

Colorado CTE Course – Scope and Sequence

Course Name	Pathophysiology		Course = 1 Carnegie Unit Credit
Course Description	In Pathophysiology, students will develop a deep understanding of normally observed body system functioning that maintains homeostasis. Students will then study abnormal functioning of the body that disturbs its normal physiological processes through the integration of biology, chemistry, and medicine. Using critical thinking and scientific problem-solving skills students will perform investigations to describe and identify imbalances/abnormalities due to diseases or pathology.		
Note:	This course should be taken after Anatomy and Physiology so that students have a strong knowledge base to build from and develop a deep understanding of Pathophysiology. 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 essential knowledge and skills are covered.		
Schedule:	Schedule calculation based on 120 contact hours. 60% of instruction time should be geared toward meeting the course competencies in this scope document. The remaining 40% of the instructional time allows for guest speakers, student presentations, field trips, remediation, or other content topics.		
<p>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</p>			
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Outcomes
Review of basic genetics	1%		<ul style="list-style-type: none"> ● Demonstrate an understanding of genetics that includes... <ul style="list-style-type: none"> ○ Chromosomes ○ DNA ○ RNA ○ Proteins ○ Dominance ○ Recessiveness ○ Genotype ○ Phenotype.
Genetic Diseases	3.5%		<ul style="list-style-type: none"> ● Describe characteristics of genetic diseases and their pathology. This should at the minimum include... <ul style="list-style-type: none"> ○ Down Syndrome ○ Turner Syndrome

			<ul style="list-style-type: none"> ○ Klinefelter Syndrome ○ Fragile X Syndrome ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Epigenetics and Disease	3.5%		<ul style="list-style-type: none"> ● Describe epigenetic mechanisms ● Describe how epigenetics can affect human development ● Identify specific syndromes that result from genomic imprinting <ul style="list-style-type: none"> ○ Prader-Willi and Angelman Syndromes ○ Beckwith-Wiedemann Syndrome ○ Russell-Silver Syndrome ● Long-Term and Multigenerational Persistence of Epigenetic States Induced by Stochastic and Environmental Factors, 66 ● Describe the role that epigenetics plays in the development of cancer ● Describe Risk Factors, Diagnostic Procedures, Treatment and all levels of medical professionals specific to the identified diseases or disorders.
Fluids and Electrolytes, Acids and Bases	3.5%		<ul style="list-style-type: none"> ● Distribution of Body Fluids and Electrolytes ● Alterations in Water Movement ● Sodium, Chloride, and Water Balance ● Alterations in Sodium, Chloride, and Water Balance ● Alterations in Potassium and Other Electrolytes ● Acid-Base Balance ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Biology of Cancer	4.5%		<ul style="list-style-type: none"> ● Cancer Terminology and Characteristics ● The biology of cancer cells ● Clinical Manifestations of Cancer ● Diagnosis, Characterization, and Treatment of Cancer

			<ul style="list-style-type: none"> Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases.
Structure and Function of the Neurologic System	1%		<ul style="list-style-type: none"> Nervous systems organization and functions.
Alterations in Cognitive Systems, Cerebral Hemodynamics, and Motor Function	3.5%		<ul style="list-style-type: none"> Alterations in Cognitive Systems Alterations in Cerebral Hemodynamics Alterations in Neuromotor Function Alterations in Complex Motor Performance Extrapyramidal Motor Syndromes Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Disorders of the Central and Peripheral Nervous Systems and Neuromuscular Junction	3.5%		<ul style="list-style-type: none"> Central Nervous System Disorders Peripheral Nervous System and Neuromuscular Junction Disorders Tumors of the Central Nervous System Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Mechanisms of Hormonal Regulation	1%		<ul style="list-style-type: none"> Mechanisms of Hormonal Regulation Structure and Function of the Endocrine Glands
Alterations of Hormonal Regulation	3.5%		<ul style="list-style-type: none"> Mechanisms of Hormonal Alterations Alterations of the Hypothalamic-Pituitary System Alterations of Thyroid Function Alterations of Parathyroid Function Dysfunction of the Endocrine Pancreas: Diabetes Mellitus Alterations of Adrenal Function Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Structure and Function of the	1%		<ul style="list-style-type: none"> Components of the Hematologic System Development of Blood Cells

