

Course Code: BIO 105 (IAI L1 904L)

Course Title: Human Biology

Department: Natural Sciences

Effective Date: Summer 2026

PCS Code: 1.1 - Baccalaureate/Transfer

CIP Code: 26.0101

Repeatability: 0

Credit Hours

Catalog Notation: 3-3-4

Credit Hour Distribution:

Lecture: 3

Lab: 3

Clinical: 0

Total: 4

General Course Information

Catalog Description

Provides non-science majors basic principles of human biology in the context of current social issues. An emphasis on the human body and its interconnectedness to health, disease, growth, development, genetics, and evolution, as they relate to individuals and society.

General Course Objectives

- To provide some basic biological principles, with an emphasis on human biology.
- Discuss how these principles apply to social concerns.
- Provide a framework for students to make educated decisions about the use of technology in biology and medicine as it applies to their lives.
- Practice using the Scientific Method in a laboratory setting and explain the importance of doing good science.
- Recognize the significance of the connectedness of all living things and how they operate within a biosphere.
- Recognize the role of pathogens in the immune response and apply this knowledge to challenges faced in controlling disease.
- Apply the anatomy and physiology of the cardiovascular system, urinary system, and reproductive system to understand proper functioning and consequences of dysregulation in humans.
- Recognize the role the environment and genetics play in embryological/fetal development, as well as aging.
- Recognize the importance of cell division to life and apply this concept to Mendelian Genetics, the role the environment plays in genetics, and disease.
- Apply the structure and function of DNA to mutations, protein shape, health, disease, biotechnology, and evolution.
- Describe the major events in the evolution of hominins and distinguish among the different theories regarding Homo sapiens evolution.

Minimum Placement Levels

English	Reading	Math
Placement out of ENG 099	Placement out of CCS 098	None

Prerequisites

None

Methods of Evaluation

13-15 adaptive reading assignments; 13-15 module quizzes; 13-15 pre-lab virtual simulations; 13-15 lab reports submitted as worksheets with group data collected, graphing, and analyzation; an oral presentation; participation in online and classroom discussions; proctored mid-term exam and final exam

Instructional Materials and Additional Supplies

[Human Biology Connect 1 Semester Access Card](#) (E-text)

Author: Mader

Bio 105 Modules & Labs

Author: Joesting

Edition: current edition

Course Content

General Learning Outcomes (GLOs)

