assignments and interactive activities to introduce students to the gross anatomy of the nervous system. Students will learn the names, locations and basic functions of parts of the nervous system, including the spinal cord, medulla, pons, cerebellum, midbrain, thalamus, hypothalamus, basal ganglia, cerebral cortex, and peripheral and cranial nerves. The nervous system vascular and ventricular systems will be described and related to each of these areas. A select subset of possible lesions/diseases will be studied and discussed to facilitate an understanding of the function of the human nervous system.
Prerequisite: GCBA 804
Instructor: Robert Norgren; Megan Perry; Matthew Vilburn
Typically Offered: SPRING

**GCBA 813 NEUROANATOMY LECTURE 3 Credit Hours**
This course is designed to provide foundational knowledge about the anatomy, functional organization, and physiology of the human nervous system. The course will focus on the organization of the neural systems in the brain and spinal cord that mediate sensation, movement, and higher-order signal integration as they relate to memory, emotion, and cognition. The course will also provide the foundation for understanding impairments of the nervous system due to age, injury, or disease.
Prerequisite: GCBA 908 and GCBA 909.
Corequisite: GCBA 814
Instructor: M. Vilburn, M. Perry
Typically Offered: SUM/SPRING

**GCBA 814 NEUROANATOMY LAB 2 Credit Hours**
This course is designed to equip students with an anatomical understanding of the central nervous system. Students will use anatomical-donor tissues to study the gross anatomy, spatial relationships, and functions of the human brain and spinal cord, and myelin-stained sections of the central nervous system to visualize the major tracts and nuclei of the brain and brainstem. Additional topics to be covered include introduction to neurological clinical imaging and predicted deficits in neurologic function as related to injury or disease.
Prerequisite: GCBA 908 and 909
Corequisite: GCBA 813
Instructor: M. Vilburn, M. Perry
Typically Offered: SUM/SPRING

**GCBA 823 FUNDAMENTALS IN GENETICS AND GENOMICS 2 Credit Hours**
This course will introduce basic concepts in classical and modern molecular genetics as well as state of the art genomic analysis.
Crosslisted: MGCB 823
Typically Offered: SPRING

**GCBA 825 HUMAN HISTOLOGY 5 Credit Hours**
A study of cells, fundamental tissues, organ systems at both the light and ultramicroscopic level. Include section on tissue cell fixational and processing for light and advanced microscopy.
Typically Offered: SPRING

**GCBA 830 FUND OF ELECTRON MICRO 2 Credit Hours**
The general theory and techniques of electron microscopy, including special methods involved in the fixation, embedding, sectioning, and staining of specimens.
Prerequisite: CBA 826 and permission of instructor.
Typically Offered: SPRING

**GCBA 845 CLINICALLY ORIENTATED HUMAN ANATOMY I 3 Credit Hours**
This is the first semester of a 2 semester clinically-oriented human anatomy course. The content of the two courses includes human anatomy presented in a systems approach the utilizes a wide variety of imaging modalities and clinical correlations to understand gross anatomy with cell biology, histology, embryology and neuroanatomy followed by a review applying the information to anatomic regions of the human body. The sequence of the units correlates with CAHP 445.
Typically Offered: FALL

**GCBA 846 CLINICALLY ORIENTATED HUMAN ANATOMY II 2 Credit Hours**
This is the second semester of a 2 semester clinically-oriented human anatomy course. The content of the two courses includes human anatomy presented in a systems approach that utilizes a wide variety of imaging modalities and clinical correlations to understand gross anatomy with cell biology, histology, embryology and neuroanatomy followed by a review applying the information to anatomic regions of the human body. The sequence of the units correlates with the CAHP 446.
Typically Offered: FALL

