

**STATE UNIVERSITY OF NEW YORK  
COLLEGE OF TECHNOLOGY  
CANTON, NEW YORK**



**COURSE OUTLINE**

**BIOL 207 – Human Anatomy**

**Prepared By: Ron Tavernier, PhD**

**School of Science, Health and Criminal Justice  
Science Department  
May 2015**

- A. **TITLE:** Human Anatomy
- B. **COURSE NUMBER:** BIOL 207
- C. **CREDIT HOURS:** 4
- D. **WRITING INTENSIVE COURSE:** No
- E. **COURSE LENGTH:** 15 weeks
- F. **SEMESTER(S) OFFERED:** Spring
- G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**  
Two seventy-five minute lectures and one 180-minute laboratory session per week.
- H. **CATALOG DESCRIPTION:** This course is a detailed study of the human body with the emphasis on structure and general function. Included topics are cells, tissues, skeletal, muscular, digestive, circulatory, respiratory, reproductive, urinary, nervous, endocrine systems and sense organs. This course is most suitable for students in health-related, biology, or Mortuary Science curriculums requiring in-depth knowledge of the human body.
- I. **PRE-REQUISITES/CO-REQUISITES:** New York State Regents Biology examination grade of 75+ or Intro to Biology (BIOL 101) or Intro to Human Biology (BIOL102) or College Biology I (BIOL 105) or permission of the instructor.
- J. **GOALS (STUDENT LEARNING OUTCOMES):**  
By the end of this course, the student will be able to:

<i>Course Objective</i>	<i>Institutional SLO</i>
1. Use correct anatomical terminology to describe body directions, regions, planes and sections. Identify the major regions of a cell and the major subcellular organelles and describe the general function of each. Identify the body's main tissue types and describe their structure, function, and location. Identify and describe the major features of the integument, major bones and cartilages of the human skeleton and describe the gross and microscopic structure of a long bone.	3. Prof. Competence
2. Identify and describe the types of joints and the movements they allow. Identify the major muscles of the human body and describe the gross and microscopic structure of a skeletal muscle. Identify the components of the urinary system, the male and female reproductive systems and describe their structure and function.	3. Prof. Competence
3. Identify the components of the respiratory and digestive systems and describe their general functions. Describe the structure of the heart, blood vessels and lymphatic vessels, and identify the major arteries, veins and lymphatic vessels of the human body.	3. Prof. Competence
4. Identify the major endocrine organs and describe their functions. Describe the structure and function of the neuron and identify the main structural and	3. Prof. Competence

<b>functional divisions of the nervous system. Identify the major regions of the brain and spinal cord and describe their general functions.</b>	
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**K. TEXTS:**

Marieb, Wilhelm and Mallatt, *Human Anatomy*, 6<sup>th</sup> edition, Benjamin-Cummings, 2012

**L. REFERENCES: None**

**M. EQUIPMENT: Appropriate laboratory materials**

**N. GRADING METHOD:**

A	90% +
B+	85-89%
B	80-84%
C+	75-79%
C	70-74%
D+	65-69%
D	60-64%
F	<60

**N. MEASUREMENT CRITERIA/METHODS:**

- Term Tests
- Lab Practicums
- Final Exam
- Weekly homework/online quizzes/in-class quizzes

**P. DETAILED COURSE AND LABORATORY OUTLINE:**

I. Orientation and Terminology.

- Define anatomy and describe its major subdivisions.
- Define and explain the principle of complementary structure and function.
- Name (in order of increasing complexity) the different levels of structural organization that make up the human body, and describe each one.
- Describe the anatomical position.
- Use correct anatomical terminology to describe body directions, divisions, and planes.
- Identify the names of specific body areas (regional terms).
- Name and describe the major body cavities and their subdivisions.
- Name the specific serous membranes and state their common function.

II. Cellular Anatomy

- List the three major regions of a generalized cell and indicate the general function of each region.
- Describe the structure of the plasma membrane and relate it to membrane function.
- Describe the structure and function of the microvilli.
- Describe and compare the structure and function of tight junctions, desmosomes, and gap junctions.
- Describe the function of mitochondria, free ribosomes, bound ribosomes, rough endoplasmic reticulum, smooth endoplasmic reticulum, Golgi apparatus, and lysosomes.
- Describe the functions of the nuclear membrane, nucleolus, and chromatin.

