ANATOMY AND PHYSIOLOGY II
Course Syllabus

Course Number: HLTH-0046B          OHLAP Credit: Yes
OCAS Code: Anatomy--5333
Course Length: 60 Hours
Career Cluster: Health Science
Career Pathway: Therapeutic Services
Career Major(s): Health Science Tech, Advanced Pharmacy Technician, Advanced Unlicensed Assistant, Basic Medical Assistant, Medical Assistant with Phlebotomy, Chiropractic Assistant, Electrocardiograph Technician, Emergency Medical Responder, Fitness Specialist, Licensed Practical Nurse, Medication Administration Technician, Physical Therapy Aide, Student Athletic Training Aide, Surgical Nurse Assistant, Surgical Technology (Accredited Program), Vision Care Assistant, Vision Care Technician, PLTW Biomedical Science and Medicine

Pre-requisite(s):
Anatomy/Physiology is the study of the structural complexity of the human body and its intricate functional mechanisms. This course is taught as a laboratory science. Students will conduct scientific investigations and fieldwork using scientific knowledge and methodology that will enable them to make educated conclusions based on higher-level critical thinking and problem solving skills. The areas studied will be an integration of biology and chemistry and will include, but are not limited to: organization of the body, chemical basis for life, cells & tissues, integumentary system, skeletal system, muscular system, nervous system, endocrine system, blood, circulatory system, lymphatic & immune systems, respiratory systems, digestive system & metabolism, urinary system, and reproductive system. An emphasis should be placed on real-world applications, and active-learning exercises should be included along with laboratory experiences.

Textbooks: Elsevier (2010)
The Human Body in Health and Disease, G. Thibodeau & K. Patton, 5th ed.

Course Objectives:

A. Endocrine System
1. Indicate important differences between hormonal and neural controls of body functioning.¹
2. List the major endocrine organs, and describe their locations in the body and the hormones they secrete.¹
3. Describe what a hormone is and how it functions.¹
4. Understand the negative feedback mechanism and describe its role in regulating blood levels of the various hormones.¹
5. Describe major pathological consequences of hypersecretion and hyposecretion of the hormones.¹
6. Identify the endocrine role of the kidneys, the stomach and intestine, the heart, and the placenta.¹
7. Describe the effect of aging on the endocrine system and body homeostasis.¹

B. Blood
1. Describe the composition and physical characteristics of whole blood and explain why it is classified as a connective tissue.¹
2. List the functions of blood.
3. Discuss the composition and functions of plasma.
4. Describe the blood-clotting process.
5. Describe the ABO and Rh blood groups and explain the basis of transfusion reactions.
6. Explain the importance of blood testing as a diagnostic tool.
7. Name some blood disorders that become more common with age.

C. Cardiovascular System
1. Describe the location of the heart in the body, and identify its major anatomical areas on a model or diagram.
2. Name the coverings of the heart.
3. 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.
4. Identify the elements of the intrinsic conduction system of the heart, and describe the pathway of impulses through this system.
5. Explain what information can be gained from an electrocardiogram.
6. Compare and contrast the structure and function of arteries, veins, and capillaries.
7. Define vasoconstriction and vasodilation.
8. Identify the body’s major arteries and veins, and name the body region supplied by each.
9. Discuss the unique features of special circulations of the body: arterial to the brain, hepatic portal, pulmonary, and fetal.
10. List and explain the factors that influence blood pressure and describe how blood pressure is regulated.
11. Describe the structure and function of a capillary bed.
12. Describe the fetal circulatory system.

D. Lymphatic System and Immune Systems
1. Name the two major types of structures composing the lymphatic system and explain how the lymphatic system is functionally related to the cardiovascular and immune systems.
2. Describe the composition of lymph and explain its formation and transport.
3. Describe the general location, histological structure, and functions of lymph nodes.
4. Name and describe the other lymphoid organs of the body. Compare and contrast them with lymph nodes structurally and functionally.
5. Describe the surface membrane barriers and their protective functions.
6. Explain the importance of phagocytosis and natural killer cells in nonspecific body defense.
7. Relate the events of the inflammatory process.
8. Name several antimicrobial substances produced by the body that act in nonspecific body defense.
9. Explain how fever helps protect the body against invading pathogens.
10. Explain what an antigen and hapten is and name that act as complete antigens.
11. Compare and contrast the origin, maturation process, and general function of B and T lymphocytes.
12. Describe the role of macrophages and other phagocytes in immunity.
13. Describe immunodeficiencies, allergies, and autoimmune diseases.

