



### **Course Description**

#### **BSC1005L | General Education Biology Laboratory | 1.00 credit**

An optional one-credit lab to provide students with experience in the scientific process. Laboratory fee. This course applies the scientific method to critically examine and explain the natural world, including but not limited to cells, organisms, genetics, evolution, ecology, and behavior.

### **Course Competencies:**

**Competency 1:** The student will understand how scientists apply the Scientific Method to gain knowledge of the natural world by:

1. Explaining how to design hypothesis-driven experiments and be able to differentiate between hypotheses, theories, pseudoscience, and facts.
2. Gaining experience in interpreting graphs.
3. Applying how the Scientific Method could be used daily to make informed decisions.

**Competency 2:** The student will have an understanding of the basic structure and function of important biomolecules by:

1. Identifying the four major groups of biological molecules and their functions in living systems and how they relate to human health.
2. Contrasting acids and bases and explaining how they are involved in determining the pH of a solution.

**Competency 3:** The student will be able to demonstrate microscopy competency by:

1. Demonstrating knowledge of the basic parts of the compound light microscope.
2. Demonstrating ability to correctly use the compound light microscope, including care and storage, as well as focusing, determining total magnification, and estimating the size of objects.
3. Demonstrating knowledge of the parts of the stereoscope.
4. Demonstrating the ability of the correct use of the stereoscope.

**Competency 4:** The student will understand the differences between various cell types, such as plant and animal cells, to recognize cellular organelles and differentiate between prokaryotic and eukaryotic cells by:

1. Comparing the basic characteristics of prokaryotic and eukaryotic cells.
2. Explaining how substances move into and out of cells, highlighting diffusion and osmosis.
3. Identifying the stages of cellular division in mitosis and meiosis.
4. Comparing sexual and asexual reproduction.
5. Communicating how errors in mitosis and meiosis can lead to abnormal conditions, highlighting cancer.

**Competency 5:** The student will have an overview of ecology and of major plant and animal phyla by:

1. Describing the characteristics of Dicots and Monocots, including knowledge of the structure and function of the parts of the flowering plants.
2. Evaluating the importance of local, native, and exotic species.
3. Analyzing the need to control invasive species.
4. Describing the major groups of animals.
5. Evaluating the relevancy of selected plant and animal adaptations.
6. Evaluating the interdependence of species.
7. Analyzing the importance of protecting biodiversity and the impact of humans on the environment.

**Competency 6:** The student will be able to understand the energy flow in living systems and ecosystems by:

1. Analyzing the role of the chloroplast, chlorophyll, and other pigments in the process of photosynthesis.
2. Performing fermentation experiments to understand how yeast extracts energy from organic molecules.
3. Performing separation of pigments using paper chromatography.
4. Defining the electromagnetic spectrum.
5. Distinguishing how cellular respiration and photosynthesis are interrelated.

**Competency 7:** The student will be able to understand basic principles of inheritance and their application by:

1. Applying how Punnett Squares are used to predict the possible outcomes of crosses.
2. Explaining other patterns of inheritance, such as sex-linkage.
3. Interpreting pedigrees.
4. Extracting DNA and understanding DNA's structure and function.

**Learning Outcomes:**

- Use quantitative analytical skills to evaluate and process numerical data
- Create strategies that can be used to fulfill personal, civic, and social responsibilities
- Describe how natural systems function and recognize the impact of humans on the environment