III. Tissues

- A. Define tissue.
- B. List two ways that cells may be specialized to do certain things.
- C. List the four basic tissue types and their general functions.
- D. List the functions of epithelial tissue.
- E. List and describe the structural and functional characteristics of epithelial tissue.
- F. Explain how epithelial tissues are classified.
- G. Name and describe the various classes of epithelia.
- H. List the major function of each type of epithelial tissue and its major locations.
- I. List the four main subclasses of connective tissue.
- J. List the common characteristics of connective tissue.
- K. List the three types of fibers found in connective tissue and describe the structure and function of each.
- L. Name the characteristic cell type for each subclass of connective tissue.
- M. Describe the types of connective tissue found in the body and indicate their characteristic functions and locations.
- N. Describe the three types of membrane (cutaneous, mucous, serous).
- O. List the three types of muscle tissue.
- P. Compare and contrast the structure and locations of the three types of muscle tissue.
- Q. Describe the structure, function, and location of nervous tissue.

#### IV. The Integumentary System

- A. Describe the subdivisions of the integument.
- B. List the six major functions of the integument and describe each one.
- C. List and describe the three ways in which the integument constitutes a barrier.
- D. List the five types of sensory receptors in the integument and describe the type of stimulus each one detects.
- E. Name the specific tissue types composing the epidermis and dermis.
- F. Describe the cellular structure of the epidermis.
- G. Describe the structure of the layers of the epidermis.
- H. Describe the two layers of the dermis.
- I. Describe the structure of hair and hair follicles, and the features of hair growth.
- J. Describe the anatomy of nails.
- K. Describe the structure and function of sweat glands.
- L. Describe the structure and function of sebaceous glands.

#### V. Bones and Skeletal Tissue

- A. Locate the major cartilages of the adult skeleton.
- B. List and describe five important functions of bones.
- C. Compare and contrast the structure of the four bone shape classes and provide examples of each.
- D. Describe the gross anatomy of a typical long bone and flat bone. Include the locations and functions of red marrow, yellow marrow, articular cartilage, periosteum, and endosteum.
- E. Describe the microscopic structure of compact and spongy bone.
- F. Describe the anatomy of an osteon.
- G. Describe the chemical composition of bone and the characteristic conferred by its organic and inorganic components.
- H. Describe, compare, and contrast the two types of osteogenesis: intramembranous ossification and endochondral ossification.
- I. Describe the process of long bone growth that occurs at epiphyseal plates.
- J. Compare the locations and functions of osteoblasts, osteocytes, and osteoclasts, in bone remodeling.
- K. Describe the four steps of fracture repair.
- L. Identify the following types of fractures: compound, comminuted, compression, depressed, greenstick, spiral.
- M. Be able to label a diagram of a long bone.

## VI. Joints

- A. Define joint or articulation.
- B. List the two general functions of joints.
- C. Describe how joints are classified.
- D. Define synarthrotic, amphiarthrotic, and diarthrotic.
- E. Describe the general structure of fibrous joints. Name, describe, and give an example of each of the three common types of fibrous joints.
- F. Describe the general structure of cartilaginous joints. Name, describe, and give an example of each of the two common types of cartilaginous joints.
- G. Describe the five structural features shared by all synovial joints.
- H. List and describe four common accessory features of synovial joints.
- I. List three factors that contribute to synovial joint stability.
- J. Name and describe the movements allowed by synovial joints.
- K. Describe the six types of synovial joints based on the movement(s) allowed (plane, hinge, pivot, condyloid, saddle, ball and socket). Provide examples of each type.
- L. Describe the knee. Consider the articulating bones, accessory structures present, movements allowed, and factors contributing to joint stability.
- M. Be able to label a diagram of the knee.