**GCBA 853 HUMAN EMBRYOLOGY 1 Credit Hour**
Cross List: GCBA 513
Typically Offered: SUMMER

**GCBA 891 ANATOMICAL SCIENCES TEACHING PRACTICUM-HIGH SCHOOL ALLIANCE 1 Credit Hour**
This course is designed to help each student understand how to "name, claim, and aim" their natural execution, relationship building, influence, and strategic thinking talents while they assist in teaching High School Alliance students in their anatomy course. Major learning topics include the 34 CliftonStrengths themes, how to use those strengths effectively for individual achievement and in group dynamics, and how to apply their strengths to common responsibilities and challenges associated with administrating a medical anatomy course. The course exercises will teach students how to enhance their strengths to propel them personally and professionally beyond teaching medical anatomy in this course. The majority of this 1 credit course intentionally entails experience-based and in-class learning with only a small amount of time spent on "out-of-class" preparation or studying.
Prerequisite: GCBA 908 and 909
Instructor: Ethan Snow
Typically Offered: SPRING
Capacity: 20

**GCBA 892 INTRODUCTORY MEDICAL ANATOMY RESEARCH PRACTICUM 1 Credit Hour**
This course is designed to prepare the graduate student to understand the scientific method and demonstrate their understanding by designing an anatomical science-based research project. Major topics to be covered include 1) the scientific method, 2) research study design, and 3) scientific writing/reporting.
Instructor: Travis McCumber
Typically Offered: FALL/SPR

**GCBA 893 MEDICAL ANATOMY RESEARCH PRACTICUM 1 Credit Hour**
This course is designed to prepare the graduate student to apply the scientific method to an anatomical science-based research project. Students will engage in the scientific method, data collection, data analysis, data interpretation, and scientific writing/reporting. Students will work with a faculty advisor on their research project and will share their research project goals, approach and findings through anoral presentation and a written report.
Prerequisite: GCBA892
Corequisite: GCBA 892
Instructor: McCumber
Typically Offered: SPRING

**GCBA 894 OBSERVATIONAL LEARNING AND ANATOMY IN THE HEALTHCARE ENVIRONMENT 2 Credit Hours**
The purpose of this course is to provide MS students in the Medical Anatomy program with opportunities to observe and experience different healthcare careers. During this course, students will shadow healthcare professionals in various roles and disciplines. These experiences will also allow students to see first-hand how the knowledge of anatomy is utilized and applied in various clinical settings. Students must log a total of 48 hrs of shadowing.
Instructor: Karen Gould
Typically Offered: FALL

**GCBA 896 RSCH OTHER THAN THESIS 1-9 Credit Hours**
Student research that is clearly distinct from ongoing or planned thesis/dissertation work, or research/lab rotations preformed prior to selecting a permanent advisor or supervisor.
Typically Offered: FALL/SP/SU

**GCBA 899 MASTERS THESIS 1-9 Credit Hours**
Independent student research related to the masters thesis.
Typically Offered: FALL/SP/SU

**GCBA 902 SPECIAL TOPICS 1-3 Credit Hours**
Current problems, techniques, and literature pertaining to the major subdivisions of the field of anatomy. The student may participate in selected research topics, under the supervision of a selected instructor.
Prerequisite: Permission of instructor.
Typically Offered: FALL/SP/SU

**GCBA 903 JOURNAL CLUB 1 Credit Hour**
Typically Offered: FALL/SPR

**GCBA 904 ANATOMICAL SCIENCES JOURNAL CLUB 1 Credit Hour**
Typically Offered: FALL

**GCBA 905 PHYSIOLOGY AND PATHOPHYSIOLOGY OF THE MUSCULOSKELETAL SYSTEM 1-2 Credit Hours**
This course is designed to prepare the graduate student to explain the fundamental principles of physiology and pathophysiology of the musculoskeletal system and to apply their understanding of these principles and their knowledge of anatomy and/or histology to develop clinical case studies that provide the opportunity to interpret and evaluate physiologic, histopathologic, and pathophysiologic findings in a clinical context.
Prerequisite: GCBA 908/909
Corequisite: GCBA 908/909
Instructor: Karen Gould, Travis McCumber, Robert Norgren, Matt Vilburn
Typically Offered: FALL/SP/SU

**GCBA 906 TEACHING THEORY & APPLICATION 2 Credit Hours**
This course is targeted to graduate/professional students or anyone in interested in expanding their knowledge of teaching theory. This course blends research on learning principles, effective classroom teaching and the skill of application to improve their foundation of teaching.
Typically Offered: SUM/FALL

