Course Information Form (CIF)

Course Code: BIO 100
Course Title: Introduction to Biology

Department: Natural Sciences
PCS Code: 1.1 - Baccalaureate/Transfer
CIP Code: 26.0101
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 2-2-3
Credit Hour Distribution:

Lecture: 2	Lab: 2	Clinical: 0	**Total: 3**

General Course Information

Catalog Description

Basic introduction to biology, including scientific method, cell structure and function, DNA and RNA, genetics and inheritance, diversity and evolution of life, organ systems and physiology, biotechnology, and ecology and the environment. Designed for those with limited biology course experience.

General Course Objectives

To provide a general introduction to biological science, including the scientific approach to problem solving, communication and technology skills, and the application of biological principles to everyday life.

Minimum Placement Levels

English	Reading	Math
None	Placement out of CCS 098	None

Prerequisites

None

Methods of Evaluation

12-14 quizzes, 10-12 lab assignments, 12-14 discussions, and 1 final exam.

Instructional Materials and Additional Supplies

Biology for a Changing World with Physiology, 4th editions; Shuster, Vigna, and Tontonoz; MacMillian Learning and Scientific American, 2021.

Course Content

General Learning Outcomes (GLOs)

- Communication: Students will demonstrate the ability to read, write, listen, and speak effectively.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Biology and Tools of Science	1. Understand what science is and how science is done. 2. Know the steps of the Scientific Method and be able to apply them. 3. Analyze a scientific study and determine the validity of its conclusions based on its experimental design. 4. Recognize what makes a good hypothesis and the difference between a guess, a hypothesis, and a theory. 5. Evaluate the validity of scientific claims in popular media. 6. Define biology. 7. Identify and discuss the five properties that define life. 8. Define atom, molecule, element, and matter. 9. Understand the structure and function of the four types of macromolecules that make up the human body. 10. Recognize the properties of water that make it a crucial component of life on Earth.	2	2	0
Cell Structure and Function	1. List the principles of cell theory. 2. Identify cell organelles and their functions. 3. Describe the structure and function of cell membranes. 4. Define, describe, and observe the movement of substances across cell membranes. 5. Describe the processes of cellular respiration and fermentation, their inputs, and their products. 6. Compare and contrast the structure and function of DNA and RNA. 7. Identify the location, structure, and function of chromosomes in cells. 8. Explain how DNA is replicated and describe the general steps of protein synthesis. 9. Identify some of the critical roles that proteins play in living organisms. 10. Define gene and gene expression, and be able to explain the process of genetic profiling using PCR. 11. Define genome and discuss the implications and applications of the Human Genome.	4	4	0
Energy and Plant Physiology	1. Define energy and be able to give examples of chemical, potential, and kinetic energy. 2. Identify renewable and non-renewable energy sources. 3. Discuss the variety of ways energy impacts our human existence, ranging from the food we consume to the energy resources that power all aspects of our daily lives. 4. Explain how photosynthesis and cellular respiration form a continuous cycle on Earth, identifying the inputs and outputs of both. 5. Identify how plants acquire carbon dioxide, water, light energy, and nutrients necessary for photosynthesis and growth. 6. Describe the processes of pollination, fertilization, germination, and growth in flowering plants. 7. Recognize the many edible parts of flowering plants and identify which parts we consume in a variety of fruit and vegetable crops.	4	4	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Biotechnology	1. Describe how biotechnology is used in food production, gene therapy, and medical science, as well as the ethical issues surrounding these uses. 2. Understand the process of creating genetically modified crops via traditional genetic engineering and CRISPR technology, and be familiar with the potential benefits and negative consequences. 3. Define transgenic organism and be able to describe the steps in creating this type of organism. 4. Discuss the ethical, legal, and social issues involved in the field of human genomic research and CRISPR applications in the treatment of genetic diseases.	2	2	0
