



ANATOMY AND PHYSIOLOGY II

Date 12/15/11

C - L - CR
3 - 3 - 4

COURSE NUMBER: BIO 211

PREREQUISITE(S): BIO 210 with a grade of "C" or better.

CO-REQUISITE(S): None

COURSE

DESCRIPTION:

This is a continuation of a sequence of courses, including 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: endocrine, cardiovascular, lymphatic, urinary, respiratory, digestive, reproductive, and immune. Additional topics will include fluid, electrolyte, and acid-base balance.

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. Describe the major organs and functions of the endocrine system.
 1. Distinguish between endocrine tissue and exocrine tissue.
 2. Explain the importance of intercellular communication and describe the various types of mechanisms involved.
 3. Compare the modes of intercellular communication used by the endocrine and nervous systems and discuss the functional significance of the differences between the two systems.
 4. Compare the cellular components of the endocrine system with those of other tissues and systems.
 5. Compare the major structural classes of hormones.
 6. Explain the general mechanisms of hormonal action (including G-protein coupled second messenger systems).
 7. Describe neural, hormonal, and humoral control of endocrine organs.
 8. Describe the structure of the pituitary gland and explain its anatomical and functional relationships with the hypothalamus.
 - a. Identify the hormones produced/released by the anterior and posterior lobes of the pituitary gland and specify the functions of those hormones.
 - b. Discuss the results of abnormal levels of pituitary hormone production.
 9. Identify the hormones produced by the thyroid gland, parathyroid gland, adrenal cortex (each layer), adrenal medulla, and pineal gland.
 - a. Specify the functions of those hormones and discuss the results of abnormal levels of those hormones.
 10. Describe the histologic structure of the pancreas.
 - a. Identify the hormones produced by the pancreas, and specify the functions of those hormones.
 - b. Discuss the results of abnormal levels of pancreatic hormone production.
 11. Discuss Type I and Type II diabetes mellitus.
 12. Describe the functions of the hormones produced by the kidneys, heart, thymus, testes, ovaries, and adipose tissue.
- B. Describe the basic organization and functions of the cardiovascular system.
 1. Describe the anatomical features of the heart and pericardium.
 2. Trace the flow of blood through the heart, identifying the major blood vessels, chambers, and heart valves.
 3. Describe the events of the action potential in cardiac muscle and explain the significance of the plateau period.
 4. Discuss the action potential of nodal cells and conducting cells and describe the components of the intrinsic conducting system of the heart.
 5. Identify the electrical events associated with a normal electrocardiogram.
 6. Explain the events of the cardiac cycle, including: atrial and ventricular systole and diastole, opening and closing of heart valves, and heart sounds
 7. Define cardiac output, and describe the factors that influence this variable.
 8. Describe the variables that influence heart rate.
 9. Describe the variables that influence stroke volume.
 10. Distinguish among the types of blood vessels on the basis of their structure and function.

11. Explain the mechanisms that regulate blood flow through arteries, capillaries, and veins.
 12. Describe the factors that influence and/or regulate blood pressure.
 13. Discuss the mechanisms and various pressures involved in the movement of fluid between capillaries and interstitial spaces.
 14. Describe how central and local control mechanisms interact to regulate blood flow and pressure in tissues.
 15. Identify the principal blood vessels and the functional characteristics of the circulation to the brain, heart, and lungs.
 16. Identify the major arteries and veins of the pulmonary circuit.
 17. Identify the major arteries and veins of the systemic circuit.
 18. Identify the differences between fetal and adult circulation patterns.
 19. Describe the changes in the patterns of blood flow that occur at birth.
- C. Identify the major components of the lymphatic system and explain their functions.
1. Describe the structure of lymphoid tissues and organs and explain their functions.
- D. Describe the structures and functions of the respiratory system.
1. Identify the regions and structures of the respiratory system and describe their functions.
 2. Describe the structure of the larynx.
 3. Describe the structure of the conducting pathways.
 4. Describe the superficial anatomy of the lungs and bronchial tree.
 5. Explain the structural features of the respiratory membrane.
 6. Summarize the physical principles governing the movement of air into the lungs and the diffusion of gases into and out of the blood.
 7. Explain the partial pressures of oxygen and carbon dioxide in alveolar air, blood, and the systemic circuit.
 8. Describe how oxygen is bound to hemoglobin, transported, and released in the blood.
 9. Describe three ways carbon dioxide is transported in the blood.
 10. Describe the factors that influence the respiration rate.
- E. Describe and identify the organs of the digestive system and explain their major functions.
1. Explain the meaning of the term enteric nervous system.
 2. Explain the muscular processes that move materials through the digestive tract.
 3. Describe the functions of the major structures and regions of the oral cavity.
 4. Describe the anatomy and functions of the pharynx and esophagus.
 5. Describe the anatomy of the stomach, its histological features, and its role in digestion.
 6. Define and explain the significance of the term alkaline tide.
 7. Describe the anatomical and histological characteristics and functions of the small intestine and large intestine.
 8. Explain the hormonal regulatory mechanisms involved in the various regions of the GI tract.