Hematologic System			<ul style="list-style-type: none"> ● Mechanisms of Hemostasis ● Pediatrics & Hematologic Value Changes ● Aging & Hematologic Value Changes
Alterations of Hematologic Function	3.5%		<ul style="list-style-type: none"> ● Alterations of Erythrocyte Function ● Myeloproliferative Red Cell Disorders ● Alterations of Leukocyte Function ● Alterations of Lymphoid Function ● Alterations of Splenic Function ● Hemorrhagic Disorders and Alterations of Platelets and Coagulation ● Describe Risk Factors, Diagnostic Procedures, Treatment and all levels of medical professionals specific to the identified diseases or disorders.
Structure and Function of the Cardiovascular and Lymphatic Systems	1%		<ul style="list-style-type: none"> ● The Circulatory System ● The Heart ● The Systemic Circulation ● The Lymphatic System
Alterations of Cardiovascular Function	3.5%		<ul style="list-style-type: none"> ● Diseases of the Veins ● Diseases of the Arteries ● Disorders of the Heart Wall ● Manifestations of Heart Disease ● Shock ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Structure and Function of the Pulmonary System	1%		<ul style="list-style-type: none"> ● Structures of the Pulmonary System ● Function of the Pulmonary System
Alterations of Pulmonary Function	3.5%		<ul style="list-style-type: none"> ● Clinical Manifestations of Pulmonary Alterations ● Pulmonary Disorders ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Structure and Function of the	1%		<ul style="list-style-type: none"> ● Structures of the Renal System ● Renal Blood Flow

Renal and Urologic Systems			<ul style="list-style-type: none"> ● Kidney Function ● Tests of Renal Function
Alterations of Renal and Urinary Tract Function	3.5%		<ul style="list-style-type: none"> ● Urinary Tract Obstruction ● Urinary Tract Infection ● Glomerular Disorders ● Acute Kidney Injury ● Chronic Kidney Disease ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Structure and Function of the Reproductive Systems	1%		<ul style="list-style-type: none"> ● Structure and Function of the Female and Male Reproductive Systems
Alterations of the Female Reproductive System	1.7%		<ul style="list-style-type: none"> ● Abnormalities of the Female Reproductive Tract ● Alterations of Sexual Maturation ● Disorders of the Female Reproductive System ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Alterations of the Male Reproductive System	1.7%		<ul style="list-style-type: none"> ● Alterations of Sexual Maturation ● Disorders of the Male Reproductive System ● Disorders of the Male Breast ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.
Structure and Function of the Digestive System	1%		<ul style="list-style-type: none"> ● The Gastrointestinal Tract ● Accessory Organs of Digestion
Alterations of Digestive Function	3.5%		<ul style="list-style-type: none"> ● Disorders of the Gastrointestinal Tract ● Disorders of the Accessory Organs of Digestion ● Cancer of the Digestive System ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.

Structure and Function of the Musculoskeletal System	1%		<ul style="list-style-type: none"> ● Structure and Function of Bones ● Structure and Function of Joints ● Structure and Function of Skeletal Muscles
Alterations of Musculoskeletal Function	3.5%		<ul style="list-style-type: none"> ● Musculoskeletal Injuries ● Disorders of Bones ● Disorders of Joints ● Disorders of Skeletal Muscle ● Musculoskeletal Tumors ● Describe Risk Factors, Diagnostic Procedures, Treatment, and all levels of medical professionals specific to the identified diseases or disorders.

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 6:** Craft arguments using techniques specific to the genre.
- **Prepared Graduate 7:** Craft informational/explanatory texts using techniques specific to the genre.
- **Prepared Graduate 8:** Craft narratives using techniques specific to the genre.
- **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.