Cell Reproduction and Inheritance	1. Describe the process and function of mitosis. 2. Identify potential sources of mutations and be familiar with the types of mutations that may occur during mitosis and meiosis. 3. Understand what effects these mutations may have on resulting protein structure and function and in causing diseases such as sickle cell anemia and cancer. 4. Describe the process and function of meiosis. 5. Define phenotype, genotype, dominant, recessive, homozygous, and heterozygous and how they apply to inheritance and the expression of traits. 6. Demonstrate knowledge of inheritance principles by working genetics problems for simple inheritance. 7. Be familiar with complex inheritance patterns; identify the role of X and Y chromosomes in determining biological sex, inheriting sex-linked traits, and paternity testing.	4	4	0
Natural Selection and Evolution	1. Explain the process of natural selection and discuss its role in the evolution of species. 2. Recognize natural selection's role in pesticide resistant insects and antibiotic resistant bacteria. 3. Define a gene pool and compare and contrast how adaptive and non-adaptive mechanisms of evolution such as natural selection, genetic drift, mutations, and gene flow affect it. 4. Understand why genetic diversity is important for long-term population stability. 5. Explain Charles Darwin's theory of evolution. 6. Define homology and how an organism's anatomy reflects its adaptation to its ecological environment. 7. Discuss the role of fossils, the fossil record, and DNA as tools to understand and provide supporting evidence of evolution. 8. Be familiar with the evolutionary history of Homo sapiens. 9. Explain with scientific evidence that biologically distinct human races do not exist.	4	4	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Ecology, Environmental Biology, and Climate Change	1. Describe the biological organization of an ecosystem. 2. Discuss the interactions among organisms and between organisms and their nonliving environments. 3. Define the ecological concept of a niche. 4. Identify factors that determine the growth rates of populations and explain the role of keystone species in an ecosystem. 5. Define food chains, food webs, trophic levels, producers, and consumers and be able to describe how energy flows through an ecosystem. 6. Explain the difference between climate and weather. 7. Explain the role of temperature and precipitation in shaping both the presence of biomes and the plant and animal species around the world. 8. Describe the flow of carbon through the environment via the carbon cycle, identifying both natural processes and human activities. 9. Identify common greenhouse gases, their sources, and how the greenhouse effect is changing the climate on planet Earth. 10. Understand that the modern day phenomenon of continued global warming and subsequent climate change is anthropogenic. 11. Identify renewable and non-renewable natural resources and how their use impacts Earth's biocapacity. 12. Calculate ecological footprints and understand ways to increase the sustainability of daily life choices.	4	4	0
Human Physiology I	1. Identify the eleven organ systems in the human body, along with their key organs and functions. 2. Define homeostasis and be able to describe the role of feedback loops, sensors, and effectors in maintaining homeostasis. 3. Explain the role of the hypothalamus, the pituitary gland, and hormones in the body's response to changes in the environment. 4. Become familiar with the anatomy and physiology of the human digestive system. 5. Describe the process of digestion in both upper and lower digestive systems, from consumption to elimination. 6. Describe the anatomy of the male and female reproductive systems. 7. Be familiar with the hormones of male and female human reproductive systems. 8. Understand types of assisted reproduction technologies and their risks and benefits. 9. Describe the potential uses of stem cells in research and medicine, along with ethical considerations of such use. 10. Explain the identifying characteristics of viruses and how viruses cause disease. 11. Understand the role of the immune system in protecting human health. 12. Differentiate between innate and adaptive immunity and their roles in protecting against infection. 13. Describe how vaccines work, what herd immunity is, and how antigenic drift and antigenic shift can create new versions of pathogens.	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Human Physiology II	1. Become familiar with the anatomy and physiology of the human cardiovascular system. 2. Describe the function of various blood components and the process of blood circulation in the human body. 3. Identify risk factors for developing cardiovascular disease and lifestyle choices that can mitigate these risks. 4. Identify the structures of the human respiratory system. 5. Explain the process of gas exchange and transport in the human respiratory and cardiovascular systems. 6. Describe the organization of the human nervous system and the structure of specialized nerve cells called neurons. 7. Explain how neurons transmit electrical signals. 8. Describe the role of neurotransmitters in the human central nervous system. 9. Explain the biological basis of addiction and the effects of addictive drugs on human health.	3	3	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	30	0