E. Respiratory System
1. Identify the organs forming the respiratory passage-way in descending order until the alveoli are reached.
2. Describe several protective mechanisms of the respiratory system.
3. Describe the makeup of the respiratory membrane and relate its structure to its function.
4. Describe the structure and function of the lungs and the pleural coverings.
5. Explain the relative roles of the respiratory muscles and lung elasticity in effecting volume changes that cause air to flow into and out of the lungs.
6. Explain the functional importance of the partial vacuum that exists in the intrapleural space.
7. Describe several physical factors that influence pulmonary ventilation.
8. Explain and compare the various lung volumes and capacities. Indicate types of information that can be gained from pulmonary function tests.
9. Describe how oxygen and carbon dioxide are transported in the blood.
10. Describe the neural controls of respiration.
11. Name several physical factors that influence respiratory rate.
12. Describe the symptoms and probable causes of Chronic Obstructive Pulmonary Disease and lung cancer.
13. Describe normal changes that occur in respiratory system functioning from infancy to old age.

F. Digestive System and Metabolism
1. Describe the overall function of the digestive system and differentiate between organs of the alimentary canal and accessory digestive organs.
2. List and briefly describe the major processes occurring during digestive system activity.
3. Explain how villi aid digestive processes in the small intestine.
4. Describe the anatomy and basic function of each organ and accessory organ of the alimentary canal.
5. Name the deciduous and permanent teeth and describe the basic anatomy of a tooth.
6. Describe the composition and functions of saliva and explain how salivation is regulated.
7. Describe the mechanism of chewing and swallowing.
8. Explain how gastric secretion and motility in the stomach are regulated.
9. Describe the function of local hormones in the digestive process.
10. State the roles and tell how bile and pancreatic juice are regulated in the small intestine.
11. List the major functions of the large intestine and describe the regulation of defecation.
12. List the major enzymes or enzyme groups produced by the digestive organs or accessory glands and name the foodstuffs on which they act and the end products of protein, fat, carbohydrate, and nucleic acid digestion.
13. List the six major nutrient categories and note important dietary sources and the main cellular uses of each.
14. Define metabolism and explain the difference between catabolism and anabolism.
15. Analyze and explain the chemical reactions that provide energy for the body. Identify the means, including the structure and function of the digestive system by which energy is processed and stored within the body.
16. Explain the importance of energy balance in the body and indicate consequences of energy imbalance.
17. Define basal metabolic rate and total metabolic rate and name several factors that influence each.
18. Describe how body temperature is regulated and indicate the common mechanisms regulating heat production/retention and heat loss from the body.
19. Analyze the effects of energy deficiencies in malabsorption disorders and
name important congenital disorders of the digestive system and significant inborn errors of metabolism.

G. Urinary System
1. Describe the anatomy of the kidney and its coverings.
2. Trace the blood supply through the kidney.
3. Identify the parts of the nephron responsible for filtration, reabsorption, and secretion and describe the mechanisms underlying each of these functional processes.
4. Describe the normal physical and chemical properties of urine.
5. List several abnormal urine components and name the condition when each is present in detectable amounts.
6. Describe the general structure and function of the ureters, bladder, and urethra.
7. Compare the course, length, and functions of the male urethra with those of the female.
8. Define micturition and describe the micturition reflex.
9. List the factors that determine body water content and describe the effect of each factor.
10. Compare and contrast the relative speed of buffers, the respiratory system, and the kidneys in maintaining the acid-base balance of the blood.
11. Describe some congenital problems and explain the effect of aging of the urinary system.

H. Reproductive System
1. Describe the common function of the male and female reproductive systems.
2. Using a model or diagram, identify the organs and accessory organs of the male and female reproductive systems and discuss the general function of each.
3. Know the process of meiosis to the extent of comparing and contrasting it to mitosis.
4. Outline the process of spermatogenesis.
5. Discuss hormonal regulation of testicular function and the physiological effects of testosterone on male reproductive anatomy.
6. Trace the pathway of sperm cells from their site of formation to the body exterior.
7. Describe the phases of the ovarian cycle and relate them to events of oogenesis.
8. Describe how hormones control the activities of female reproductive organs and the development of female secondary sex characteristics.
9. Discuss the structure and function of the mammary glands.
10. Describe the process of fertilization and the changes of the female body during pregnancy.
11. Understand the major functions of the placenta.
12. Explain how labor is initiated and describe the three stages of labor.
13. Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders.
14. Discuss several agents that can interfere with normal fetal development.
15. Distinguish among the modes of inheritance and describe the events that lead to genetic variability of gametes.
16. List and explain several techniques used to determine or predict genetic diseases.

1 ODCTE Objective
All unmarked objectives are TTC instructor developed.
Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and lab practice and performance.  
2. Each course must be passed with seventy (70%) percent or better. Licensed Practical Nurse (LPN) require eighty (80%) percent or better due to accreditation or certification requirements.  
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.  
4. Students wanting to take advantage of college credit/alliance agreements must maintain an 80% in their coursework.  
5. Career Major grades established during coursework are a major criteria in successfully obtaining certification.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

Available Certifications/College Credit: The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility: The student must maintain a grade point average of 2.0 or better. The following career major(s) may require a 3.0 GPA or better due to the Articulation Agreements and/or accreditation/certification requirements: Certified Dental Assistant, Emergency Medical Technician (EMT), Licensed Practical Nurse (LPN), Surgical First Assistant (SFA), Surgical Technologist, Surgical Nurse Assistant, Central Sterile Processing Technician.