

Secondary Field of Study in Human Anatomy

Department of Anatomy and Regenerative Biology

The major goal of the program is to have students obtain a broad understanding of human morphology as it relates to function, ranging from embryologic development through adulthood.

The program consists of the following courses:

1. ANAT 2181 Human Gross Anatomy (3 credit hours)
2. ANAT 2160 Human Functional Neuroanatomy (3 credit hours)
3. ANAT 2130 Human Embryology (3 credit hours)
4. ANAT 2150 Human Microscopic Anatomy (3 credit hours)

The secondary field is constituted of 12 credits of these Anatomy courses with a prerequisite of BiSc5 and 6 (3 credits each) or BiSc 11 and 12 (4 credits each) or High School AP Biology. In order to remain in the program, students must earn letter grades of C- or better in the required courses.

ANAT 2181 Human Gross Anatomy: The course provides a broad appreciation for the structural organization of the human body and relates that organization to function. Descriptions of alterations in normal anatomy through disease or injury reinforce the significance of the anatomical structure/function relationships. Lecture material is supplemented with cadaver demonstrations in the Gross Anatomy Laboratory of the Medical School. The learning objectives are:

- 1) Describe the structure and function of the musculoskeletal system in the upper and lower limbs and common clinical diseases and injuries associated with it.
- 2) Describe the structure and function of the musculoskeletal components of the thoracic and abdominal walls.
- 3) Describe the regional organization, structure, and function of the major organ systems in the thorax, including the mechanics of respiration (Respiratory System) and the cardiac cycle (Cardiovascular System).
- 4) Describe the regional organization, structure, and function of the major organ systems in the abdomen and pelvis, including the gastrointestinal tract (Digestive System), kidneys, ureters, and bladder (Urinary System), and the genital organs (Reproductive System).
- 5) Describe the structural organization of the head and neck and the distribution and function of the various cranial nerves that influence its somatic and sensory components.

ANAT 2160 Human Functional Neuroanatomy: The course explores the structure-function relationships of the human central (CNS) and peripheral (PNS) nervous systems and will introduce common clinical correlations, i.e., diseases or injuries whose occurrence or expression has an abnormal impact on the normal structure-function relationship. The availability of real human cadaveric brain specimens for demonstrations in laboratory sessions in the School of Medicine adds a unique and enriching dimension to the course content. The learning objectives are:

- 1) Recognize the major features of the external and internal morphology of the adult and developing brain, spinal cord, and peripheral nerves, including the blood supply, meninges and ventricular system.
- 2) Describe the connections between anatomical structures that comprise the sensory and motor systems of the CNS.
- 3) Interpret common PNS and CNS lesions and recognize their etiology.

ANAT 2130 Human Embryology: Lectures will cover development of basic organ systems, with an emphasis on congenital birth defects. Students will also be introduced to topics including molecular control of development and assisted reproductive technologies. Two lecture sessions will be demonstration laboratories where students will study computer animations of human development, anatomical models, and preserved specimens. The learning objectives are:

- 1) Describe the early human embryologic development, from fertilization to development of the major organ systems during the embryonic period (3rd to 8th week).
- 2) Describe the development of the skeletal, muscular, cardiovascular, respiratory, digestive, urogenital, integumentary, auditory, and visual systems.
- 3) Explain basic concepts concerning the molecular control of human development.
- 4) Explain the developmental basis of common birth defects.

ANAT 2150 Human Microscopic Anatomy: The course is designed to provide a basic background in the normal histological structure of cells, tissues and organs of the human body. Because there is an inseparable relationship between structure and function, emphasis is placed on structural-functional correlates at both the light and electron microscopic levels. Descriptions of alterations in normal histology through disease or injury provide an understanding of the etiology of various disease states. Histological terms and concepts are taught for the purpose of identification and precise communication. The learning objectives are:

- 1) Describe the basic structure of a cell, including the function of membranes and organelles.
- 2) Describe how the type and histological arrangement of the cells present within tissues and organs of each major body system relate to the function of those tissues and organs.
- 3) Recognize how histological structure and function relate to the etiology of various disease states.

After completing the Embryology, Microscopic Anatomy, Human Gross Anatomy, and Functional Neuroanatomy courses, students will be able to demonstrate comprehension of: a) the stages of human development; b) the structure and cellular components of the tissues and organs and their physical and functional interrelationships; c) the regional organization of the musculoskeletal system and major organs, and d) the functional and internal/external organization of the central and peripheral nervous systems, by taking multiple choice and short answer examinations.