

Colorado CTE Course – Scope and Sequence

Course Name	Anatomy and Physiology		Course = 1 Carnegie Unit Credit
Course Description	This course provides a deeper exploration of the human body and biological systems in great detail. Students expand their knowledge of the body and terminology/phonetic pronunciations used to describe and locate body parts as well as an overall review of human development and body processes.		
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all competencies are covered. Please contact your local community college partner for credit options available.		
Schedule:	Schedule calculation based on 120 contact hours. 60% of instruction time should be geared in meeting the course competencies in the scope and sequence. The remaining 40% of the instructional time allows for guest speakers, student presentations, field trips, remediation, or other content topics.		
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills			
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Outcomes
Anatomical Position	2%	NHSS: 1.1.1.a.b.c.d.e.f	1. Demonstrate the anatomical position 2. Describe the human body using directional and regional terms 3. Identify three planes most commonly used in the study of anatomy 4. Distinguish between the posterior (dorsal) and the anterior (ventral) body cavities, identifying their subdivisions and representative organs found in each
Levels of Organization	4%	NHSS: 1.1.1,a	1. Identify the main tissue types and discuss their roles in the human body 2. Identify the four types of tissue membranes and the characteristics of each that make them functional 3. Explain the functions of various epithelial tissues and how their forms enable their functions 4. Explain the functions of various connective tissues and how their forms enable their functions

			- Describe the characteristics of muscle tissue and how these enable function - Discuss the characteristics of nervous tissue and how these enable information processing and control of muscular and glandular activities
The Integumentary System	3%	NHSS: 1.1.2,c	- Describe the integumentary system and the role it plays in homeostasis - Describe the layers of the skin and the functions of each layer - Describe the accessory structures of the skin and the functions of each - Describe the changes that occur in the integumentary system during the aging process - Discuss several common diseases, disorders, and injuries that affect the integumentary system - Explain treatments for some common diseases, disorders, and injuries of the integumentary system
Bone Tissue and the Skeletal System	3%	NHSS: 1.1.2,a	- List and describe the functions of bones - Describe the classes of bones - Discuss the process of bone formation and development - Explain how bone repairs itself after a fracture - Discuss the effect of exercise, nutrition, and hormones on bone tissue - Describe how an imbalance of calcium can affect bone tissue - Describe the embryonic formation and growth of the different types of bones
Axial Skeleton	3%	NHSS: 1.1.2,a	- Describe the functions of the skeletal system and define its two major subdivisions - Identify the bones and bony structures of the skull, the cranial suture lines, the cranial fossae, and the openings in the skull - Discuss the vertebral column and regional variations in its bony components and curvatures

			4. Describe the components of the thoracic cage
The Appendicular Skeleton	3%	NHSS: 1.1.2.a	1. Discuss the bones of the pectoral and pelvic girdles, and describe how these unite the limbs with the axial skeleton 2. Describe the bones of the upper limb, including the bones of the arm, forearm, wrist, and hand 3. Identify the features of the pelvis and explain how these differ between the adult male and female pelvis 4. Describe the bones of the lower limb, including the bones of the thigh, leg, ankle, and foot
Joints	1%	NHSS: 1.1.2.a	1. Discuss both functional and structural classifications for body joints 2. Describe the characteristic features for fibrous, cartilaginous, and synovial joints and give examples of each 3. Define and identify the different body movements 4. Discuss the structure of specific body joints and the movements allowed by each
Muscle Tissue	4%	NHSS: 1.1.2.b	1. Explain the organization of muscle tissue 2. Describe the function and structure of skeletal, cardiac muscle, and smooth muscle 3. Explain how muscles work with tendons to move the body 4. Describe how muscles contract and relax 5. Define the process of muscle metabolism 6. Explain how the nervous system controls muscle tension 7. Relate the connections between exercise and muscle performance 8. Explain the development and regeneration of muscle tissue
The Muscular System	4%	NHSS: 1.1.2.b	1. Describe the actions and roles of agonists and antagonists 2. Explain the structure and organization of muscle fascicles and their role in generating force 3. Explain the criteria used to name skeletal muscles

			- Identify the skeletal muscles and their actions on the skeleton and soft tissues of the body - Identify the origins and insertions of skeletal muscles and the prime movements
The Nervous System and Nervous Tissue	4%	NHSS: 1.1.2.g	- Name the major divisions of the nervous system, both anatomical and functional - Describe the functional and structural differences between gray matter and white matter structures - Name the parts of the multipolar neuron in order of polarity - List the types of glial cells and assign each to the proper division of the nervous system, along with their function(s) - Distinguish the major functions of the nervous system: sensation, integration, and response - Describe the components of the membrane that establish the resting membrane potential - Describe the changes that occur to the membrane that result in the action potential - Explain the differences between types of graded potentials - Categorize the major neurotransmitters by chemical type and effect
Anatomy of the Nervous System	2%	NHSS: 1.1.2.g	- Relate the developmental processes of the embryonic nervous system to the adult structures - Name the major regions of the adult nervous system - Locate regions of the cerebral cortex on the basis of anatomical landmarks common to all human brains - Describe the regions of the spinal cord in cross-section - List the cranial nerves in order of anatomical location and provide the central and peripheral connections - List the spinal nerves by vertebral region and by which nerve plexus each supplies
The Somatic Nervous System	2%	NHSS: 1.1.2.g	- Describe the components of the somatic nervous system - Name the modalities and submodalities of the sensory systems

