

Prepared by the Department of Natural Science and Applied Technology

Date of Departmental Approval: February 1, 2016

Date approved by Curriculum and Programs: February 22, 2016

Effective: Fall 2016

**1. Title: BIO152 General Biology II
BIO152L General Biology II Laboratory****2. Course Description**

The second in a two-semester sequence in introductory biology for science majors or science-interested students. It is designed to acquaint the student with the evolution and diversity of life as well as general ecological principles. Prokaryotes, unicellular eukaryotes, plants, fungi and animals are studied. The laboratory features activities and experiments that reinforce the concepts presented in lecture. Microscopy, dissection, and some field work provide the basis for learning. (3 class hours/ 3 laboratory hours)

3. Student Learning Outcomes (Instructional Objectives, Intellectual skills)

Upon completion of the course, the student is able to:

- Describe population genetics and discuss the roles of genetic variation in the evolutionary process.
- Describe the characteristics of the domains and kingdoms of organisms including differentiating between prokaryotic and eukaryotic species.
- Apply basic rules of phylogenetic systematics (cladistics) to show evolutionary relationships among taxa.
- Compare the evolutionary relationships, cell and/or tissue types, body morphology, reproduction methods, development and life cycles of selected bacteria, protists, plants and animals.
- Identify the evolutionary adaptations required for aquatic organisms to transition to terrestrial ecosystems.
- Define homeostasis and provide examples of homeostatic regulation in plants and animals.
- Describe the flow of energy through an ecosystem.
- Discuss and explain the basic principles of population and community ecology including population growth and stability and community structure. Apply this knowledge to a discussion of the causes and effects of past and future human population growth.
- Provide and discuss examples of modern environmental issues.
- Display proficiency in various laboratory techniques and instrumentation.

4. Credits: 4 credits**5. Satisfies General Education Requirement:** Natural or Physical Science**6. Prerequisite(s):** A grade of C or higher in BIO101 or BIO151 (General Biology I)**7. Semester(s) Offered:** Fall, Spring, Summer**8. Suggested Guidelines for Evaluation:** Three full-period exams, weekly quizzes, two lab practical exams, lab reports**9. General Topical Outline of the Course:****I. Natural Selection and Evolution**

Natural selection as the method of evolution

Diversity of genes within a population

Hardy-Weinberg genetics

II. The History of Life on Earth

Geological timeline for Earth

Fossil record and carbon dating

Phylogeny and nomenclature

III. Unicellular Life

Bacteria

Spontaneous generation and the primordial soup

- Definition of life
- Morphology, nutrition, habitat location
- Archaea
 - Morphology, nutrition, habitat location
- Unicellular Eukaryotes
 - Endosymbiont theory
 - Morphology, nutrition, habitat location

IV. Plant Evolution and Diversity

- Evolution of plants from green algal ancestor
- Evolution and diversity of modern plants
- Morphology, physiology and reproduction of:
 - Non-vascular plants
 - Seedless vascular plants
 - Seeded vascular plants

V. Fungal Evolution and Diversity

- Role of fungi in biosphere
- Evolution and diversity of modern fungi
- Morphology, physiology and reproduction of major fungal types

VI. Animal Evolution and Diversity

- Evolution of animals
- Transition from aquatic to terrestrial ecosystems
- Evolution of vertebrates from invertebrate species
- Physiology and reproduction of:
 - Invertebrates
 - Vertebrates
 - Concentration on mammalian evolution and reproductive techniques

VII. Ecology and Ecosystems

- Population and community ecology
- Energy and nutrient cycling

VIII. Conservation Biology

- Restoration ecology
- Global sustainability through biological analysis