**GCBA 907 TEACHING AND RESEARCH PRESENTATION SKILLS 2 Credit Hours**
This is a required course for PhD seeking students. This course focuses on the development of the fundamental skills required for making effective presentations in both a classroom and research context.
Prerequisite: Permission of instructor.
Typically Offered: SPRING

**GCBA 908 GROSS ANATOMY LECTURE 5 Credit Hours**
This course is a comprehensive study of human anatomy with clinical correlations. Taken as a companion to the GCBA 909 course, which involves a full body dissection.
Prerequisite: GCBA 909 (or concurrent registration)
Typically Offered: FALL

**GCBA 909 GROSS ANATOMY LABORATORY 6 Credit Hours**
This course allows hands-on application of anatomical concepts and relationships through whole body dissection in small groups.Taken as a companion to the GCBA 908 course.
Prerequisite: GCBA 908 (or concurrent enrollment).
Typically Offered: FALL

**GCBA 912 MODERN APPROACHES IN CELL BIOLOGY & MOLECULAR GENETICS 3 Credit Hours**
This advanced-level course will focus on current techniques and concepts in cell biology and genetics. This course includes a didactic component as well as discussion section where the students will be asked to present their interpretations and ideas on cutting edge research. Hands on workshops and demonstrations are also conducted weekly.
Prerequisite: Permission of instructor.
Typically Offered: SPRING

**GCBA 913 ADVANCED GROSS ANATOMY & DISSECTION 4 Credit Hours**
This course provides foundational knowledge about structures and processes in the nervous system. Consequences of use, disuse, age, pathology, and injury will be addressed as they relate to sensorimotor impairment, disability, and/or handicap.
Prerequisite: GCBA 908 and GCBA 909
Typically Offered: SUMMER

**GCBA 940 TEACHING PRACTICUM: HUMAN GROSS ANATOMY 2 Credit Hours**
A series of courses designed to provide an opportunity for students to develop and apply the skills requisite for effective teaching in the anatomical sciences.
Prerequisite: Appropriate GCBA course(s) or equivalent, GCBA 806, GCBA 910, GCBA 920 and permission of instructor.
Typically Offered: SUM/FALL

**GCBA 942 TEACHING PRACTICUM: HUMAN NEUROANATOMY 1 Credit Hour**
A series of courses designed to provide an opportunity for students to develop and apply the skills requisite for effective teaching in the anatomical sciences.
Prerequisite: Appropriate GCBA course(s) or equivalent, GCBA 907, GCBA 908, GCBA 909 and permission of instructor.
Typically Offered: SPRING

**GCBA 945 STEM CELL AND DEVELOPMENTAL BIOLOGY 2 Credit Hours**
An in depth study of the basic science of stem cell biology and the application of tissue engineering principles to generate stem cell-based solutions to significant clinical problems. Special emphasis is placed on embryonic stem cells, adult stem cells, and stem cell plasticity and the interaction between stem cells and the mircoenvironment.
Prerequisite: IPBS 801-803
Typically Offered: SUMMER

**GCBA 949 TEACHING PRACTICUM: HUMAN HISTOLOGY 2 Credit Hours**
A series of courses designed to provide an opportunity for students to develop and apply the skills requisite for effective teaching in the anatomical sciences.
Prerequisite: Appropriate GCBA course(s) or equivalent, GCBA 806, GCBA 910, GCBA 920 and permission of instructor.
Typically Offered: FALL/SPR

**GCBA 970 SEMINAR 1 Credit Hour**
Attendance at weekly seminars offered by the department/program, or other activities specific to the degree program (contact the program director for more information).
Typically Offered: FALL/SPR

**GCBA 971 PROFESSIONAL OPPORTUNITIES SEMINAR 1 Credit Hour**
In this course students will shadow a series of physicians of healthcare professionals from participating units. Through the course of these shadowing experiences, student will have the opportunity to see first hand how knowledge of human anatomy is utilized on a day to day basis in clinical practice.
Typically Offered: FALL

**GCBA 999 DOCTORAL DISSERTATION 1-15 Credit Hours**
Independent student research related to the PhD dissertation. This course may be utilized before or after successful completion of the comprehensive exam.
Typically Offered: FALL/SP/SU