ANATOMY AND PHYSIOLOGY I
Course Syllabus

Course Number: HLTH-0046A
OHLAP Credit: Yes
OCAS Code: 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. Organization of the Body
1. Define and explain how anatomy and physiology are related.
2. Name and explain the relationship between levels of structural organization that make up the human body.
3. Identify and state the major functions of the organ systems of the body.
4. Properly use the terms that describe relative positions, body sections and body regions.
5. Describe the functions of the human body and explain how these functions aid in the maintenance of life.
6. Develop an understanding of homeostasis and its role in normal body function.

B. Chemical Basis for Life
1. Explain how the study of living materials requires understanding of chemistry.
2. Describe the relationships among matter, atoms and molecules.
3. Identify three major types of chemical reactions that occur in the body.
4. Differentiate between a salt, an acid, and a base.
5. Describe factors that affect chemical reaction rates.
6. Compare the processes of osmosis, diffusion and filtration and give examples.
7. Explain the importance of water and salts to body homeostasis.
8. Distinguish between organic and inorganic compounds.
9. Compare the structures and functions of carbohydrates, lipids, proteins and nucleic acids.
10. Distinguish between different types of proteins.
11. Describe how and where enzymes work in the body.
12. Compare and contrast the structure and functions of DNA and RNA.
13. Explain the role of ATP in cell metabolism.

C. Cells and Tissues
1. Identify on a cell model or diagram the cell organelles and be able to explain their functions.
2. Describe the structure of the plasma membrane, and explain how the various transport processes account for the directional movements of specific substances across the plasma membrane.
3. Describe different cell types and explain the functionality of the differences.
4. Describe the cell cycle, including the phases of mitosis, and explain how the timing of cell division is regulated.
5. Have an understanding of stem cells and how they are used in modern medical procedures and research.
6. Name the four primary classes of human tissues and explain how they differ structurally and functionally.
7. Know the anatomical location of the different tissue types.
8. Describe ways the body repairs damaged tissue.
9. Identify the various forms of cancer and describe how it affects the body.

D. Integumentary System
1. Have an understanding of the functions of the skin and be able to relate them to its structure.
2. Recognize and identify the major skin structures when provided a diagram or model.
3. Identify and know the purpose of the accessory structures of the skin.
4. Describe the normal and pathological colors that the skin can have and explain their causes.
5. Identify and differentiate between the three types of skin cancer.
6. Describe the three classes of burns and the priorities in burn treatment.
7. Understand the role of the integumentary system in maintaining homeostasis.

E. Skeletal System
1. Identify the subdivisions of the skeleton as axial or appendicular.
2. State several functions of the skeletal system.
3. Demonstrate knowledge, with the use of models or pictures, the major bones, their surface features, and basic functions.
4. Describe the developmental aspects of the skeleton from formation in the fetus throughout the lifetime of the bones.
5. Distinguish between and give the function of the four major classes of joints.
6. Be able to identify and understand the function of tendons and ligaments.
7. Understand the causes and current medical treatments of skeletal disorders and abnormalities.

F. Muscular System
1. Distinguish between the three types of muscles, and tell where they are located in the body.
2. Describe the structure of a skeletal muscle with respect to location and names of its connective tissue coverings and attachments.
3. Describe the microscopic structure and functional role of the skeletal muscle fiber.
4. Explain how muscle fibers are stimulated to contract and what occurs during a muscle twitch with regard to each component’s function. 

5. Explain how skeletal muscle fibers are innervated and how they contract. 

6. Explain how skeletal muscle meets its energy demands during rest and exercise. 

7. Explain oxygen debt and muscle fatigue and discuss situations that would cause them. 

8. Describe the effects of aerobic and resistance exercise on skeletal muscles and other body organs. 

9. List and define the criteria used in naming muscles and be able to provide an example to illustrate the use of each criterion. 

10. Name and identify, on a diagram or model, each of the muscles. State the origin and insertion for each, and describe the action of each.

G. Nervous System

1. List the general functions of the nervous system. 

2. Explain the structural and functional divisions of the nervous system. 

3. List the types of supporting cells and cite their functions. 

4. Describe the important anatomical regions of a neuron and relate each to a physiological role. 

5. Classify sensory receptors according to body location, structure, and stimulus detected. 

6. Describe the events that lead up to, happen during, and result after a nerve impulse and its conduction from one neuron to another. 

7. Identify and indicate the functions of the major regions of the cerebral hemispheres, diencephalons, brain stem, and cerebellum on a human brain model or diagram. 

8. Identify the three meningeal layers, and state their functions. 

9. Understand the formation and function of cerebrospinal fluid and the blood-brain barrier. 

10. Describe spinal cord structure and list its functions. 

11. List the components of the peripheral nervous system. 

12. Distinguish between sensory, motor, and mixed nerves. 

13. Name the 12 pairs of cranial nerves and describe the body region and structures innervated by each. 

14. Name the four major nerve plexuses, give the major nerves of each, and describe their distribution. 

15. Distinguish between autonomic and somatic reflexes. 

16. Compare and contrast the general functions of the parasympathetic and sympathetic divisions. 

17. Understand from an anatomical and physiological perspective, the functions of sight, hearing & balance, taste, and smell. 

18. Describe the developmental aspects of the nervous system, from embryo to old age. 

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.
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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.