Course Syllabus

Department: Science and Technology
Date: 1/2012

I. Course Prefix and Number: BIO 121
   Course Name: General Biology I
   Credit Hours and Contact Hours: 4 credit hours and 5 contact hours

   Catalog Description including pre- and co-requisites: Basic principles of biology, photosynthesis and respiration, levels of cellular complexity, genetics and evolution. Prerequisite: Successful completion of all required remedial courses.

II. Course Outcomes and Objectives
   Student Learning Outcomes:
   Students will
   - Describe basic principles of biology.
   - Describe the basic principles of biochemistry, cell structure and function, cell metabolism (photosynthesis, respiration), and genetics.
   - Collaborate in lab
   - Design laboratory experiments by applying concepts to solve problems
   - Analyze data and form conclusions and present in a written laboratory report using the CSE format.
   - Revise written laboratory reports.
   - Evaluate and summarize scientific articles including ethical implications.

   Relationship to Academic Programs and Curriculum:
The course meets the first semester of the science sequence requirement for an Associate’s in Liberal Arts and Sciences. This course is required for the Biotechnology Associate in Science, Natural Resource Conservation Law Enforcement in Applied Science, the Environmental Studies Associate in Science, and the Fisheries Technology Associate in Applied Science degree programs. This course is approved for SUNY Gen Ed Credit in the Natural Science knowledge and skill area.

   College Learning Outcomes Addressed by the Course:
   - X writing
   - X computer literacy
   - [] oral communications
   - X ethics/values
   - X reading
   - [] citizenship
   - [] global concerns
   - X mathematics
   - X information resources
   - X critical thinking

III. Instructional Materials and Methods
   Types of Course Materials:
   Textbook and Lab book required
Methods of Instruction (e.g. Lecture, Lab, Seminar …):

Three hours of lecture and two hours of laboratory per week.

IV. Assessment Measures (Summarize how the college and student learning outcomes will be assessed):

Objective format exams with short answer items will assess the student’s understanding of biologic principles and scientific inquiry. Written laboratory reports and journal article review will assess the student’s ability to summarize knowledge, apply scientific reasoning, analyze data, communicate understanding of scientific principles, interpret results, and evaluate experimental design. A computer generated report will have data and information from a variety of sources, synthesized into a report. This will also assess the college learning outcome of ethics and values.

V. 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
   5. Cellular Reproduction
   6. Prokaryotic cell division
   7. Chromosome structure
   8. Eukaryotic cell cycle
   9. Mitosis and cytokinesis
  10. Meiosis
  11. Genetics and Inheritance
  12. Monohybrid and dihybrid crosses
  13. Sex-linked inheritance
  14. Incomplete dominance and codominance
  15. Genetic disorders
  16. Genetic problem solving
  17. Biotechnology
  18. Recombinant DNA
  19. Methods in biotechnology