Miami Dade College

BSC 2010L **Principals of Biology I Laboratory**

Course Description: This laboratory course is designed to complement BSC2010, Principles of Biology I. In this course, the student will apply the principles of scientific investigation, the chemistry of life, microscopy, cell structure and function, metabolism, and the continuity of life.

Course Competency	**Learning Outcomes**
Competency 1: The student will learn, upon successful completion of this course, the nature of scientific investigations by:	• Communication • Critical thinking • Environmental Responsibility
1. Posing questions and hypotheses that can be tested through scientific investigation. 2. Designing and performing scientific experiments to understand the various components of the scientific method. 3. Interpreting and communicating the results of scientific experiments.	
Competency 2: The student will learn, upon successful completion of this course, the chemistry of life by:	• Critical thinking • Environmental Responsibility
1. Measuring hydrogen ion concentration by using the pH meter. 2. Using chemical assays to detect the presence of biologically important molecules such as carbohydrates, lipids, and proteins.	
Competency 3: The student will learn, upon successful completion of this course, cell structure and function and the tools utilized to study cells by:	• Communication • Critical thinking • Environmental Responsibility
1. Identifying the various parts of the compound and dissecting microscopes, their functions, and proper use. 2. Understanding the applications of different microscopy techniques in biological research. 3. Identifying cell structures and organelles using light microscopes and electron micrographs.	

4. Comparing structural features of selected cell types. 5. Discussing the evolutionary significance of increasing cellular complexity using various organisms as examples of the various organisms. 6. Testing how selectively permeable membranes allow for diffusion and osmosis, and factors that influence transport across selectively permeable membranes. 7. Understanding the behavior of plant and animal cells exposed to solutions of different tonicity.	
Competency 4: The student will learn, upon successful completion of this course, cellular metabolism by:	• Communication • Critical thinking • Environmental Responsibility
1. Demonstrating how the structure and function of enzymes is affected by different environmental conditions such as substrate concentration, temperature, and pH. 2. Determining the mode of enzyme inhibition experimentally. 3. Investigating how different environmental conditions affect metabolic processes such as fermentation and cellular respiration. 4. Learning the use of spectrophotometry to measure biological reactions in vitro. 5. Utilizing paper chromatography and spectrophotometry to isolate and identify pigments involved in photosynthesis.	
Competency 5: The student will learn, upon successful completion of this course, the continuity of life by:	• Communication • Critical thinking • Environmental Responsibility
1. Identifying the phases of mitosis in plant and animal cells and explaining the events occurring in each phase. 2. Comparing mitosis and cytokinesis in plants and animal cells. 3. Contrasting the events of mitosis and meiosis in cells. 4. Identifying different genetic abnormalities based on observations of different karyotypes.	

5. Applying the principles of Mendelian and non-Mendelian genetics to understand inheritance patterns. 6. Demonstrating the function of restriction enzymes in relevance to biotechnology. 7. Applying the basic principles of gel electrophoresis to analyze DNA.	