

BIOLOGY 102
BIOLOGICAL PRINCIPLES II

BULLETIN INFORMATION

BIOL 102: Biological Principles II (3 credit hours)

Course Description:

Introductory survey of plant and animal development, physiology, ecology, and evolution

Co-requisite: BIOL 102L

Prerequisites: grade of C or better in BIOL 101

SAMPLE COURSE OVERVIEW

BIOL 102 is the second portion of the Introductory Biology sequence and will cover the origins of life, biodiversity, whole organism biology of plants and animals, evolution and ecology. BIOL 102 emphasizes science as a method of understanding the natural world and focus on the use of experimental design and technological to solve questions of biological function that influence contemporary societal issues. Historical and contemporary case studies will be used to illustrate scientific inquiry. The use of statistical and analytical reasoning will also be used to critically evaluate data to assess quantitative and qualitative experimental outcomes that culminate in our modern understanding of Biology. Additionally, the importance of biological scientific literacy to understand and analyze the impact of biological processes on contemporary issues such as sustainability of environmental production, biotechnology and human health and welfare will be emphasized. The purpose of BIOL 102 is to provide a basic overview of biological processes at multiple spatial and temporal scales that will generate a basis for understanding modern biological issues, their importance to contemporary societal issues, and for success in advanced course work in the Biological Sciences.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Biology 102, students will be able to:

1. Demonstrate an understanding of scientific inquiry from other legitimate methods of inquiry and to recognize the difference between scientifically legitimate inquiry and claims without a sound scientific basis
2. Identify and describe the constraints of transport processes that govern physiological rates
3. Differentiate among hypotheses for the origin of life of Earth
4. Describe the characteristics of the domains and kingdoms of life
5. Describe the characteristics and evolutionary relationships of the major phyla of life
6. Describe the interaction of morphological and biochemical properties of terrestrial plants that regulate physiological processes
7. Demonstrate an understanding of mechanisms of growth and development in plants and animals and discuss how those processes are controlled

8. Differentiate different organ systems and their components and explain how physiological mechanisms in one portion of an organ system regulate physiological processes in other portions of the system
9. Evaluate the role of genetic variation in contributing to human health welfare
10. Understand the phenotypic composition of populations from its underlying genetic variation
11. Assess the role of opposing evolutionary forces in causing or limiting genetic differentiation among populations
12. Evaluate the evidence of evolution by common descent by interpreting patterns of biogeographic, genetic, morphological, and biochemical relationships among organisms
13. Demonstrate how processes that control genetic divergence among populations culminate in the formation of “higher” taxonomic groups and assess how an evolutionary perspective assists in interpreting biological diversity
14. Distinguish the processes that control the assembly of species into communities
15. Analyze the consequences of human and societal activities on the composition and diversity of biological communities and ecosystems
16. Describe the roles of energy conversion and nutrient recycling in determining the composition, diversity, and distribution of ecological systems and how human activities alter the provision of services to human societies
17. Demonstrate recognition of the role of sound scientific information in informing policy and management issues.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. Textbook: Campbell, N.A. and J.B. Reece. 2008. *Biology*, 8th edition (any previous edition is also suitable)
2. Online Resources, including Power Point presentations, are available through *Blackboard*

SAMPLE ASSIGNMENTS AND/OR EXAMS

1. Four exams: Grade evaluations will be made based upon best performance on four exams. The exams will include questions that assess the student’s capacity to integrate scientific literacy and utilize the scientific method to derive new conclusions from data and differentiation among alternative hypotheses. The format of the exams may vary (multiple choice, short answer, or essay). The fourth test is not a cumulative exam.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

Evolution

Class 1	Introduction
Class 2	Fossils, Geologic time scale, Natural Selection
Class 3	Population genetics
Class 4	Speciation

Biodiversity

Class 5	Origin of Life
Class 6	Procaryotes
Class 7	Eucaryotic origins, Protists
Class 8	Plants
Class 9	Fungi
Class 10	EXAM 1
Class 11	Animal evolution and diversity
Class 12	Animal structure

Plants: Form and Function

Class 13	Growth and Structure
Class 14	Transport and Vascularization
Class 15	Reproduction
Class 16	Development and Control Systems
Class 17	EXAM 2

Animals: Form and Function

Class 18	Form and Function
Class 19	Digestion
Class 20	Gas exchange, Circulation
Class 21	Water Balance and Excretion
Class 22	Immune Systems
Class 23	EXAM 3

Ecology

Class 24	Physiological Ecology/Thermoregulation
Class 25	Introduction to Ecology
Class 26	Community Ecology
Class 27	Ecosystems Global Ecology and Global Change

EXAM 4 according to University exam schedule