- Communication: Students will demonstrate the ability to read, write, listen, and speak effectively.
- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 1: Exploring Life and Science	<ol style="list-style-type: none">1. Explain the basic characteristics common to all living organisms, and why the study of evolution is important in understanding life.2. Describe the relationship between humans and the biosphere.3. Recognize the importance of scientific journals in the reporting of scientific information.4. Describe the challenges facing science and technology in society.5. Lab Activity: The Scientific Method	3	3	0
Module 2: Chemistry of Life	<ol style="list-style-type: none">1. Describe the structure of an atom and its placement on the periodic table and define: atoms, elements, isotopes, ionic bonds, covalent bonds, hydrogen bonds, hydrolysis reaction, and dehydration reaction.2. Describe the properties and bonds of water.3. Summarize the structure of the pH scale and the importance of buffers to biological systems.4. Discuss the known or potential effects of acid rain in central Illinois and know how this would affect forests, lakes, farmland, and technology (cars and roads).5. List the four classes of organic molecules found in cells and examine examples of each.6. Compare the structures and functions of carbohydrates, lipids, proteins, and nucleic acids.7. Lab Activity: Microscope Use and Scale	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 3: Cell Structure and Function	<ol style="list-style-type: none"> 1. State the basic principles of cell theory. 2. Summarize the role of microscopy in the study of cells and development of cell theory. 3. Compare the internal and external structures of a prokaryotic cell and eukaryotic cell. 4. Describe how eukaryotic cells evolved from prokaryotic cells. 5. Describe the structure of the plasma membrane and how its components contribute to the processes of diffusion, osmosis, and facilitated transport. 6. Explain the role of the cytoskeleton in the cell and its structure. 7. Identify the role of products, reactants, and enzymes in metabolic reactions. 8. Summarize anaerobic and aerobic energy generation and illustrate the ATP cycle. 9. Lab Activity: Diffusion and Osmosis 	3	3	0
Module 4: Tissues, Organ Systems, and Homeostasis	<ol style="list-style-type: none"> 1. Describe the biological levels of organization of a human. 2. Distinguish the structure and function of the four major classes of tissue. 3. Describe examples and functions for each subcategory of connective tissues. 4. Distinguish between the different types of muscle and know their function and location in the body. 5. Describe the structure of a neuron and the function of neuroglia. 6. Distinguish between different forms of epithelial tissue with regard to location and function. 7. Summarize the functions of each organ system in the human body. 8. Define homeostasis and provide examples relative to the human body systems. 9. Distinguish between positive and negative feedback mechanisms. 10. Lab Activity: Heart Dissection 	3	3	0
Module 5: Cardiovascular System - Heart, Blood Vessels, and Blood	<ol style="list-style-type: none"> 1. Summarize the functions of the cardiovascular system and how it interacts with other body systems to maintain homeostasis. 2. Describe the structure and function of the three types of blood vessels. 3. Identify the internal and external structures of the heart. 4. Explain how blood flow and pressure differ in the vessels and how this is regulated. 5. Compare the oxygen content of the blood and flow of blood in the vessels of the pulmonary and systemic system. 6. Explain the lymphatic system's role when excess fluid leaves the capillaries. 7. Explain the underlying causes of CV disease in humans, and how current technology in medicine can treat CV disorders. 8. List the percentage of components of blood and what is found within each component. 9. Describe the structure and function of hemoglobin. 10. Summarize the role of erythropoietin in red blood cell production. 11. List the steps in the formation of a blood clot and disorders associated with blood clotting. 12. Explain what determines blood types in humans. 13. Predict the compatibility of blood types for a given transfusion. 14. Lab Activity: Blood Typing 	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 6: Ecology and the Nature of Ecosystems	<ol style="list-style-type: none"> 1. Identify the relationship between ecosystems and the biosphere. 2. Identify ways in which autotrophs and heterotrophs obtain nutrients. 3. Interpret the energy flow and biogeochemical cycling within and among ecosystems. 4. Explain the energy flow among populations through food webs and ecological pyramids. 5. Define the term biogeochemical cycle and identify how human activities can alter it. 6. Identify the steps of the water cycle, carbon cycle, nitrogen cycle, and phosphorus cycle. 7. Lab Activity: Cellular Respiration 	3	3	0
Module 7: Human Interactions with the Biosphere	<ol style="list-style-type: none"> 1. Define the terms exponential growth and carrying capacity, and relate each to human population growth. 2. Explain the relationship among birthrate, death rate, and the annual growth rate of a population. 3. Distinguish between renewable and nonrenewable resources and give an example of each. 4. Explain how human activity is influencing the natural resources of land, water, food, minerals, and energy. 5. Discuss the direct and indirect values to society for conserving biodiversity. 6. Describe the characteristics of a sustainable society and methods of developing sustainability in rural and urban areas. 7. Lab Activity: Population Biology - Growth & Competition 	3	3	0
