**I. COURSE TITLE:** Anatomy and Physiology II

 **COURSE NUMBER:** 2206 **CATALOG PREFIX:** BIOL

**II. PREREQUISITE(S):** BIOL 2205

**III. CREDIT HOURS:** 4 **LECTURE HOURS:** 3

 **LABORATORY HOURS:** 1 (3 contact) **OBSERVATION HOURS:** 0

**IV. COURSE DESCRIPTION:**

 Topics cover the structure and function of the human: endocrine system,

 cardiovascular system (including blood), lymphatic system including immunity,

 digestive system including nutrition, respiratory system, urinary system including

 fluid balance, electrolyte and acid-base balance, reproductive system including

 development, and basic genetics including human inheritance. Laboratory

 exercises are designed to complement topics covered in lecture.

**V. ADOPTED TEXT(S):**

*Human Anatomy and Physiology with Mastering Bundle*

10th edition

Marieb and Hoehn

 Pearson/Benjamin Cummings, 2015

ISBN: 978-0-13-416877-7 (Bundle)

Bundle Contents include Interactive Physiology 10 System Suite CD, Laboratory Simulations in Physiology, Practice Anatomy Lab and Brief Atlas of the Human Body

**VI. COURSE OBJECTIVES:**

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

 Endocrine System

 1. Distinguish between endocrine and exocrine glands.

 2. Describe how hormones can be classified according to their chemical composition.

 3. Explain how steroid and nonsteroid hormones affect target cells.

 4. Discuss how negative feedback mechanisms regulate hormonal secretion.

 5. Explain how the nervous system controls hormonal secretion.

 6. Name and describe the locations of the major endocrine glands and list the hormones they secrete.

 7. Describe the general functions of the hormones.

 Blood

 1. Describe the general characteristics of blood and discuss its major
 functions.

 2. Distinguish among the formed elements of the blood.

 3. Explain the significance of red blood cell counts and how they are used to
 diagnose disease.

 4. Discuss the life cycle of a red blood cell.

 5. Explain the control of red blood cell production.

 6. Distinguish among the different types of white blood cells and give the
 functions of each type.

 7. List the major components of plasma and describe the functions of each.

 8. Define hemostasis and explain the mechanisms that help to achieve it.

 9. Describe the major steps in hemostasis.

 10. Explain how to prevent coagulation.

 11. Explain blood typing and how it is used to avoid adverse reactions
 following blood transfusions.

 12. Describe how blood reactions may occur between fetal and maternal

 tissues.

 Cardiovascular System

 1. Name the organs of the cardiovascular system and discuss their functions.

 2. Identify and locate the major parts of the heart and discuss the function of
 each part.

 3. Trace the pathway of the blood through the heart and the vessels of the
 coronary circulation.

 4. Discuss the cardiac cycle and explain how it is controlled.

 5. Identify the parts of a normal ECG pattern and discuss the significance of
 this pattern.

 6. Compare the structures and functions of the major types of blood vessels.

 7. Describe how substances are exchanged between blood in capillaries and
 the tissue fluid surrounding body cells.

 8. Explain how blood pressure is produced and controlled.

 9. Describe the mechanisms that aid in returning venous blood to the heart.

 10. Compare the pulmonary and systemic circuits of the cardiovascular
 system.

 11. Identify and locate the major arteries and veins of the pulmonary and
 systemic circuits.

 Lymphatic System and Immunity

 1. Describe the general functions of the lymphatic system.

 2. Identify the locations of the major lymphatic pathways.

 3. Describe how tissue fluid and lymph form and explain the function of
 lymph.

 4. Describe a lymph node and its major functions.

 5. Discuss the functions of the thymus and spleen.

 6. Distinguish between innate (nonspecific) and adaptive (specific) immune

 system defenses and provide examples of each.

 7. Explain how two major types of lymphocytes are formed, activated, and
 how they function in immune mechanisms.

 8. Name the major types of immunoglobulins and their functions.

 9. Distinguish between primary and secondary immune responses.

 10. Distinguish between active and passive immunity.

 11. Explain how allergic reactions, tissue rejection reactions, and

 autoimmunity arise from immune mechanisms.

 Digestive System

 1. Name and describe the locations and major organs of the digestive system.

 2. Describe the general functions of each digestive organ.

 3. Describe the structure of the wall of the alimentary canal.

 4. Explain how the contents of the alimentary canal are mixed and moved.

 5. List the enzymes and other secretions of the digestive organs and

 describe the function of each.