## VII. Muscle Tissue

- A. List four characteristics of all muscle tissue.
- B. Compare and contrast the three types of muscle tissue.
- C. List four important functions of muscles.
- D. List and describe the four functional characteristics of muscle tissue.
- E. Describe the gross structure of a skeletal muscle including the names of its connective tissue coverings.
- F. Describe the two types of muscle attachment and the idea of origins and insertions.
- G. Name and describe the patterns of fascicle arrangement.
- H. Describe the microscopic structure of skeletal muscle fibers.
- I. Describe the molecular anatomy of a sarcomere.
- J. Describe the structure and function of thick and thin filaments.
- K. Explain the sliding filament theory of muscle contraction.
- L. Compare and contrast the anatomy of smooth muscle to that of skeletal muscle.
- M. Be able to label the parts of a skeletal muscle.

## VIII. Urinary System

- A. List the four components of the urinary system.
- B. List at least three functions of the urinary system.
- C. Describe the external and internal anatomy of the kidney and its coverings.
- D. Describe the anatomy of a nephron and explain the general function of each component.
- E. Describe the structure and function of ureters, urinary bladder, and urethra.
- F. Identify the trigone and explain its significance.
- G. Compare the course, length, and functions of the male urethra with those of the female.
- H. Be able to label a diagram of the kidney.

## IX. Reproductive System

- A. Describe the common function of the male and female reproductive systems.
- B. List the specific functions of the male and female reproductive systems.
- C. Describe the structure and function of the testes and explain the importance of their location in the scrotum.
- D. Explain the role of the pampiniform plexus in testicular function.
- E. Name, in order, the structures a sperm cell traverses from its origin in the seminiferous tubule until it leaves the body.
- F. Describe the location, structure, and function of the accessory organs of the male reproductive system.
- G. Describe the structure of the penis.

- H. List the three regions of the male urethra.
- I. Be able to label a diagram of a teste.
- J. Describe the location, structure, and function of the ovaries.
- K. Describe the location, structure, and function of each part of the female reproductive duct system (vagina, cervix, uterus, uterine tube).
- L. Describe the structure and function of the female external genitalia.
- M. Name, in order, the structures and egg cell/embryo/fetus traverses from its origin in an ovary until it leaves the body.
- N. Discuss the structure and function of the mammary glands.
- O. Be able to label a diagram of the female reproductive system.

#### X. The Respiratory System

- A. Describe the overall function of the respiratory system.
- B. List and describe the four processes involved in respiration.
- C. Identify the organs forming the respiratory passageway in descending order until the alveoli are reached.
- D. Describe the anatomy and the functions of the nose.
- E. Describe the anatomy and functions of the nasal cavity.
- F. Describe the structure and function of the respiratory mucosa.
- G. List and describe the three divisions of the pharynx.
- H. Describe the structure and functions of the larynx.
- I. Describe the structure and function of the trachea.
- J. Describe the structure of the bronchial tree.
- K. Describe the structure of the “respiratory zone” and the respiratory membrane, and relate their structures to function.
- L. Describe the gross anatomy of the lungs and pleural coverings.

#### XI. Digestive System

- A. Describe the overall function of the digestive system and list the organs of the alimentary canal and the accessory digestive organs.
- B. List and describe the six processes occurring during digestive system activity.
- C. Describe the location and function of the peritoneum and the peritoneal cavity, including the mesentery.
- D. Define retroperitoneal.
- E. Describe the tissue composition and the general functions of each of the four layers of the alimentary tube.
- F. Describe the structure and functions of the oral cavity.
- G. List the functions of the tongue and the three types of papillae.
- H. Describe the composition and functions of saliva.
- I. Distinguish between extrinsic and intrinsic salivary glands.
- J. Describe the dental formula and list the four types of teeth and their general functions.
- K. List the three regions of the pharynx.
- L. Describe the structure and function of the esophagus.
- M. Describe the gross and microscopic anatomy of the stomach.
- N. Describe the composition of gastric juice, name the cell types responsible for secreting its various components, and indicate the importance of each component in stomach activity.
- O. Identify the main function of the small intestine.
- P. List and locate the three parts of the small intestine.
- Q. Describe the structural modifications that enhance absorption in the small intestine.
- R. State the roles of bile and pancreatic juice in digestion.
- S. Name, locate and briefly describe the digestive function of the three accessory organs to the small intestine.
- T. Describe the anatomy and functions of the large intestine.
- U. Describe the epithelial lining of the digestive system from the oral cavity to the anal canal.