			3. Distinguish between general and special senses 4. Explain the stimulus-response motor pathway
The Autonomic Nervous System	2%	NHSS: 1.1.2.g	1. Describe the components of the autonomic nervous system 2. Differentiate between the structures of the sympathetic and parasympathetic divisions in the autonomic nervous system 3. Name the components of a visceral reflex specific to the autonomic division to which it belongs 4. Describe how the central nervous system coordinates and contributes to autonomic functions
The Endocrine System	2%	NHSS: 1.1.2.h	1. Identify the contributions of the endocrine system to homeostasis 2. Discuss the chemical composition of hormones and the mechanisms of hormone action 3. Summarize the site of production, regulation, and effects of the hormones of the pituitary, thyroid, parathyroid, adrenal, and pineal glands 4. Discuss the hormonal regulation of the reproductive system 5. Explain the role of the pancreatic endocrine cells in the regulation of blood glucose 6. Identify the hormones released by the heart, kidneys, and other organs with secondary endocrine functions 7. Discuss several common diseases associated with endocrine system dysfunction
The Cardiovascular System: The Heart	4%	NHSS: 1.1.2.d	1. Identify and describe the interior and exterior parts of the human heart 2. Describe the path of blood through the cardiac circuits 3. Describe the size, shape, and location of the heart 4. Compare cardiac muscle to skeletal and smooth muscle 5. Explain the cardiac conduction system 6. Describe the process and purpose of an electrocardiogram 7. Explain the cardiac cycle 8. Calculate cardiac output

			9. Describe the effects of exercise on cardiac output and heart rate 10. Name the centers of the brain that control heart rate and describe their function 11. Identify other factors affecting heart rate
The Cardiovascular System: Blood Vessels and Circulation	3%	NHSS: 1.1.2.d	1. Compare and contrast the anatomical structure of Arteries, arterioles, capillaries, venules, and veins 2. Accurately describe the forces that account for capillary exchange 3. List the major factors affecting blood flow, blood pressure, and resistance 4. Describe how blood flow, blood pressure, and resistance interrelate 5. Discuss how the neural and endocrine mechanisms maintain homeostasis within the blood vessels 6. Describe the interaction of the cardiovascular system with other body systems 7. Label the major blood vessels of the pulmonary and systemic circulations 8. Compare fetal circulation to that of an individual after birth
The Lymphatic and Immune System	2%	NHSS: 1.1.2.e	1. Identify the components and anatomy of the lymphatic system 2. Discuss the role of the innate immune response against pathogens 3. Describe the power of the adaptive immune response to cure disease 4. Explain immunological deficiencies and over-reactions of the immune system
The Respiratory System	4%	NHSS: 1.1.2.f	1. List the structures of the respiratory system 2. List the major functions of the respiratory system 3. Outline the forces that allow for air movement into and out of the lungs 4. Outline the process of gas exchange 5. Summarize the process of oxygen and carbon dioxide transport within the respiratory system

			6. Discuss how the respiratory system responds to exercise
The Digestive System	3%	NHSS: 1.1.2.i	1. List and describe the functional anatomy of the organs and accessory organs of the digestive system 2. Discuss the processes and control of ingestion, propulsion, mechanical digestion, chemical digestion, absorption, and defecation 3. Discuss the roles of the liver, pancreas, and gallbladder in digestion 4. Compare and contrast the digestion of the three macronutrients
The Urinary System	4%	NHSS: 1.1.2.j	1. Describe the composition of urine 2. Label structures of the urinary system 3. Characterize the roles of each of the parts of the urinary system 4. Illustrate the macroscopic and microscopic structures of the kidney 5. Trace the flow of blood through the kidney 6. Outline how blood is filtered in the kidney nephron
The Reproductive System	1%	NHSS: 1.1.2.k	1. Describe the anatomy of the male and female reproductive systems, including their accessory structures 2. Explain the role of hypothalamic and pituitary hormones in male and female reproductive function 3. Trace the path of a sperm cell from its initial production through fertilization of an oocyte 4. Explain the events in the ovary prior to ovulation

Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc)

[CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Reading, Writing, & Communicating

Standard 1: Oral Expression and Listening

- **Prepared Graduate 1:** Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.
- **Prepared Graduate 2:** Deliver effective oral presentations for varied audiences and varied purposes.

Standard 2: Reading for All Purposes

- **Prepared Graduate 3:** Read a wide range of literary texts to build knowledge and to better understand the human experience.
- **Prepared Graduate 4:** Read a wide range of informational texts to build knowledge and to better understand the human experience.

Standard 3: Writing and Composition .

- **Prepared Graduate 9:** Demonstrate mastery of their own writing process with clear, coherent, and error-free polished products.

Standard 4: Research Inquiry and Design

- **Prepared Graduate 10:** Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.

Note: Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.