9. Describe the structure, functions, and regulation of the accessory digestive organs.
 10. Describe the chemical events responsible for the digestion of organic nutrients.
 11. Describe the mechanisms involved in the absorption of organic and inorganic nutrients.
- F. Identify the components of the urinary system and describe the functions of the urinary system.
1. Describe the gross and histological structural features of the kidneys.
 2. Identify the major blood vessels associated with the kidney and trace the path of blood flow through the kidney.
 3. Describe the structure of the nephron and outline the processes involved in the formation of urine.
 4. Discuss the major functions of each portion of the nephron and collecting system.
 5. Describe the factors that influence net filtration pressure and the glomerular filtration rate.
 6. Identify the types of transport mechanisms found along the nephron and discuss the major reabsorptive or secretory functions of each segment of the nephron and collecting system.
 7. Explain the mechanism of counter current exchange.
 8. Explain the role of countercurrent multiplication in the formation of the medullary osmotic gradient.
 9. Describe how ADH, ANP, and aldosterone influence the volume and concentration of urine.
 10. Describe the mechanism of selected antidiuretic drugs.
 11. Describe the structures and functions of the ureters, urinary bladder, and urethra.
- G. Describe the principal components of the reproductive system and summarize their functions.
1. Outline the processes of meiosis and spermatogenesis in the testes.
 2. Explain the roles of the male reproductive tract and accessory glands in the maturation, nourishment, storage, and transport of spermatozoa.
 3. Summarize the hormonal mechanisms that regulate male reproductive functions.
 4. Outline the processes of meiosis and oogenesis in the ovaries.
 5. Describe the structure, histology, and functions of the ovaries, fallopian tubes, uterus, and vagina.
 6. Summarize the anatomical, physiological, and hormonal aspects of the female reproductive cycle.
- H. Explain what is meant by the terms fluid balance, electrolyte balance, and acid–base balance and discuss their importance in homeostasis.
1. Compare the ionic composition of intracellular and extracellular fluids.
 2. Explain the basic concepts involved in the regulation of fluids and electrolytes.
 3. Identify the hormones that play important roles in regulating fluid balance

- and electrolyte balance and describe their effects.
4. Describe the movement of fluid among compartments (ECF, ICF, and the environment).
 5. Discuss the mechanisms regulating sodium, potassium, calcium, and chloride ion concentrations.
 6. Explain the buffering systems that balance the pH of the intracellular and extracellular fluids.
 7. Define and explain the terms respiratory acidosis, respiratory alkalosis, metabolic acidosis, and metabolic alkalosis.
 8. Describe the compensatory mechanisms involved in the maintenance of acid–base balance.
- I. Identify the major components of the immune system and explain their functions.
1. Discuss the importance of lymphocytes and describe their distribution in the body.
 2. Explain the difference between nonspecific and specific defense.
 3. Describe the components and mechanisms of nonspecific defenses.
 4. Distinguish between cell-mediated (cellular) immunity and antibody-mediated (humoral) immunity.
 5. Discuss the types of T cells and the role each plays in the immune response.
 6. Describe the mechanisms of T cell activation and the differentiation of the major classes of T cells.
 7. Describe the mechanisms of B cell activation and the differentiation of plasma cells and memory B cells.
 8. Describe the structure of an antibody and discuss the types of antibodies in body fluids and secretions.
 9. Explain the functions of antibodies.
 10. Discuss the primary and secondary responses to antigen exposure.
 11. Explain the origin of autoimmune disorders, immunodeficiency diseases, and allergies and list important examples of each type of disorder.
 12. Discuss the effects of stress on immune system function.