

March 2006

I. General Information

Course Name: General Biology I

Prefix and Number: BIO 121

Credit hours: 4 credit hours 5 contact hours

Catalog Description: Basic principles of biology, photosynthesis and respiration, levels of cellular complexity, genetics and evolution. High School Biology highly recommended as a prerequisite.

II. Course Outcomes and Objectives

Learning Outcomes: Students will develop an understanding of basic principles of biology. A major objective of the course is to develop skills relating to the process of conducting science and the scientific method. Students will develop an understanding of the basic principles of biochemistry, cell structure and function, cell metabolism (photosynthesis, respiration), and genetics. Students are expected to develop an understanding of these basic principles and be able to apply concepts to solve problems. Group laboratory work helps students develop communication skills.

College Competencies Addressed by the Course: Writing, Oral Communication, Reading, Computer Literacy, Problem Solving, Global Concerns

III. Methods of Instruction

Types of Course materials: Textbook and Lab book required

Methods of instruction: Three hours of lecture and two hours of laboratory per week.

Assessment measures: Longitudinal assessment of student performance on tests, homework, labs, project work, journals; Classroom Assessment Techniques

Methods of Evaluation: Quizzes, examinations and laboratory reports

IV. General Outline of Topics Covered

A. Introduction

1. Biology as a science
2. Scientific method

B. Basic Chemistry

1. Atomic structure
2. Chemical bonds
3. Chemistry of water
4. Organic functional groups
5. Carbohydrates: structure and function in living organisms
6. Lipids: structure and function in living organisms
7. Proteins: structure and function in living organisms
8. Nucleic acids: structure and function in living organisms

C. Principles of Metabolism

1. Energy
2. Thermodynamics
3. Endergonic and exergonic reactions
4. Enzymes

D. Cell Membrane Structure and Function

1. Membrane structure
2. Passive and active transport mechanisms

E. Cell Structure and Function

1. Prokaryotic vs. eukaryotic cells
2. Eukaryotic cell organelles
3. Animal vs. plant cells

F. Photosynthesis

1. Light dependent reactions
2. Light independent reactions
3. C₃ vs C₄ pathway

G. Cellular Respiration

1. Glycolysis and pyruvate formation
2. Aerobic respiration
3. Anaerobic respiration/fermentation

H. DNA

1. Molecular structure
2. DNA replication

3. Gene expression
4. DNA mutations and protein function

I. Cellular Reproduction

1. Prokaryotic cell division
2. Chromosome structure
3. Eukaryotic cell cycle
4. Mitosis and cytokinesis
5. Meiosis

J. Genetics and Inheritance

1. Monohybrid and dihybrid crosses
2. Sex-linked inheritance
3. Incomplete dominance and codominance
4. Genetic disorders
5. Genetic problem solving

K. Biotechnology

1. Recombinant DNA
2. Methods in biotechnology