BIOL 1101: Principles of Biology I

A. COURSE DESCRIPTION

Credits: 4
Lecture Hours/Week: 3
Lab Hours/Week: 3
OJT Hours/Week: *.*

Prerequisites:
This course requires any of these seven prerequisites
  Reading College Level
  Reading at College Level
  Reading at College Level
  Placement into EAP 1230
  EAP 0930 - Academic Reading and Study Skills (Minimum grade: 1.67 GPA Equivalent)
  Placement into EAP 1230
  ESOL 0930 - Academic Reading and Study Skills

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

This is the first course in a two-semester biology sequence. This course introduces students to the concepts of cell structure and function, cellular metabolism, heredity and genetics. This course is intended for students for biological and physical science majors or those planning to enter a professional program. (3 hours lecture, 3 hours lab)
Strongly Suggested Prerequisite: CHEM 1061 or Concurrent Registration with CHEM 1061

B. COURSE EFFECTIVE DATES: 08/27/2012 - Present

C. OUTLINE OF MAJOR CONTENT AREAS
D. LEARNING OUTCOMES (General)
1. (MnTC Goal 3a; ELO 1) Apply cell theory and theory of evolution to in order to understand the following concepts:
   - Cell architecture and the major cell structures, their functions and evolutionary origins
   - The chemical and energetic principles that underlie cellular structure and metabolism of all life
   - The relationships between energy-releasing and energy-capturing processes of cellular metabolism, and the variation among organisms
   - The dynamic nature and function of enzymes
   - Cell cycle, including the processes of mitosis and meiosis and DNA replication

2. (MnTC Goal 3a; ELO 1) Apply cell theory and theory of evolution to in order to understand the following concepts (cont):
   - Patterns of genetic inheritance and sources of genetic diversity required for evolution
   - Molecular characteristics of DNA, RNA, and proteins and the interrelated process of these materials in the cell resulting in gene expression
   - Prokaryotic and eukaryotic gene expression control mechanisms

3. (MnTC Goal 3b, 3c; ELOs 1, 2a, 2d, 3e, 4a) Demonstrate the following laboratory skills:
   - Use the scientific method, including identifying testable questions, developing well reasoned hypotheses, designing or choosing methods to test the hypotheses (including controlled experiments), performing lab experiments, collecting data and evaluating the hypotheses based on the data, revising or formulating new questions, new hypotheses and additional tests based on the data collected

4. (MnTC Goal 3b, 3c; ELOs 1, 2a, 2d, 3e, 4a) Demonstrate the following laboratory skills (cont):
   - Accurately collect laboratory results using a variety of techniques including: Physical characteristics (weight, length, volume), Microscopes, Colorometric indicator assays, DNA Technology
   - Convert from one metric measurement unit to another, use calculations to make liquid solutions and relate change in volume to change in concentration, use standard curve relationships to estimate unknown values, and perform other lab math appropriate to the research being done

5. (MnTC Goal 3b, 3c; ELOs 1, 2a, 2d, 3e, 4a) Demonstrate the following laboratory skills (cont):
   - Represent and explain numerical information in mathematical form, including tables, graphs, and diagrams
   - Be able to safely use and understand all laboratory equipment employed during the semester
   - Read primary literature
   - Relate lab results and techniques to molecular and cellular biological principles

6. (MnTC Goal 3b, 3c; ELOs 1, 2a, 2d, 3e, 4a) Demonstrate the following laboratory skills (cont):
   - Work as a member of a collaborative team to plan, design, and complete lab experiments, to analyze and present data as a team, to provide assistance and support to teammates to create a constructive team climate, and to resolve conflict
   - Communicate about the lab projects in standard scientific formats, such as lab notebooks, formal lab reports, journal clubs, research posters and/or present
7. (MnTC Goal 3b, 3c, 3d; ELO 2a) Think critically about scientific problems encountered in their society:
   - Use the scientific method to attack testable questions
   - Read primary literature
   - Present concise, accurate results and application in written and spoken format

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

   Goal 03 - Natural Science

   1. Demonstrate understanding of scientific theories.
   2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
   3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
   4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

F. LEARNER OUTCOMES ASSESSMENT
   As noted on course syllabus

G. SPECIAL INFORMATION
   None noted