Module 8: Cell Division and DNA Biology/Technology	<ol style="list-style-type: none"> 1. Know the function and general characteristic of chromosomes. 2. List the stages of the cell cycle and state the purpose of each. 3. Contrast the events of meiosis I and meiosis II with the events of mitosis. 4. Explain how meiosis increases genetic variation. 5. Describe the effects of deletions, duplications, inversions, and translocations on chromosome structure. 6. Describe the causes and consequences of trisomy 21. 7. Describe the structure of a DNA molecule and the process of replicating it. 8. Understand the function of genetic code and the processes of transcription and translation. 9. Recognize the importance of DNA sequencing in the study of biology. 10. Discuss some of the products that have been produced using biotechnology. 11. Investigate how humans are related to various other species and to each other by assessing known genome sequencing projects. 12. Lab Activity: DNA & Proteins, Meiosis Simulation 	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 9: The Lymphatic and Immune Systems	<ol style="list-style-type: none"> 1. Describe the structure of the lymphatic system and how it interacts with the circulatory system. 2. Explain the function and origin of lymph based on its components. 3. Define innate defenses vs. adaptive immune defenses. 4. Summarize the events in the inflammatory response. 5. Explain the two arms of adaptive immunity: antibody-mediated immunity and cell-mediated immunity. 6. Distinguish between active vs. passive immunity. 7. Explain how the HIV virus is transmitted and the methods by which AIDS is treated. 8. Identify how allergic reactions, tissue rejection, and autoimmune diseases affect the body. 9. Lab Activity: White Blood Cells 	3	3	0
Module 10: Biology of Infectious Diseases	<ol style="list-style-type: none"> 1. Define the term pathogen. 2. Compare structures of a prokaryotic cell to structures of a virus. 3. Distinguish among an outbreak, an epidemic, and a pandemic and their effect on society. 4. Describe the infectious diseases: HIV, tuberculosis, and malaria. 5. List some examples of emerging diseases. 6. Summarize how pathogens acquire antibiotic resistance and the significance of this on society and healthcare. 7. Lab Activity: Microbes in the Environment 	3	3	0
Module 11: Urinary System	<ol style="list-style-type: none"> 1. Summarize the components and functions of the urinary system. 2. Identify structures of a kidney. 3. Describe the functions of the different components of a nephron. 4. Describe the processes involved in the formation of urine. 5. Summarize how the kidney supports water-salt balance and pH level homeostasis in the body. 6. List the major diseases of the urinary system and know their causes. 7. Describe how hemodialysis can help restore homeostasis of the blood in the event of kidney failure. 8. Lab Activity: Kidney Dissection 	3	3	0
Module 12: Reproductive System	<ol style="list-style-type: none"> 1. Identify the structures and functions of the male and female reproductive systems. 2. Summarize how hormones regulate the male and female reproductive system. 3. Describe the stages of spermatogenesis and oogenesis. 4. Explain the ovarian cycle and the effects of each stage. 5. List the forms of birth control and summarize how each reduces the chances of fertilization. 6. Describe causes of infertility and how the use of assisted reproductive technologies can increase the chances of conceiving. 7. Discuss STDs and the microbes that cause them (and treatments available). 8. Discuss the sources and effects of misinformation about sex, STDs, and contraceptives on society. 9. Lab Activity: Urinalysis 	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Module 13: Development and Aging	<ol style="list-style-type: none"> Describe the steps in the fertilization of an egg cell by a sperm. Summarize the key events that occur at each stage of pre-embryonic and embryonic development. Describe the flow of blood in a fetus and explain the role of the placenta. Summarize the major events in the development of the fetus from 3-9 months. Summarize the events that occur during the birthing process. Discuss the hypothesis on why humans age, and the effects of aging on the organ systems of the body. Discuss current technology used for preventing and testing for birth defects and discuss current gene therapies available for individuals living with congenital disabilities. Lab Activity: Working with DNA 	3	3	0
Module 14: Genetic Inheritance	<ol style="list-style-type: none"> Understand how inheritance patterns are important to many aspects of human society, agriculture, animal husbandry, and medicine. Define: genotype, phenotype, allele, gene, dominant, and recessive. Calculate the probability of a specific genotype or phenotype in an offspring of a genetic cross. Interpret a human pedigree to identify the pattern of inheritance for a trait and explore examples of how genetic counselors can construct pedigrees to determine hereditary conditions as dominant or recessive. Explain how a combination of genetics and the environment can influence a phenotype. Predict a person's blood type based on genotype. Examine how certain human physical traits demonstrate the idea of dominant and recessive traits and set up hypothetical crosses between students using these characteristics to predict the genotypes and phenotypes of their progeny. Lab Activity: Human Genetics: Genotype, Inheritance, Genetic Counseling 	3	3	0
Module 15: Human Evolution	<ol style="list-style-type: none"> Explain how the conditions of the early Earth's atmosphere were able to contribute to life starting on our planet. Discuss how the first organic monomers and polymers may have evolved. Explain how the first true cell evolved. Describe how the process of natural selection supports the concept of biological evolution. Discuss how the fossil record, biogeography, and anatomical and biochemical evidence all support the concept of biological evolution. Describe the major events in the evolution of the hominins and the adaptations of the homo erectus. Distinguish among the different theories regarding Homo sapiens evolution. Lab Activity: Human Evolution 	3	3	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	45	0