Virginia Western Community College
BIO 102
General Biology II

Prerequisites

A passing grade of C or higher in BIO 101 or equivalent, or departmental permission.

Course Description

Focuses on biological processes with a chemical foundation, including macromolecules, cellular structure, metabolism, and genetics in an evolutionary context. Explores the core concepts of evolution; structure and function; information flow, storage and exchange; pathways and transformations of energy and matter; and systems biology. Emphasizes the process of science, interdisciplinary approach, and relevance of biology to society. Part II of a two-course sequence. Lecture 3 hours. Recitation and laboratory 3 hours. Total 6 hours per week. 4 credits

Semester Credits: 4 **Lecture Hours: 3** **Laboratory Hours: 3**

Required Materials

Textbooks:
Biology. Hawkes Learning. 2024. ISBN: 978-1-64277-644-7; hard copies are optional, but an online subscription to the eText and homework platform are required.

VWCC Biology 102 Laboratory Manual. Customized for VWCC from Inquiry Into Life Laboratory Manual, 17th edition. Mader and Cox. Publisher: McGraw-Hill Higher Education. ISBN: 9781307931044.

Course Outcomes

At the completion of this course, the student should be able to:

- Demonstrate an understanding of the diversity of animal life, both invertebrate and vertebrate.
- Demonstrate a knowledge of homeostasis, comparing and contrasting positive and negative feedback mechanisms.
- Demonstrate a knowledge of select organ systems of animals, with emphasis on human anatomy and physiology. Two organ systems will be featured at the discretion of the instructor. While the emphasis will be on the human body, adaptations characteristic of other types of animals will also be discussed.
- Demonstrate a basic understanding of ecological concepts, such as biomes, population ecology, communities, and ecosystems.
- Demonstrate a knowledge of ecosystem energetics and man's impact on ecosystems.
- Demonstrate knowledge of the concepts of evolution, natural selection and the origin of species.
- Be familiar with evolutionary trends of plants.
- Discuss the four major plant groups, their reproduction, and acquisition of resources.

Topical Description

Evolution

Chapter 18: Evolution and the Origin of Species

- Understanding Evolution *(this will be a review from BIO 101)*
- Speciation: The Evolution of New Species
- Factors that Affect Speciation

Chapter 19: The Evolution of Populations

- How Populations Evolve
- Population Genetics
- Adaptive Evolution

Chapter 20: The Tree of Life and Phylogenetics

- Organizing Life on Earth
- Determining Evolutionary Relationships *(Skip 20.3)*

Overview of the Animal Kingdom

Chapter 27: Introduction to Animal Diversity

- Characteristics of Animals
- Classification of Animals
- Animal Phylogeny

Chapter 28: Invertebrates

(Note: much of this information is covered in lab, which can save time in the lecture portion.)

- Phylum Porifera
- Phylum Cnidaria
- Superphylum Lophotrochozoa
- Superphylum Ecdysozoa
- Superphylum Deuterostomia

Chapter 29: Vertebrates

(See note under ch. 28)

- Chordates
- Fishes
- Amphibians
- Reptiles
- Mammals
- Primate Evolution and Diversity

Chapter 33: The Animal Body

- Animal Body Plans
- *(Skip 33.2 – tissues will be taught in lab.)*
- Homeostasis

Organ Systems

Instructors may choose two organ systems to feature but must first discuss all the organ systems and their basic functions. Organ systems to choose from are:

- *Digestive*
- *Circulatory*
- *Respiratory*
- *Immune*
- *Urinary*
- *Endocrine*
- *Reproductive*
- *Nervous*
- *musculoskeletal*

Overview of The Plant Kingdom

(A survey of Ch. 25: Seedless Plants and Ch. 26: Seed Plants will be covered in lab.)

Chapter 30: Plant Physiology

- The Plant Body
- Stems
- Roots
- Leaves
- Transport of Water and Nutrients in Plants *(Skip 30.6)*

Ecology

Chapter 44: Ecology and the Biosphere

- The Scope of Ecology
- Biogeography
- Terrestrial Biomes
- Aquatic Biomes
- Climate and Climate Change

Chapter 45: Population and Community Ecology

- Population Demography
- Life Histories and Natural Selection
- Population Growth and Regulation
- Community Ecology *(Skip 45.5)*

Chapter 46: Ecosystems

- Ecosystem Ecology
- Energy Flow Through Ecosystems
- Biogeochemical Cycles

Chapter 47: Conservation Biology and Biodiversity

- The Biodiversity Crisis
- The Importance of Biodiversity to Human Life
- Threats to Biodiversity
- The Future: Preserving Biodiversity

Lab Topics

- Nonvascular Plants and Seedless Vascular Plants
- Seed Plants
- Evidences of Evolution
- Introduction to Invertebrates
- Invertebrate Coelomates
- Vertebrates
- Animal Organization - Tissues
- Homeostasis – circulatory system, respiratory system, excretory system
- Basic Mammalian Anatomy I and II (2 weeks; pig dissection)
- Forest ecology – Fishburn field trip
- Ecosystems semester project

Notes to Instructors

1. Comprehensive study of the listed topics is beyond the reasonable expectations of a 15-week Biology 102 course. It is up to the discretion of the instructor to choose which topics are more detailed but each topic should be adequately covered.
2. Additional topics may be covered at Instructor's discretion.

ADA Statement (PDF)
Title IX Statement (PDF)