 6. Describe how digestive secretions are regulated.

 7. Explain how digestive reflexes control movement of material through the
 alimentary canal.

 8. Explain how the products of digestion are absorbed.

 Nutrition and Metabolism

 1. Define nutrition, nutrients, and essential nutrients.

 2. List the major sources of carbohydrates, lipids, and proteins.

 3. Describe how cells utilize carbohydrates, lipids, and amino acids.

 4. Explain how the energy values of food are determined.

 5. Explain what is meant by desirable weight.

 6. List the fat-soluble and water-soluble vitamins and summarize the general functions of each vitamin.

 7. Distinguish between a vitamin and a mineral.

 8. List the major minerals and trace elements and summarize the general
 functions of each.

 Respiratory System

 1. List the general functions of the respiratory system.

 2. Name and describe the locations of the organs of the respiratory system.

 3. Describe the functions of each organ of the respiratory system.

 4. Explain how inspiration and expiration are accomplished.

 5. Name and define each of the respiratory air volumes and capacities.

 6. Locate the respiratory center and explain how it controls normal breathing.

 7. Discuss how various factors affect the respiratory center.

 8. Describe the structure and function of the respiratory membrane.

 9. Explain how the blood transports oxygen and carbon dioxide.

 Urinary System

 1. Name the organs of the urinary system and list their general functions.

 2. Describe the locations of the kidneys and the structure of a kidney.

 3. List the functions of the kidneys.

 4. Trace the pathway of blood through the major vessels within a kidney.

 5. Describe a nephron and explain the function of its major parts.

 6. Explain how glomerular filtrate is produced and describe its composition.

 7. Explain how various factors affect the rate of glomerular filtration and
 how this rate is regulated.

 8. Discuss the role of tubular reabsorption in urine formation.

 9. Explain why the osmotic concentration of the glomerular filtrate changes
 as it passes through a renal tubule.

 10. Describe a countercurrent mechanism and explain how it helps
 concentrate urine.

 11. Define tubular secretion and explain its role in urine formation.

 12. Describe the structure of the ureters, urinary bladder, and urethra.

 13. Discuss the process of micturition and explain how it is controlled.

 Water, Electrolyte, and Acid-Base Balance

 1. Explain water and electrolyte balance and discuss the importance of this balance.

 2. Describe how the body fluids are distributed within compartments.

 3. Describe how fluid composition differs between compartments.

 4. Describe how fluids move from one compartment to another.

 5. List the routes by which water enters and leaves the body and how inputs
 and outputs of water are regulated.

 6. Explain how electrolytes enter and leave the body and how the input and
 output of electrolytes are regulated.

 7. Explain acid-base balance.

 8. List the major sources of hydrogen ions in the body.

 9. Explain how chemical buffer systems, the respiratory center, and the
 kidneys minimize changing pH values of the body fluids.

 Reproductive Systems

 1. State the general functions of the male reproductive system.

 2. Name the parts of the male reproductive system and describe the general
 functions of each part.

 3. Outline the process of meiosis and explain how it mixes up the parental genes.

 4. Outline the process of spermatogenesis.

 5. Trace the path sperm cells follow from their site of formation to the outside of the body.

 6. Describe the structure of the penis and explain how its parts produce an erection.

 7. Explain how hormones control the activities of the male reproductive organs and the development of male secondary sex characteristics.

 8. State the general functions of the female reproductive system.

 9. Name the parts of the female reproductive system and describe the general functions of each part.

 10. Outline the process of oogenesis.

 11. Explain how hormones control the activities of the female reproductive organs and the development of female secondary sex characteristics.

 12. Describe the major events that occur during a reproductive cycle.

 13. List several methods of birth control and describe the relative effectiveness of each.

 Pregnancy, Growth, and Development

 1. Distinguish between growth and development during prenatal and

 postnatal periods.

 2. Define pregnancy; describe the process of fertilization and implantation.

 3. Describe the major events of the period of cleavage.

 4. Describe the hormonal changes and other changes that occur in the maternal body during pregnancy.

 5. Explain how the primary germ layers originate and list the structures each layer produces.

 6. Describe the major events of embryonic development.

 7. Describe the formation and function of the placenta.

 8. Define fetus and describe the major events that occur during the fetal stage of development.

 9. Trace the general path of blood through the fetal cardiovascular system.

 10. Describe the birth process and explain the role of hormones in this process.

 Genetics and Genomics

 1. Distinguish between genes and chromosomes.

 2. Define genome.

 3. Define different morphologic types of chromosomes.

 4. Explain how genes can have many alleles (variants), but a person can have only two alleles of a particular gene.

 5. Distinguish among the modes of inheritance.

 6. Explain how gene expression varies among individuals.

 7. Describe how genes and the environment interact to produce complex traits.

 8. Describe how traits are transmitted on the sex chromosomes and how gender affects gene expression.

 9. Explain how deviations in chromosome number or arrangement can harm health and how these abnormalities are detected.

 10. Explain how conditions caused by extra or missing chromosomes reflect a meiotic error.

 11. Explain how gene therapy works.

**VII. COURSE METHODOLOGY:**

 This course may use lecture, discussion, video, and overhead presentations. The course may include chapter and workbook assignments, hand-in assignments, computer assignments, work projects, research papers, and laboratory activities. Written quizzes and exams may be used as appropriate to the course objectives and online instruction.

