BIOL G225: HUMAN PHYSIOLOGY

Item	Value
Curriculum Committee Approval Date	10/19/2021
Top Code	041000 - Anatomy and Physiology
Units	4 Total Units
Hours	108 Total Hours (Lecture Hours 54; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	• GWC Physical Universe*** (GB1)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5B Biological Sciences (5B) • Cal-GETC 5C Laboratory Activity (5C)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5B Biological Sciences (5B) • IGETC 5C Laboratory Activity (5C)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B2 Life Science (B2) • CSU B3 Laboratory Activity (B3)

Course Description

This course is an introduction to the physiological function of the basic systems of the human body. Designed for paramedical biology majors (nursing, x-ray technicians, dental hygiene, physical therapy, etc.) and physical education majors. Will not satisfy transfer requirements for biology majors. PREREQUISITE: BIOL G220 or BIOL G221. ADVISORY: Eligible for college level English and Math. Transfer Credit: CSU; UC. C-ID: BIOL 120B. **C-ID:** BIOL 120B.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. Summarize the human body systems and their interactions.
3. Interpret data pertaining to human physiological processes.
4. Identify normal and abnormal physiological values.
5. Outline how normal physiological processes maintain internal homeostasis.

Course Objectives

- 1. Evaluate collected data gathered in a laboratory setting.
- 2. Relate normal physiological processes to the maintenance of internal homeostasis.
- 3. Explain homeostatic mechanisms as they apply to the disease process.
- 4. Relate cellular biochemistry with the physiological process of the body.
- 5. Correlate anatomical structures with their physiological function(s).

Lecture Content

Introduction: The Cell Introduction to human physiology The cell and its composition Basic functional systems of the cell Control of cell function; and cell reproduction DNA, protein synthesis, gene regulation, DNA replication The Body Fluids and the Urinary System The fluids of the body Capillary membrane dynamics, and the body=s special fluid systems Formation of urine by the kidney and micturition Regulation of body fluid constituents and volumes Blood and Immunity . The blood cells The reticuloedothelial system, immunity and allergy Blood coagulation and transfusion The Cardiovascular System The pumping action of the heart, and its regulation Blood flow through the systemic circulation and its regulation Special areas of the circulatory system Systemic arterial pressure and hypertension Cardiac output, venous pressure, cardiac failure and shock Respiration Mechanics of respiration and transport of oxygen and carbon dioxide Regulation of respiration and the physiology of respiratory abnormalities The Nervous System and Muscle The nerve and membrane potentials Muscle physiology Synaptic functions of neurons, and design of the nervous system Somethetic sensations and interpretation of sensations by the brain The thought processes and control of motor activities Reflex functions of the spinal cord and brain stem The autonomic nervous system, sleep and psychosomatic effects The Special Sensory Systems Vision Hearing, taste and smell Proprioception Tactile sensations The Gastrointestinal and Metabolic Systems Gastrointestinal movements, secretion, and their regulation Digestion and assimulation of carbohydrates, fats and proteins Release of energy from foods and nutrition Body heat and temperature regulation Endocrinology and Reproduction Introduction to endrocrinology The hypophyseal hormones Thyroxin Adreocortical hormones Calcium metabolism, bone, parathoid hormone Pancreatic hormones Sexual functions of the male and female sex hormones Reproduction

Lab Content

Metrics Review of the microscope Basic metric units Metric System Conversions Cell Division Cell structure The cell cycle Mitosis Meiosis Respiration and Acid-Base Balance Ventilation Introduction to pH Acids Bases Description of buffer systems The role of the respiratory system in the maintenance of blood pH Disease states associated with acid/base imbalances Homeostasis Explanation of the Intracellular and Extracellular Fluid Compartments Regulated variables Homeostatic control system Homeostatic feedback mechanisms Homeostasis and disease Molecular Motion and Cell transport Membrane permeability Membrane structure Membrane Transport Diffusion Osmosis Osmolarity and osmotic pressure Tonicity Facilitated Diffusion Active Transport Endocrine Concepts Endocrine system Hypothalamus and pituitary connection Hormones of the anterior and posterior pituitary Thyroid hormone regulation Thyroid hormone and metabolism Blood glucose regulation Types of Diabetes Mellitus Neurophysiology Nephron structure Measuring membrane potential Electrical signals in neurons Graded potentials Action potentials Refractory periods Propagation of action potentials Factors that affect the speed of propagation of action potentials Frequency of action potentials Types of synapses Synaptic Transmission Sensory Physiology Vision Hearing i >Taste Touch Skeletal Muscle Physiology Skeletal muscle anatomy Structure of a muscle fiber

Skeletal muscle contraction Skeletal muscle response to stimulation Electromyogram Cardiovascular Physiology Cardiovascular system Circulation through the heart Electrical conduction system of the heart Electrocardiogram Cardiac cycle Blood pressure Dynamics of fluid flow Blood Components of blood White Blood Cells Red Blood cells Hemoglobin ABO Blood types Determination of blood types Respiratory Physiology Mechanics of breathing Spirometry Lung volumes and capacities Chemical control of respiration Digestive System Mechanical digestion Chemical digestion Carbohydrate digestion Lipid digestion Protein digestion Urinary System Renal System anatomy Nephron structure Renal exchange processes Renin-Angiotensin-Aldosterone system Antidiuretic hormone Tubular reabsorption of glucose Normal components of urine Urinalysis i

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Reading Assignments

A physiology text providing explanations, process, and theory relating to physiology.Appropriate text chapters on a weekly basis.

Writing Assignments

Students must write lab reports and/or summaries of experimental data gathered in laboratory. Students will also demonstrate mastery of course objectives by essay examination questions.

Out-of-class Assignments

Homework assignments to assess comprehensive of lecture units and assigned text readings.

Demonstration of Critical Thinking

After collection of laboratory experiment data or data supplied by the instructor, students must analyze the data so as to produce conclusions about the data.

Required Writing, Problem Solving, Skills Demonstration

Students must write lab reports and/or summaries of experimental data gathered in laboratory. Students will also demonstrate mastery of course objectives by essay examination questions.

Eligible Disciplines

Biological sciences: Masters degree in any biological science OR bachelors degree in any biological science AND masters degree in biochemistry, biophysics, or marine science OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Fox. Human Physiology, 15th ed. McGraw Hill, 2019 2. Required Silverthorne, Dee Unglaub. Human Physiology: An Integrated Approach, online access , 8th ed. Pearson, 2020

Manuals Resources

1. MCG Custom Lab Manual. Human Physiology, ISBN 9781260029031, McGraw Hill , 01-01-2016