



South Central College

BIOL 162 Human Biology

Course Outcome Summary

Course Information

Description	This one-semester course is an introduction to the biology of the human body. Basic form and function of the body systems and their interactions will be emphasized. Other topics include: terminology, basic chemistry, cell biology, genetics, molecular biology and nutrition as it relates to the human body. (Minnesota Transfer Curriculum goal area 3) (Prerequisites: A Reading Comprehension Score of 78 or above or READ 0090.)
Total Credits	4
Total Hours	80

Types of Instruction

Instruction Type	Credits/Hours
Lecture	3/48
Lab	1/32

Pre/Corequisites

Reading Comprehension Score of 78 or above or READ 0090.

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

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. Explain the interrelation of human biology with science and society.

Learning Objectives

Describe the characteristics of living things.

Describe the characteristics of a scientific hypothesis and how it relates to experimentation on humans and animals.

Apply critical thinking to evaluate scientific information.

2. Describe the basic chemistry of living things.

Learning Objectives

Describe the components of an atom and how they interact.

Describe the role of water in life and its properties that make it a good solvent.

Describe chemical bonds including covalent, ionic and hydrogen.

Describe acids, bases, buffers and enzymes and their role in maintaining homeostasis.

Describe the major categories of biological molecules: carbohydrates, lipids, proteins and nucleic acids and understand their importance in the human body.

3. Describe cellular structures, functions and metabolism.

Learning Objectives

Compare and contrast eukaryotic and prokaryotic cells.

Describe the structure and function of the nucleus, ribosomes, endoplasmic reticulum, mitochondria, cytoskeleton and Golgi apparatus.

Explain how enzymes speed up reactions.

Describe the plasma membrane and movement across it.

Explain cellular respiration and fermentation in the generation of adenosine triphosphate (ATP) including glycolysis, Krebs cycle and the electron transport chain.

Compare and contrast the role of carbohydrates, lipids and proteins as the source of cellular respiration.

4. Describe tissues, organs and organ systems and explain why homeostasis is important to living organisms.

Learning Objectives

Compare and contrast the structure and function of the 4 different types of tissue: epithelia, connective, muscle and nervous.

Describe the 11 organ systems.

Give examples of how major organ systems work together to maintain homeostasis.

5. Describe the skeletal, muscular and integumentary systems.

Learning Objectives

Describe the structure and function of bone including growth, remodeling and repair.

Describe the structure and function of muscles including the mechanism of muscular contraction.

Describe the structures and functions of the integumentary system.

Analyze health applications that may include: artificial joints, osteoporosis, arthritis, tendinitis, anabolic steroid abuse, Blackberry thumb, fibromyalgia, artificial skin, Botox.

6. Describe the integration and control of the nervous system, general sense and special senses.

Learning Objectives

Compare and contrast the tissues and cells of the nervous system.

Compare and contrast the structures and functions of the central and peripheral nervous system.

Briefly explain how a nerve impulse is transmitted from one neuron to the next.

Describe the role of the meninges, cerebral spinal fluid and blood brain barrier in protecting the central nervous system.

Identify the major parts of the brain and their functions.

Compare and contrast the autonomic nervous system with relation to the sympathetic and parasympathetic systems.

Analyze how drugs affect the nervous system.

Describe the major structures and functions of general senses, vision, hearing, smell and taste.

Analyze health applications that may include: brain injuries, sleep, autism, spinal cord injuries, brain tumors, vision problems, hearing loss.

7. Describe the function and mechanism of hormones and how the endocrine system relates to homeostasis.

Learning Objectives

Describe the mechanism of hormone function.

Describe the various endocrine glands, their hormones, effects and dysfunctions.

Analyze health applications that may include: hormone replacement therapy, hormones and response to stress, melatonin use in boosting the immune system and jet lag.

8. Describe the function of the cardiovascular system and explain its interrelationship with the lymphatic system.

Learning Objectives

Describe the functions and components of blood including ABO blood types, Rhesus (Rh) factor, blood donation and blood clotting.

Compare and contrast the structure and function of veins, arteries and capillaries.

Explain how materials are exchanged between tissues and blood in a capillary bed.

Describe the structures and functions of the heart and blood flow through the heart.

Illustrate the cardiac and conduction system of the heart.

Describe how the blood and lymphatic vessels work together.

Analyze health applications that may include: cardiovascular disease and cigarette smoking, high blood pressure, coronary artery disease, peripheral artery disease, atherosclerosis, benefits of exercise, heart attack, replacement valves, varicose veins, aneurysms.

9. Describe the respiratory system and the exchange of gases.

Learning Objectives

Describe the major structures and functions of the respiratory system.

