



South Central College

BIOL 230 Human Physiology

Course Outcome Summary

Course Information

Description	This course provides an in-depth study of the functioning of most body systems, including muscle, nervous, cardiovascular, respiratory, digestive, urinary, and endocrine systems at both the cellular and systemic level. An emphasis is placed on normal physiology, but dysfunction will also be discussed. This course contains a weekly 3 hour laboratory component. (Prerequisites: BIOL 220 with a grade of C or better and CHEM 108, CHEM 110 or CHEM 120 with a grade of C or better) (MNTC Goal Area 3)
Total Credits	4
Total Hours	96

Types of Instruction

Instruction Type	Credits/Hours
Lecture	3/48
Lab	1/48

Pre/Corequisites

Successful completion of CHEM 108, CHEM 110 or CHEM 120 with a C or better.

Successful completion of BIOL 220 with a C or better.

Institutional Core Competencies

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Define homeostasis by classifying regulatory feedback systems.

Learning Objectives

Describe how homeostasis operates under a negative feedback system.

Identify the components of a negative feedback system in a physiological system.

Describe how feedforward regulation helps maintain homeostasis.

Explain positive feedback and its role in reproduction and disease.

2. Describe intracellular processes.

Learning Objectives

Identify the chemical composition of the cell.

Explain the functions of the organelles within the cell.

Describe the process of cell respiration.

Identify the modes of cell transport.

Explain how the distribution of ions across the membrane affects chemical forces.

Explain how membrane potential affects electrical forces across the membrane.

Compare and contrast graded and action potentials.

Demonstrate properties and characteristics of enzymes through experimentation.

3. Describe synaptic transmission.

Learning Objectives

List the steps of synaptic transmission.

Explain the role excitatory and inhibitory post synaptic potentials have on synaptic transmission.

Describe the effect of various drugs and toxins on synaptic transmission.

Describe neuronal integration.

4. Explain how the nervous system functions.

Learning Objectives

Identify the structures of the central nervous system and list their functions.

Describe integrated central nervous system function.

Explain sensory transduction in each of the sensory systems.

Explain how the brain interprets sensory information.

Compare and contrast the functions of the two branches of the autonomic nervous system.

Categorize reflexes and describe the components of a reflex arc.

Become proficient in performing and interpreting stretch reflexes.

5. Describe the properties of skeletal muscle.

Learning Objectives

List the steps involved in a skeletal muscle contraction.

Describe the effects of toxins and drugs on the neuromuscular junction.

Describe the relationship between agonistic and antagonistic muscles by interpreting electromyogram tracings.

List the mechanisms involved in recruitment, summation and the length tension relationship.

6. Describe the properties of the cardiac muscle.

Learning Objectives

Describe Frank-Starling's law of the heart.

Explain the effect of stimulating the right vagus nerve.

Describe how the refractory period prevents summation in the heart.

Describe the conduction of the action potential through the heart.

Recognize arrhythmias by reading electrocardiogram strips.

7. Compare and contrast the physiology of the three muscle types.

Learning Objectives

Describe how each type of muscle creates a change in membrane potential.

Describe the subcellular mechanisms of excitation contraction coupling in each muscle type.

Explain the factors that influence the force of contraction in each muscle type.

8. Explain the physiology of the cardiovascular system.

Learning Objectives

Describe the cardiac cycle.

Identify factors that influence cardiac output and mean arterial pressure.

Predict what changes will occur in capillary forces in given medical conditions.

Describe short and long term regulation of mean arterial blood pressure.

Predict cardiovascular responses to real or theoretical conditions.

Demonstrate the effect of position change, decreased temperature and the valsalva maneuver on peripheral blood flow and mean arterial pressure.

9. Describe the functions of the blood.

Learning Objectives

Distinguish between specific and nonspecific immunity.
Explain the mechanisms in cell mediated and humoral immunity.
Describe types of immune dysfunctions.
Describe blood types and predict compatibility for blood transfusions.
Explain the mechanisms involved in hemostasis.
Describe the life cycle of erythrocytes.
Identify the five types of leukocytes and list the functions of each type.
Develop an understanding of various hematology tests.
Identify various types of immunity.

10. Explain the physiology of the respiratory system.

Learning Objectives

Use Boyle's law to describe the process of ventilation.
Describe gas transport in the respiratory system.
Explain how changes in the carbon dioxide level in the blood affect pH.
Predict the effect of various activities on respiration by using the chemoreceptor reflex.
Identify and measure pulmonary volumes to predict pulmonary disorders.
Explain the oxygen-hemoglobin disassociation curve.
Explain the Haldane effect and Bohr effect.
Describe respiratory system disorders.

11. Describe the function of the urinary system.

Learning Objectives

Identify the anatomy of the urinary system.
Explain the processes involved in urine formation.
Describe hormone regulation of the kidneys.
Explain how the kidneys regulate pH.
Explain how the kidneys regulate fluid and electrolytes in the system.
List the steps involved in micturition.
Use urinalysis to identify various disorders of the urinary system.

12. Explain how the endocrine system regulates body function.

Learning Objectives

Identify the major endocrine glands and the hormones they secrete.
Describe hormone actions at the target tissues.
Describe hormone interactions.
Explain hormone regulation.
Describe conditions that occur as a result of abnormal hormone secretion.

13. Describe the role of the gastrointestinal system in digestion.

Learning Objectives

Explain the mechanisms of digestion of protein, fats and carbohydrates.
Explain the mechanisms of absorption of amino acids, glucose, fat, vitamins, sodium and water.
Describe hormonal regulation of digestion.
Explain the role of the accessory structures in digestion.

14. Explain the physiology of the reproductive system.

Learning Objectives

Identify the structures of the male and female reproductive systems and explain their functions.
Explain gametogenesis.
Describe hormonal regulation of the menstrual cycle.
Explain hormonal regulation of pregnancy.
Explain hormonal changes that occur with menopause.

15. Develop laboratory skills.

Learning Objectives

Develop skills in data acquisition using BioPac systems.
Collect and graph data.
Analyze and interpret experimental data.

16. Demonstrate safe laboratory practices.

Learning Objectives

Be aware of any hazardous materials in the lab.
Handle chemicals and equipment in a safe manner.

SCC Accessibility Statement

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.