**VIII. GRADING:**

 Grading will follow the policy in the college catalog.

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| --- | --- | --- | --- |
| **A** | **90** | **–** | **100** |
| **B** | **80** | **–** | **89** |
| **C** | **70** | **–** | **79** |
| **D** | **60** | **–** | **69** |
| **F** | **0** | **–** | **59** |

**IX. COURSE OUTLINE:**

 Lecture

 Endocrine System

 Blood

 Cardiovascular System

 Lymphatic System and Immunity

 Digestive System

 Nutrition and Metabolism

 Respiratory System

 Urinary System

 Water, Electrolyte, and Acid-Base Balance

 Reproductive Systems

 Pregnancy, Growth, and Development

 Genetics and Genomics

 Laboratory

 Safety

 Endocrine Physiology and Histology Lab

 Blood Testing Lab

 Heart Anatomy and Physiology Lab

 Blood Vessel Anatomy and Physiology Lab

 Lymphatic Anatomy and Histology Lab

 Immunity Physiology Lab

 Respiratory Anatomy and Physiology Lab

 Digestive Anatomy and Histology Lab

 Digestive Physiology Lab

 Nutrition Lab

 Urinary Anatomy and Physiology Lab

 Body Balances Lab

 Reproduction Anatomy and Histology Lab

 Development Lab

 **SAMPLE** Course Calendar

 Week 1 Class Orientation, Laboratory Safety, Chapter 16 Endocrine System

 Lab #1 - Endocrine PhysioEx Lab with Histology extension

 Week 2 Chapter 17 Blood

 Lab #2 – Blood Analysis PhysioEx Lab with Histology extension

 Week 3 Chapter 18 Heart

 Lab #3 – Cardiovascular Physiology PhysioEx Lab with Anatomy ext.

 Week 4 Chapter 19 Blood Vessels

 Lab #4 – Cardiovascular Dynamics PhysioEx Lab with Anatomy ext.

 Week 5 Chapter 20 Lymphatic System

 Chapter 21 Immune System

 Lab #5 – Immunity Interactive Physiology Simulation with Anatomy
 and Histology extension

 Week 6 Chapter 21 Immune System

 Lab #6 – Immunity Interactive Physiology Simulation with Anatomy
 and Histology extension

 Week 7 Chapter 22 Respiratory System

 Lab #7 - Respiratory System Mechanics PhysioEx Lab with Anatomy

 Week 8 Chapter 23 Digestive System

 Lab #8 - Digestive Anatomy Lab with Histology extension

 Week 9 Chapter 23 Digestive System

 Lab #9 – Chemical and Physical Processes of Digestion PhysioEx Lab

 Week 10 Chapter 24 Nutrition

 Lab #10 – Nutrition Lab

 Week 11 Chapter 25 Urinary System

 Lab #11 – Renal System Physiology PhysioEx Lab with Anatomy and
 Histology extension

 Week 12 Chapter 26 Fluid, Electrolyte and Acid-Base Balance

 Lab #12 – Acid-Base Balance PhysioEx Lab with Fluid Balance
 Interactive Physiology Simulation extension

 Week 13 Chapter 27 Reproductive System

 Lab #13 – Reproduction Anatomy and Histology Lab

 Week 14 Chapter 28 Human Development

 Lab #14 – Development Lab

 Week 15 Genetics and Genomics

 Lab Exam

 Week 16 **Final Exam**

**X. OTHER REQUIRED BOOKS, SOFTWARE, AND MATERIALS:**

 The materials that accompany the textbook. Individual instructors may also have

 additional specific requirements including accessing online materials or materials

 on other media including CDs.

**XI. EVALUATION:**

Knowledge of lecture and laboratory material will be evaluated with periodic exams, quizzes, instructor designated assignments, and a comprehensive final exam. Scores on laboratory reports and the lab exam will comprise approximately 20% of the final class grade.

**XII. SPECIFIC MANAGEMENT REQUIREMENTS:**

 At the discretion of the instructor

**XIII.** **OTHER INFORMATION:**

 **FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes.

 Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

 **DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.