# **COURSE SYLLABUS**

LAST REVIEW	Fall 2022	
COURSE TITLE	Human Anatomy and Physiology	
COURSE NUMBER	BIOL-0143	
DIVISION	Math, Science, Business & Technology	
DEPARTMENT	Biology	
CIP CODE	24.0101	
CREDIT HOURS	5	
CONTACT HOURS/WEEK	Class: 3	Lab: 4
PREREQUISITES	None	
COURSE PLACEMENT	None	

# **COURSE DESCRIPTION**

This introductory course examines the structure and function of the organ systems of the body. Particular attention is paid to the role of the organ systems in maintaining homeostasis. In the lab, students examine structures by means of small dissections, models, skeletons, charts, and audiovisual materials; physiological data is measured and collected. This course is not intended to satisfy requirements for anatomy and physiology for some allied health programs, especially pre-nursing and pre-physical therapy assistant.

#### KANSAS SYSTEMWIDE TRANSFER: 2020/2021/2022

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

#### **General Education Learning Outcome**

- Basic Skills for Communication
- Mathematics
- Humanities
- Natural and Physical Sciences
  - Social and Behavioral Sciences

#### Institutional Learning Outcomes

- $\boxtimes$  Communication
- Computation and Financial Literacy
- Critical Reasoning
- Technology and Information Literacy
  - Community and Civic Responsibility
- Personal and Interpersonal Skills

# TEXTBOOKS

http://kckccbookstore.com/

## **METHODS OF INSTRUCTION**

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

## **COURSE OUTLINE**

- I. Cellular Anatomy and Physiology
  - A. Anatomical terminology and hierarchy of structural organization
  - B. Basic cellular chemistry
  - C. Homeostasis
  - D. Cell structure and function
  - E. Use of the microscope
  - F. Tissue structure and function
  - G. Diffusion and osmosis
  - H. Cellular bioenergetics
- II. Integumentary system
  - A. Anatomy of integumentary system
  - B. Physiology of integumentary
- II. Musculoskeletal Anatomy and Physiology
  - A. Skeletal tissue
  - B. Arthrology
  - C. Anatomy of the skeletal system
  - D. Muscle physiology
  - E. Anatomy of muscles
- III. Control Systems
  - A. Nervous tissue
  - B. Generation of electrical potentials
  - C. Receptor physiology
  - D. Nervous system potentials
  - E. Central Nervous System anatomy
  - F. Peripheral Nervous System
  - G. Reflexes
  - H. Autonomic Nervous System
  - I. Vision, hearing, and taste
  - J. Endocrine system function

- IV. Circulatory systems
  - A. Blood structure and function
  - B. Anatomy of the heart
  - C. Conducting system and the electrocardiogram
    - 1. Measurement of EKG and exercise
  - D. Cardiac cycle
  - E. Vascular structure and function
    - 1. Arteries
    - 2. Arterioles
    - 3. Capillaries
    - 4. Veins
  - F. Blood pressure
- V. Immune and lymphatic systems
  - A. Anatomy of the immune system
  - B. Anatomy of the lymphatic system
  - C. Physiology of the immune system
  - D. Physiology of the lymphatic system
- VI. Respiratory system
  - A. Anatomy of the respiratory system
  - B. Measurement of respiratory volumes
  - C. Steps of respiration
- VII. Urinary system
  - A. Anatomy of the urinary system
  - B. Physiology of renal processes
- VIII. Digestive system
  - A. Anatomy of the digestive system
  - B. Digestive physiology
  - C. Metabolism
- IV. Reproductive system
  - A. Anatomy of the Male reproductive system
  - B. Anatomy of the Female reproductive system
  - C. Physiology of the male reproductive system
  - D. Physiology Female reproductive system
  - E. Embryo development
  - F. Fetal development
  - G. Labor and delivery process
  - H. Mammary gland anatomy and physiology

# **COURSE LEARNING OUTCOMES**

Upon successful completion of this course, the student will:

A. Body Plan & Organization

Name and describe anatomical and directional terminology. Including the following topics: anatomical position, body planes, sections, body cavities & regions, directional terms, basic terminology, levels of organization, and survey of body systems

B. Homeostasis

Name and describe basic concepts of homeostasis and how homeostatic mechanisms apply to body systems including the following topics: general types of homeostatic mechanisms, examples of homeostatic mechanisms, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

