COURSE COMPETENCIES FOR BSC 2011L

The Nature of Scientific Investigation
The student will:
1. describe the nature of questions answerable using the scientific method.
2. describe the characteristics of a workable scientific hypothesis.
3. characterize the components of a scientific experiment.
4. design and carry out a scientific experiment through the stage of communication of results.

Population Genetics and the Hardy-Weinberg Theorem
The student will:
1. define the biological concept of population.
2. comprehend the Hardy-Weinberg theorem.
3. describe the relationship between allelic and genotypic frequencies.
4. demonstrate the conditions necessary to maintain Hardy-Weinberg equilibrium using the bead model.
5. test hypotheses concerning the effects of microevolutionary agents using the bead model.

Biodiversity: Protists and Fungi
The student will:
1. describe the diversity of protists.
2. comprehend the nature of the current interest in their phylogenetic relationships.
3. identify representatives of several major protistan phyla and divisions.
4. describe the diversity of fungi.
5. identify representatives of the major fungal divisions.
6. compare and contrast the types of life cycles seen in protists and fungi.
7. comprehend the ecological and economic importance of protists and fungi.

**Biodiversity: Bryophytes and Seedless Vascular Plants**

The student will:
1. differentiate bryophytes from seedless vascular plants.
2. describe the adaptations bryophytes and seedless vascular plants show to life on land.
3. identify representatives of the divisions of bryophytes and seedless vascular plants.
4. describe the generalized alternation of generations life cycle seen in land plants.
5. compare and contrast the types of life cycles seen in bryophytes and seedless vascular plants.
6. comprehend the ecological and economic importance of bryophytes and seedless vascular plants.

**Biodiversity: Seed Plants**

The student will:
1. identify representatives of the divisions of gymnosperms.
2. identify representatives of the divisions of angiosperms.
3. compare and contrast the types of life cycles seen in gymnosperms and angiosperms.
4. describe the features of flowers ensuring pollination by various agents (wind, insects, birds, and bats).
5. identify types of fruits and representative examples.
6. analyze the features seen in gymnosperms and angiosperms in relation to the adaptations of these plants for life on land.
7. summarize the major adaptations of plants to life on land, providing evidence from the laboratory investigations.

**Biodiversity: Sponges, Cnidarians, Flatworms, Roundworms, and Annelids**

The student will:
1. compare and contrast the anatomy of representative members of the phyla Porifera, Cnidaria, Platyhelminthes, Nematomida, and Annelida.
2. comprehend how similarities and differences among these various phyla relate to their phylogenetic relationships.
3. describe the relationship between body plan of these various phyla and their lifestyles.

**Biodiversity: Mollusks, Arthropods, and Chordates**
The student will:

1. compare and contrast the anatomy of representatives members of the phyla Mollusca, Arthropoda, and Chordata.
2. comprehend how similarities and differences among these various phyla relate to their phylogenetic relationships.
3. describe the relationship between the body plan of these various phyla and their lifestyles.
4. indicate the features that provide the criteria for the major branching points of the phylogenetic tree of these phyla and those in the prior unit.
5. complete a table indicating the nature of the morphological features of phylogenetic importance seen in the various phyla in this unit and the previous one.

Anatomy of Plants

The student will:

1. describe the structure and function of the cell types seen in land plants.
2. describe the organization of cells and tissues in the organs of land plants.
3. describe the nature of primary and secondary growth as seen in land plants, both herbaceous and woody.
4. comprehend the adaptations of plants to life on land as illustrated by their structural makeup.
5. apply knowledge of plant anatomy to various kinds of produce found in a grocery store.

Anatomy of Vertebrates: Integumentary and Digestive Systems

The student will:

1. describe the four principal types of animal tissue, providing examples of each.
2. identify the tissues and their modifications seen in the vertebrate skin.
3. comprehend how the structure of the vertebrate skin reflects its function.
4. describe the structure and function of the mammalian digestive system, as exemplified in the fetal pig.

Anatomy of Vertebrates: Excretory, Reproductive, and Nervous Systems

The student will:

1. describe the structure and function of the mammalian excretory system, as exemplified in the fetal pig.
2. describe the structure and function of the mammalian reproductive system, as exemplified in the fetal pig, including difference between that in males and females.
3. describe the relationship between the structure and function of the excretory and reproductive systems in mammals, as exemplified in the fetal pig.

4. describe the structural makeup of the neuron.

5. describe the nature of a simple reflex and its relationship to the structure of the spinal cord in mammals.

6. describe the anatomy of a representative sensory structure, the mammalian eye.

7. describe the role of the nervous and endocrine systems in the maintenance of homeostasis in the mammalian body.

**Ethology**

The student will:

1. provide a workable definition of the term ethology.

2. define and provide examples of taxis, kineses, and agonistic behaviors.

3. analyze these behaviors as seen in representative animals, by proposing hypotheses, making predictions, designing experiments to test the hypotheses, collecting and processing data, discussing results, and making conclusions.

**Field Ecology**

The student will:

1. describe the biotic and abiotic components of a representative ecosystem, including trophic structure and biogeochemical cycles.

2. design an ecological investigation, including construction of a hypothesis, predictions, collection techniques, procedures for data analysis, discussion of results, and construction of conclusions, based on locally available natural habitats.

3. construct illustrative models for the presentation of the results of the investigation.