

# North Hennepin Community College

## BIOL 1101: Principles of Biology I

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites:

This course requires the following prerequisite

CHEM 1061 - Principles of Chemistry I (Minimum grade: 1.67 GPA Equivalent)

Corequisites: CHEM 1061

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)

Prerequisite: CHEM 1061 or Concurrent Registration with CHEM 1061 by Dean Approval.

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

### C. OUTLINE OF MAJOR CONTENT AREAS

1. This course emphasizes the underlying and principles of cell theory and theory of evolution as a means to understand the unity and diversity of life. In this light, the chemical basis of life explored in terms of structure and function.
2. The energetics of metabolism is explored at the cellular level with effects to the organism.
3. Finally, genetic principles of gene expression and inheritance with implications toward diversity and evolution are explored.
4. This course applies prior mathematical and chemical principles in a biological context. Scientific method, experimental design and independent research are emphasized in laboratory.

#### **D. LEARNING OUTCOMES (General)**

1. Apply cell theory and theory of evolution to in order to understand the following concepts (MnTC Goal 3 a, b, c; ELOs 1, 2, 4):
2. Cell architecture and the major cell structures, their functions and evolutionary origins;
3. The chemical and energetic principles that underlie cellular structure and metabolism of all life
4. The relationships between energy-releasing and energy-capturing processes of cellular metabolism, and the variation among organisms;
5. The dynamic nature and function of enzymes;
6. Cell cycle, including the processes of mitosis and meiosis and DNA replication
7. Patterns of genetic inheritance and sources of genetic diversity required for evolution;
8. Molecular characteristics of DNA, RNA, and proteins and the interrelated process of these materials in the cell resulting in gene expression.
9. Prokaryotic and eukaryotic gene expression control mechanisms;
10. Demonstrate the following laboratory skills: (MnTC Goal 2 a, b, c, d; Goal 3 a, b, c; ELOs 2, 3, 4)
11. Use the scientific method to attack testable questions;
12. Develop controlled experiments to test viable hypotheses about cellular properties and functions
13. Accurately measure laboratory results using a variety of techniques including
  - i. Physical characteristics (weight, length, volume)
  - ii. Microscopes
  - iii. Colorometric indicator assays
  - iv. DNA Technology,
14. Relate biological principles to techniques and results acquired in the laboratory;
15. Be able to use and understand all laboratory equipment employed during the semester.
16. Read primary literature
17. Think critically about scientific problems encountered in their society: (MnTC Goal 2 a, b, c, d; MnTC Goal 3, a, b, c, d; ELOs 3)
  - a. Use the scientific method to attack testable questions;
  - b. Read primary literature
  - c. 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**

1. Knowledge of Human Cultures and the Physical and Natural World --Through study in the sciences, mathematics, social sciences, humanities, histories, languages, the arts, technology and professions.
2. Intellectual and Practical Skills - Including: Inquiry and analysis; Critical and creative thinking; Written and oral communication; Quantitative literacy; Information literacy; Teamwork and problem solving.
3. Personal and Social Responsibility and Engagement - Including: Civic knowledge and involvement - campus, local and global; Intercultural knowledge and competence; Ethical reasoning and action; Foundations and skills for lifelong learning .
4. Integrative and Applied Learning - Including: Synthesis and advanced accomplishment across general education, liberal studies, specialized studies and activities in the broader campus community