C. Chemistry & Cell Biology Review

Name and describe basic chemistry and cellular structures and function, including the following topics: atoms & molecules, chemical bonding, inorganic compounds/solutions (including the concept of pH), organic compounds, energy transfer using ATP, intracellular organization of nucleus and cytoplasm, membrane structure & function, mechanisms for movement of materials across cellular membranes, organelles, protein synthesis, cellular respiration (introduction), somatic cell division (mitosis & cytokinesis), reproductive cell division, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states and disorders

D. Histology

Identify the basic tissues of the body and their locations and explain their functions, including the following topics: overview of histology & tissue types, microscopic anatomy, location, & functional roles of epithelial, connective, muscular and nervous tissues, membranes (mucous, serous, cutaneous & synovial) - glands (exocrine & endocrine), tissue injury & repair

E. Integumentary System

Identify major gross and microscopic anatomical components of the integumentary system and describe the functions of the system, including the following topics: general functions of the skin & the subcutaneous layer, gross & microscopic anatomy of the skin, roles of the specific tissue layers of the skin & subcutaneous layer, anatomy & functional roles of accessory structures, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

F. Skeletal System

Identify major gross and microscopic, anatomical components of the skeletal system and explain their functional roles in osteogenesis, repair and body

movement, including the following topics: general functions of bone & the skeletal system, structural components, microscopic anatomy, structural components, gross anatomy, physiology of embryonic bone formation (ossification, osteogenesis), physiology of bone growth, repair & remodeling, organization of the skeletal system, gross anatomy of bones, classification, structure & function of joints (articulations), application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

#### G. Muscular System

Identify major gross and microsocpic anatomical components of the muscular system and explain their functional roles in body movement, maintenance of posture, and heat production, including the following topics: general functions of muscle tissue, identification, general location, & comparative characteristics of skeletal, smooth, & cardiac muscle tissue, detailed gross & microscopic anatomy of skeletal muscle, physiology of skeletal muscle contraction, skeletal muscle metabolism, principles & types of whole muscle contraction, nomenclature of skeletal muscles, location & function of skeletal muscles, group actions of skeletal muscles, lever systems, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

#### H. Nervous System

Identify the major gross and microscopic anatomical components of the nervous system and expain their functional roles in communication, control and integration, indluding the following topics: general functions of the nervous system, organization of the nervous system from both anatomical & functional perspectives, gross & microscopic anatomy of the nerve tissue, neurophysiology, including mechanism of resting membrane potential, production of action potentials, & impulse transmission, neurotransmitters& their roles in synaptic transmission, sensory receptors & their roles, division, origin, & function of component parts of the brain, protective roles of the cranial bones, meninges, & cerebrospinal fluid, structure & function of cranial nerves, anatomy of the spinal cord & spinal nerves, reflexes & their roles in nervous system function, physiology of sensory & motor pathways in the brain & spinal cord, functions of the autonomic nervous system, comparison of somatic & autonomic nervous systems, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

#### I. Special Senses

Identify the major gross and microscopic anatomical components of the eye and ear and explain their functional roles in vision, hearing, and equilibrium. Students should also be able to identify and locate the receptors responsible for olfaction and gustation and briefly describe the physiology of smell and taste, including the following topics: gross & microscopic anatomy of the eye & ear, roles of specific tissues of the eye in vision, roles of specific tissues of the ear in hearing & equilibrium, olfactory receptors & their role in smell, gustatory receptors & their role in taste, general gross & microscopic anatomy of hearing & accessory structures of the ear, roles of specific tissues of the ear in hearing, roles of the accessory structures, role of the ear in equilibrium, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

#### J. Endocrine System

Identify the major gross and microscopic anatomical components of the endrocrine sysem and explain the functional roles of their respective hormones in communication, control and integration, including the following topics: general functions of the endocrine system, chemical classification of hormones & mechanism of hormone actions at receptors, control of hormone secretion, control by the hypothalamus& pituitary gland, identity, source, secretory control, & functional roles of the major hormones produced by the body, local hormones (paracrines & autocrines) & growth factors, hormonal response to stress, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders,

Note: Since the endocrine system plays a key role in the regulation and integration of body organ systems, detailed aspects of endocrine system function may be emphasized throughout the course.

