

**Common Course Number:** BSC-2011-L

**Course Title:** Principles of Biology II - Laboratory

**Catalog Course Description:**

This course is intended for majors students and complements the lecture course BSC 2011. As such, it functions to provide majors students with hands-on experience with laboratory exercises designed to complement the presentation of the principles of biology as they relate to evolution, biological diversity, form and function in plants and animals, ethology, ecology, and conservation biology.

**Credit Hours:** 2

**Prerequisites:** BSC 2010L

**Corequisites:** BSC 2011

**Course Competencies:**

**Competency 1:** Upon successful completion of this course, the student will demonstrate knowledge of the nature of evolution by:

- a. defining the concept of evolution according to natural selection.
- b. discussing the role of natural selection in the shaping of organismic populations.
- c. analyzing the effects of the directional, stabilizing, and diversifying modes of selection.
- d. analyzing the effect of manipulation of various biological and environmental parameters on organismic populations.
- e. describing the conditions in organismic populations that lead to extinction.

**Competency 2:** Upon successful completion of this course, the student will demonstrate knowledge of population genetics and the Hardy-Weinberg theorem by:

- a. defining the biological concept of population.
- b. explaining the Hardy-Weinberg theorem.
- c. describing the relationship between allelic and genotypic frequencies.
- d. demonstrating the conditions necessary to maintain Hardy-Weinberg equilibrium.
- e. testing hypotheses concerning the effects of microevolutionary agents using the bead model.

**Competency 3:** Upon successful completion of this course, the student will demonstrate knowledge of prokaryotic diversity by:

- a. describing the diversity of prokaryotes.
- b. explaining the structure of prokaryotes, including colony morphology and cell morphology.
- c. identifying various different types of bacteria.
- d. using aseptic techniques in the production of bacterial preparations.
- e. investigating means of controlling the growth of bacteria.
- f. assessing the ecological and economic importance of bacteria.

**Competency 4:** Upon successful completion of this course, the student will demonstrate knowledge of protistan and fungal diversity by:

- a. describing the diversity of protists.
- b. discussing the current interest in their phylogenetic relationships.
- c. identifying representatives of several major protistan phyla and divisions.
- d. describing the diversity of fungi.
- e. identifying representatives of the major fungal divisions.
- f. comparing and contrasting the types of life cycles seen in protists and fungi.
- g. assessing the ecological and economic importance of protists and fungi.

**Competency 5:** Upon successful completion of this course, the student will demonstrate knowledge of the diversity of bryophytes and the seedless vascular plants by:

- a. differentiating bryophytes from seedless vascular plants.
- b. describing the adaptations bryophytes and seedless vascular plants show to life on land.
- c. identifying representatives of the divisions of bryophytes and seedless vascular plants.
- d. describing the generalized alternation of generations life cycle seen in land plants.
- e. comparing and contrasting the types of life cycles seen in bryophytes and seedless vascular plants.
- f. assessing the ecological and economic importance of bryophytes and seedless vascular plants.

**Competency 6:** Upon successful completion of this course, the student will demonstrate knowledge of the diversity of the seed plants by:

- a. identifying representatives of the divisions of gymnosperms and angiosperms.
- b. comparing and contrasting the types of life cycles seen in gymnosperms and angiosperms.
- c. describing the features of flowers ensuring pollination by various agents.
- d. identifying types of fruits and representative examples.
- e. analyzing the adaptations of gymnosperms and angiosperms for life on land.
- f. assessing the ecological and economic importance of seed plants.

**Competency 7:** Upon successful completion of this course, the student will demonstrate knowledge of the diversity of sponges, Cnidarians, flatworms, roundworms, and annelids by:

- a. comparing and contrasting the body plans of representative members of the phyla Porifera, Cnidaria, Platyhelminthes, Nematoda, and Annelida.
- b. explaining how similarities and differences among these various phyla relate to their phylogenetic relationships.
- c. describing the relationship between body plan of these various phyla and their lifestyles.
- d. evaluating the criteria used for construction of a phylogenetic tree for animals.

**Competency 8:** Upon successful completion of this course, the student will demonstrate knowledge of the diversity of mollusks, arthropods, and chordates, by:

- a. comparing and contrasting the body plans of representatives members of the phyla Mollusca, Arthropoda, and Chordata.
- b. explaining how similarities and differences among these various phyla relate to their phylogenetic relationships.
- c. describing the relationship between the body plan of these various phyla and their lifestyles.
- d. identifying the features that provide the criteria for the major branching points of the phylogenetic tree of these phyla and those in the prior unit.
- e. completing a table indicating the nature of the morphological features of phylogenetic importance seen in the various phyla in this unit and the previous one.

**Competency 9:** Upon successful completion of this course, the student will demonstrate knowledge of the anatomy of vertebrates by:

- a. describing the four principal types of animal tissue and providing examples of each.
- b. explaining how the four animal tissue types contribute to the structure of organs.
- c. analyzing the structure and function of vertebrate organ systems and the interactions among them.

**Competency 10:** Upon successful completion of this course, the student will demonstrate knowledge of ethology by:

- a. providing a workable definition of the term ethology.
- b. defining and providing examples of taxes, kineses, and agonistic behaviors.
- c. analyzing these behaviors in representative animals.
- d. explaining the adaptive significance of behaviors studied.

**Competency 11:** Upon successful completion of this course, the student will demonstrate knowledge of ecology by:

- a. describing the biotic and abiotic components of a representative ecosystem, including trophic levels and biogeochemical cycles.
- b. designing an ecological investigation, which includes construction of a hypothesis, predictions, collection techniques, procedures for data analysis, discussion of results, and construction of conclusions, based on locally available natural habitats.
- c. constructing illustrative models for a presentation of the results of the investigation.

**Competency 12:** Upon successful completion of this course, the student will demonstrate knowledge of conservation biology by:

- a. explaining the goals of conservation biology.
- b. describing the three levels of biodiversity, including genetic diversity, species diversity, and ecosystem diversity.
- c. analyzing the effects of habitat destruction on biodiversity using interactive models.
- d. analyzing the interplay of factors involved in establishing and maintaining protected areas.