#### XII. The Heart

- A. Describe the size and shape of the heart, and its location and orientation in the thoracic cavity.
- B. Describe the connective tissue coverings of the heart.
- C. Describe the structure and function of each of the three layers of the heart wall.
- D. Describe the structure and functions of the four heart chambers. Name each chamber and provide the name and general route of its associated great vessels.
- E. Trace the pathway of blood through the heart.
- F. Describe the generalized flow of blood through the body, beginning and ending at the heart.
- G. Name the heart valves and describe their location, function, and mechanism of operation.
- H. Identify the major branches of the coronary arteries and veins.
- I. Be able to label a diagram of the heart.

### XIII. Blood Vessels

- A. List the three major types of blood vessels.
- B. Describe the generalized blood flow circuit.
- C. Define artery.
- D. Define vein.
- E. Describe the three layers of the wall of a blood vessel and state the function of each.
- F. Define vasoconstriction and vasodilation.
- G. Compare and contrast the structure and function of the three types of arteries.
- H. Describe the structure and function of veins, and explain how veins differ from arteries.
- I. Discuss the function and importance of venous valves.
- J. Describe the structure and function of a capillary bed.
- K. Describe how blood flow through the capillary beds is regulated.
- L. Describe the structure of the two basic types of capillaries and name a location for each.
- M. Trace the pathway of blood through the pulmonary circuit.
- N. Trace the pathway of blood through the systemic circuit.
- O. Name the major arteries and veins in both the systemic and pulmonary circuits.

### XIV. Lymphatic System

- A. Identify the two parts of the lymphatic system.
- B. Describe the composition and function of lymph.
- C. Describe the structure of lymph capillaries and compare it to vascular capillaries.
- D. Locate the two main lymphatic ducts (thoracic duct and right lymphatic duct).
- E. Describe the locations, structure, and functions of the following lymphoid organs: lymph nodes, spleen, thymus, tonsils, and lymphoid follicles.

### XV. Endocrine System

- A. Indicate important differences between hormonal and neural controls of body functioning.
- B. List the major endocrine organs and describe their locations in the body.
- C. Describe the structure of the pituitary gland and list the major hormones released from each area and their functions.
- D. List the hormones released by the thyroid and parathyroid glands and their functions.
- E. Describe the structure of the adrenal glands and list the major adrenal hormones and their functions.
- F. Describe the functions of insulin and glucagons.
- H. Describe the location and function of the thymus.

### XVI. Fundamentals of the Nervous System and Nervous Tissue

- A. List the basic functions of the nervous system.
- B. List and describe the organization of the nervous system.
- C. Describe the structure of a neuron.
- D. Explain the importance of the myelin sheath.
- E. Describe the structural classification of neurons.
- F. List the three functional categories of neurons.

## XVII. Central Nervous System

- A. List the two components of the central nervous system.
- B. Name the major regions of the adult brain.
- C. Describe the general structure of the brain and spinal cord and explain how it reflects their embryonic origin.
- D. Define the structure and function of ventricles and indicate the locations of the ventricles of the brain.
- E. List the three regions of the cerebral cortex.
- F. List the major lobes, fissures, and sulci of the cerebral cortex.
- G. Explain lateralization of hemisphere function. Name the main qualities that each hemisphere controls.
- H. Explain what is meant by contralateral control.
- I. Locate the primary motor and sensory cortex.
- J. Differentiate between commissures, association fibers, and projection fibers.
- K. Describe the location of the diencephalon and name its subdivisions.
- L. List the functions of the thalamus, hypothalamus, and epithalamus.
- M. Identify the three major regions of the brain stem and note the general function of each area.
- N. Describe the structure and function of the cerebellum.
- O. Describe the structure and function of the meninges.
- P. Name the main functions of cerebrospinal fluid.
- Q. Describe the structure of the spinal cord.
- R. Know the general function of each part of the central nervous system.
- S. Be able to label diagrams of the brain.