#### K. Cardiovascular System

Identify the major gross and microscopic anatomical components of the cardiovascular system and explain their functional roles to transport and hemodynamics, including the following topics: general functions of the cardiovascular system, composition of blood plasma, identity, microscopic anatomy, numbers, formation, & functional roles of the formed elements of the blood, hemostasis, including coagulation of the blood, ABO & Rh blood grouping, gross & microscopic anatomy of the heart, including the conduction system, physiology of cardiac muscle contraction, blood flow through the heart, conduction system of the heart & the electrocardiogram, cardiac cycle, regulation of cardiac output, stroke volume & heart rate, anatomy & functional roles of the different types of blood vessels, pattern of blood circulation throughout the body, including systemic, pulmonary, coronary, hepatic portal, & fetal circulations, blood pressure & its functional interrelationships with cardiac output, peripheral resistance, & hemodynamics, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

## L. Lymphatic System & Immunity

Identify the major gross and microscopic anatomical components of the lymphatic system and explain their functional roles in fluid dynamics and immunity, including the following topics: general functions of the lymphatic system, lymph & lymphatic vessels, lymphatic cells, tissues, & organs, introduction to innate (nonspecific) defenses & adaptive (specific) defenses, innate (nonspecific) defenses, overview of adaptive (specific) defenses, antigens & antigen processing, lymphocytes & their role in adaptive immunity, antibodies & their role in adaptive immunity, applied immunology, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

#### M. Respiratory System

Identify the major gross and microscopic anatomical components of the respiratory system and explain their functional roles in beathing. Ventilation and in the process of external and internal respiration. Including the following topics: general functions of the respiratory system, gross & microscopic anatomy of the respiratory tract & related organs, mechanisms of pulmonary ventilation, pulmonary air volumes & capacities, mechanisms of gas exchange in lungs & tissues, mechanisms of gas transport in the blood, control of pulmonary ventilation, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & Disorders

## N. Digestive System

Identify the major gross and microscopic anatomical components of the digestive system and explain their functional roles in digestion, absorption, excretion and elimination, including the following topics: general functions of the digestive system, gross & microscopic anatomy of the alimentary canal, gross & microscopic anatomy of the accessory glands & organs, peritoneum & mesenteries, motility in the alimentary canal, mechanical & chemical processes of digestion, processes of absorption, hormonal & neural regulation of digestive processes, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

#### 0. Metabolism

Articulate the functional relationship among cellular, tissue and organ level metabolism, the role nutrition plays in metabolism and the mechanisms by which metabolic rate is regulated in the body, including the following topics: Nutrition, introduction to metabolism, cellular respiration & the catabolism & anabolism of carbohydrates, lipids, & proteins, metabolic roles of body organs, energy balance & thermoregulation, application of homeostatic mechanisms, predictions related to homeostatic imbalance, including disease states & disorders

## P. Urinary System

Identify the major gross and microscopic anatomical components of the urinary system and explain their functional roles, including the following topics: general functions of the urinary system, gross & microscopic anatomy of the urinary tract, including detailed histology of the nephron, functional processes of urine formation, including filtration, reabsorption, secretion, & excretion, factors regulating & altering urine volume & composition, including the renin-angiotensin system and the roles of aldosterone& antidiuretic hormone, endocrine activities of the kidneys, such as vitamin D activation & secretion of erythropoietin, innervation & control of the urinary bladder

## Q. Fluid/Electrolyte& Acid/Base Balance

Explain the physiology of the homeostatic mechanisms that control fluid/electrolyte and acid/base balance, including the following topics: regulation of water intake & output, description of the major fluid compartments, including intracellular, extracellular, intravascular, & interstitial, volume & chemical composition of major compartment fluids, movements between the major fluid compartments, causal forces, volumes, & electrolyte balance, buffer systems & their roles in acid/base balance - role of the respiratory system in acid/base balance, role of the urinary system in acid/base balance

## R. Reproductive Systems

Identify the major gross and microsocpic anatomical components of the reproductive system and explain their functional roles in reproduction and inheritance, including the following topics: general functions of the male & female reproductive systems, gross & microscopic anatomy of the male & female reproductive systems, gametogenesis, specific roles of the female reproductive organs, specific roles of the female reproductive organs, regulation of reproductive functions, conception, pregnancy, & embryological & fetal development, parturition & labor, mammary gland anatomy & physiology

# ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

# **COLLEGE POLICIES AND PROCEDURES**

Student Handbook https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-ofconduct.pdf

College Catalog https://www.kckcc.edu/academics/catalog/index.html

**College Policies and Statements** 

https://www.kckcc.edu/about/policies-statements/index.html

Accessibility and Accommodations https://www.kckcc.edu/academics/resources/student-accessibility-supportservices/index.html.