



ANATOMY AND PHYSIOLOGY I

Date 12/15/11

C - L - CR
3 - 3 - 4

COURSE NUMBER: BIO 210

PREREQUISITE(S): BIO 101 or BIO 112 with a "C" or better.

CO-REQUISITE(S): None

COURSE

DESCRIPTION:

This is the first in a sequence of courses, including an intensive coverage of the body as an integrated whole. All body systems are studied. This course provides comprehensive coverage of the anatomical and physiological vocabulary and principles necessary to understand the structures, functions, and interrelationships of the following systems: skeletal, muscular, and nervous (central and peripheral). Intermediary metabolism, blood, and sensory organs will also be covered.

COURSE

OUTCOMES:

Students should be able to demonstrate:

1. rationality, logic, and coherence, through critical thinking;
2. their ability to express themselves effectively in written and oral communication;
3. their ability to express themselves effectively in quantitative and qualitative terms;
4. the scientific method of inquiry;
5. their ability to access, retrieve, synthesize, and evaluate information.

TEXTBOOK(S):

Fundamentals of Anatomy & Physiology. Frederic H. Martini. 9th Edition. 2012 Benjamin Cummings Pub.
ISBN-10: 0321719794
ISBN-13: 9780321719799

OTHER REQUIRED

MATERIALS:

Any additional resources will be provided by the Instructor.

METHOD OF

INSTRUCTION:

Lecture, discussion, questioning, and laboratory sessions are the primary methods. Audio-visuals, interactive software, and internet resources may also be used.

TESTING:

Lecture exams, laboratory practical exams, quizzes (optional), and the final exam may include combinations of multiple choice, fill-in-the-blank, matching, and short answer/essay questions. Make-up exams will normally be scheduled at the end of the semester during the final exam period. There are no make-ups on quizzes. All written assignments (homework, labs, quizzes, exams) will be graded and available for review within one week of submission. Lecture exams will be available during office hours for review and discussion. All lecture exams must be returned to the instructor after review.

<u>GRADING SYSTEM:</u>	90 - 100 = A
	80 - 89 = B
	70 - 79 = C
	60 - 69 = D
	Below 60 = F

<u>GRADE CALCULATION METHOD:</u>	4 Lecture Exams	=	40%
	4 Laboratory Exams (+ quiz average)	=	40%
	Final exam (Comprehensive)	=	<u>20%</u>
			100%

ATTENDANCE POLICY:

Please see Student Planner & Handbook pages 77-80.

ACADEMIC CONDUCT:

Academic Dishonesty: Please see Student Planner & Handbook page 98.

Cellular Phones and Pagers/Beepers: Please see Student Planner & Handbook pages 76-77.

CLASS/LAB PROCEDURES:

1. Read the laboratory and lecture material prior to class.
2. Handle all instruments, preserved specimens, and models carefully. Reassemble models and return them to the appropriate place.
3. Do not use pens or pencils to point out features of models. Wooden pointers are made available.
4. Return prepared slides to the appropriate slide tray.
5. Report damaged models, slides, or equipment to the instructor.
6. Observe conventional sanitary precautions.
7. No eating or drinking in the laboratory.
8. Immediately report any injuries to the instructor.
9. Do not use any device without instruction and/or permission.

ACCOMMODATIONS:

Students who need special accommodations in this class because of a documented disability should notify Student Disability Services by calling (864) 592-4818, toll-free 1-800-922-3679; via email through the SCC web site at www.sccsc.edu/resources/disabilities; or by visiting the office located in the East Building Room 30-B on the SCC Central campus. Contacting Student Disability Services early in the semester gives the College an opportunity to provide necessary support services and appropriate accommodations.

COURSE OUTCOMES & OBJECTIVES:

Upon satisfactory completion of this course, the student will be able to:

- I. Demonstrate rationality, logic, and coherence through critical thinking; demonstrate their ability to express themselves effectively in written and oral communication; demonstrate their ability to express themselves effectively in quantitative and qualitative terms; demonstrate the scientific method of inquiry; and demonstrate

their ability to access, retrieve, synthesize, and evaluate information.

- A. Define metabolism and give specific examples of anabolism and catabolism.
 1. Describe the basic steps in glycolysis, the TCA cycle, and the electron transport chain and summarize the energy yield of each process.
 2. Define, explain, and give specific examples of reduction/oxidation reactions.
 3. Define substrate-level phosphorylation and oxidative phosphorylation.
 4. Describe the pathways involved in lipid metabolism.
 5. Summarize the main features of protein metabolism and the use of proteins as an energy source.
 6. Differentiate between the absorptive and postabsorptive metabolic states and summarize the characteristics of each.
 7. Discuss the homeostatic mechanisms that maintain a relatively constant body temperature.
- B. Describe the composition of blood (plasma and formed elements) and explain the major functions of the blood in terms of the cardiovascular system.
 1. Differentiate between plasma and serum.
 2. List the characteristics and functions of red blood cells.
 3. Describe the structure of hemoglobin and explain its function.
 4. Describe how the components of red blood cells are recycled.
 5. Define erythropoiesis, identify the stages involved in red blood cell maturation, and describe the homeostatic regulation of red blood cell production.
 6. Define anemia and explain several causes for this condition.
 7. Define and explain the term hematocrit.
 8. Explain the importance of blood typing and the basis for ABO and Rh incompatibilities.
 9. Categorize the various white blood cells on the basis of their structures and functions and discuss the factors that regulate the production (leukopoiesis) of each type.
 10. Describe the structure, function, and production of platelets.
 11. Discuss mechanisms that control blood loss after an injury, and describe the final reaction sequences responsible for blood coagulation.
 12. Describe the final reaction sequences responsible for fibrinolysis.
- C. Describe the structure and functions of the skeletal system.
 1. Describe the nature and function of the organic and inorganic components of bone.
 2. Identify the major types of bone markings and explain their functional significance.
 3. Identify the cell types in bone and list their major functions.
 4. Describe the functions and fundamental histology of compact and spongy bone.
 5. Distinguish between red and yellow bone marrow in terms of structure and location.
 6. Describe and compare the mechanisms of intramembranous ossification and endochondral ossification.
 7. Explain primary and secondary ossification and the role of the epiphyseal