Explain gas exchange in the lungs.

Analyze health applications that may include: common cold, influenza, pneumonia, strep throat, tuberculosis, bronchitis, emphysema, lung cancer, effects of smoking, asthma, lung disease.

10. Describe the immune system and identify its role in defending the body.

Learning Objectives

Compare and contrast various infectious agents and their transmission.

Describe the body's response to infections.

Analyze health applications that may include: rejection of organ transplants, autoimmune disorders, monoclonal antibodies, allergies, prion disease, hepatitis, rabies, West Nile virus.

11. Describe the digestive system and the role of nutrition and metabolism.

Learning Objectives

Describe the basic structures and functions of the digestive system and the accessory organs.

Describe the secretions produced by the stomach and explain how they aid in digestion.

Explain the role of nutrients in your diet: fats, carbohydrates, proteins and amino acids.

Describe the sources and functions of various vitamins and minerals used to maintain a healthy body.

Analyze food labels for nutritional value.

Analyze the effect of obesity, weight loss programs and eating disorders.

Analyze health applications that may include: acid reflex, heartburn, ulcers, gallstones and gallbladder removal, diverticulitis, colorectal cancer, gastric bypass surgery, liver cirrhosis.

12. Describe the urinary system and how it contributes to homeostasis.

Learning Objectives

Describe the structures and functions of the urinary system.

List the major components of urine and their sources.

Briefly describe the steps in the process of excretion.

Describe short term and long term regulation of blood pH.

Analyze health applications that may include: dialysis, gout, hypertension, urinalysis, kidney stones, urinary tract infections, bladder infections.

13. Describe human reproduction and development.

Learning Objectives

Diagram the male reproductive system, describe the function of all associated structures and the role of hormones.

Diagram the female reproductive system, describe the function of all associated structures and the role of hormones.

Compare and contrast the formation of sperm and eggs.

Compare the biological mechanisms of the various methods of birth control.

Describe various sexually transmitted diseases, causative agents, symptoms and treatment.

Briefly describe the prenatal period of human development: pre-embryo, embryo and fetus and the birthing

process.

Briefly describe the aging process.

Analyze health applications that may include: endocrine disruptors and reproductive problems, invitro fertilization, breast cancer, erectile dysfunction, benign prostatic hyperplasia , prostate cancer, endometriosis, ectopic pregnancy, infertility, birth defects, hormone replacement therapy for menopause, Alzheimer's.

14. Describe deoxyribonucleic acid (DNA) synthesis, mitosis and meiosis.

Learning Objectives

Analyze the cell cycle and mitosis and its role in cancer.

Compare and contrast mitosis and meiosis.

Compare normal and abnormal karyotypes.

Analyze health applications that may include: stem cells, Down syndrome, cloning, various types of cancer.

15. Describe the principles of genetics and how it relates to human inheritance.

Learning Objectives

Analyze the relationship between genes, chromosomes and mutations.

Compare dominant and recessive alleles, mutations and related human disorders.

Explain Mendelian inheritance patterns using Punnet squares and pedigrees to reveal patterns of inheritance.

Compare and contrast the following principles of inheritance: co-dominant alleles, incomplete dominance, multiple alleles, polygenic inheritance, genes on the same chromosome, sex-linked genes and autosomal genes.

Analyze health applications that may include: ethics of gene testing, "savior siblings", nature verses nurture.

16. Examine DNA technology and its role in current biotechnology.

Learning Objectives

Describe the process of transcription and translation in the synthesis of proteins.

Describe how a genetic mutation can alter the structure and function of a protein.

Describe and analyze the technique of DNA fingerprinting.

Briefly describe recombinant DNA and applications in genetic engineering.

Describe the Human Genome Project and the application of genomics in humans and disease.

17. Examine the evidence for evolution and the human impact on the environment.

Learning Objectives

Define biological evolution and describe the evidence for evolution.

Describe the human impact on the environment that may include: human growth rate, carrying capacity, depletion of resources, pollution, global climate change, carbon footprint.

Analyze health applications that may include: air pollution and human health, mercury poisoning, lead poisoning, skin cancer and ozone depletion, biofuels, mass extinction.

18. Perform laboratory experiments relating to human biology.

Learning Objectives

Identify major structures of the body systems using anatomical models and dissection.

Demonstrate physiologic processes using biological and chemical procedures.

19. Adhere to safety procedures in lab.

Learning Objectives

Locate safety equipment and describe its proper use.

Follow safety procedures and chemical hygiene as outlined in lab.

SCC Accessibility Statement

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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.