- plate in bone growth.
8. Describe bone remodeling.
 9. Describe several types of bone fractures and outline the events of bone repair.
 10. Identify all the bones of the skull and identify selected markings and foramina on the individual bones.
 11. Identify bones of the vertebral regions and describe the distinctive structural and functional characteristics of each vertebral group.
 12. Identify the bones of the sternum and true, false, and floating ribs.
 13. Identify all the bones forming the pectoral girdle and the upper limbs (including the carpal bones) and their superficial features.
 14. Identify all the bones forming the pelvic girdle and the lower limbs (including the tarsal bones), and their superficial features.
- D. Name, compare, and contrast the major categories of joints and explain the relationship between structure and function for each category.
1. Describe the basic structure of a synovial joint, and describe common accessory structures and their functions.
 2. List the types of synovial joints, and discuss how the characteristic motions of each type are related to anatomical structure.
 3. Describe the articulations between the vertebrae.
 4. Describe the structure and function of the shoulder, elbow, hip, and knee joints.
 5. Explain, using specific examples, the relationship between joint strength and mobility.
 6. Describe the effects of aging on articulations and discuss the most common clinical problems that develop as a result of aging.
- E. Describe the anatomical components and functional divisions of the nervous system.
1. Identify the histological features of a typical neuron and describe their functions.
 2. Classify neurons on the basis of their structure and function.
 3. Describe the locations and functions of neuroglia.
 4. Explain how the resting membrane potential is created and maintained.
 5. Describe the specific events involved in the generation and propagation of an action potential.
 6. Discuss the factors that affect the speed of action potential propagation.
 7. Explain the terms excitatory and inhibitory post-synaptic potentials.
- F. Describe the structure and function of skeletal muscle tissue.
1. Describe the organization of muscle at the tissue and cellular level.
 2. Identify the structural (histological) components of a sarcomere.
 3. Identify the components of the neuromuscular junction and summarize the events involved in the neural control of skeletal muscles.
 4. Explain the specific events involved in excitation-contraction coupling.
 5. Describe the mechanism (sliding filament theory) responsible for tension production in a muscle fiber, and discuss the factors that determine the peak tension developed during a contraction.

6. Differentiate between the absolute and relative refractory period.
 7. Discuss the factors that affect peak tension production during contraction of an entire skeletal muscle, and explain the significance of the motor unit in this process.
 8. Compare the different types of muscle contractions.
 9. Describe the factors that contribute to muscle fatigue and discuss the stages and mechanisms involved in the muscle's subsequent recovery.
 10. Distinguish between aerobic and anaerobic metabolism in the muscle cell.
 11. Identify and explain the structural and functional differences among skeletal muscle fibers, cardiac muscle cells, and smooth muscle cells.
 12. Discuss the roles of smooth muscle in systems throughout the body.
 13. Predict the actions of a muscle on the basis of the relative positions of its origin and insertion.
 14. Explain how the name of a muscle can help identify its location, appearance, or function.
 15. Identify the principal axial muscles of the body and name selected origins, insertions, and actions.
 16. Identify the principal appendicular muscles of the body and name selected origins, insertions, and actions.
- G. Name the major anatomical regions of the central nervous system and describe their functions.
1. Name the three primary brain vesicles and indicate which adult structures they become.
 2. Name and identify the ventricles of the brain, describe their locations and the connections between them.
 3. Discuss the formation, circulation, and functions of cerebrospinal fluid.
 4. Describe the basic anatomy and specify the functions of the medulla oblongata, pons, and cerebellum.
 5. Identify the major anatomical subdivisions of the cerebrum.
 6. Locate the motor, sensory, and association areas of the cerebral cortex, and discuss their functions.
 7. Identify selected cranial nerves and explain the functions of all the cranial nerves.
 8. Discuss the structure and functions of the spinal cord.
 9. Name and describe the three meningeal layers and the enclosed spaces that surround the central nervous system.
 10. Explain the roles of white matter and gray matter in processing and relaying sensory information and motor commands.
- H. Specify the components and functions of the afferent and efferent divisions of the nervous system and explain what is meant by the somatic nervous system.
- I. Compare the organization of the autonomic nervous system with the somatic nervous system.
1. Describe the structures and functions of the sympathetic division and the parasympathetic divisions of the autonomic nervous system.
 2. Describe the mechanisms of neurotransmitter release in both divisions.
 3. Discuss the relationship between the two divisions of the autonomic nervous system.

system and the significance of dual innervation.

- J. Identify and describe the sensory organs of smell, vision, taste, and hearing.
1. Identify the accessory structures of the eye and explain their functions.
 2. Describe and identify the internal structures of the eye and explain their functions.
 3. Explain how light stimulates the production of nerve impulses and trace the visual pathways to their destinations in the brain.
 4. Describe the structures and functions of the external and middle ear.
 5. Describe the parts of the inner ear and their roles in equilibrium and hearing.