

BIO 280 Biotechnology

COURSE DESCRIPTION:

Prerequisites: Take one: BIO 111, CHM 131, or CHM 151, passed with C or better

Corequisites: None

This course provides experience in selected laboratory procedures. Topics include proper laboratory techniques in biology and chemistry and their uses in the modern biotechnology lab setting. Upon completion, students should be able to perform laboratory techniques and use instrumentation common to basic biotechnology. *This course has been approved to satisfy the Comprehensive Articulation Agreement for transferability as a pre-major and/or elective course requirement.* Course Hours Per Week: Class, 2. Lab, 3. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon completion of this course, the student will be able to do the following:

1. perform basic and analytical laboratory techniques
2. perform data analysis and presentation, using excel and bioinformatic software
3. perform general bacteriology and microbial techniques including making media,
4. culturing bacteria and select other microorganisms
5. perform DNA manipulation techniques including transformation, DNA restriction analysis,
6. DNA fingerprinting and gel electrophoresis
7. analyze and present data from scientific literature in peer-reviewed journals
8. relate the laboratory techniques performed to modern biotechnological developments or
9. science issues facing society.

OUTLINE OF INSTRUCTION:

I. General Introduction

- A. Working in a scientific laboratory setting
- B. Using different types of scientific glassware and basic lab equipment
- C. Understanding the need for accuracy and precision in measurements

II. Scientific Reporting

- A. Writing and following protocols
- B. Properly keeping lab notebooks
- C. The need for documentation

III. Media Preparation and Chemical Lab Techniques

- A. Performing dilutions
- B. Preparing solutions
- C. Determining concentration and pH
- D. Sterilization techniques

IV. Microbiological Techniques

- A. Aseptic techniques
- B. Bacterial culturing
- C. Culturing eukaryotic microscopic organisms
- D. Microscopy

V. Nucleic acid manipulations

- A. The process of transformation
- B. methods of gene regulation

VI. Spectrophotometry

- A. Using spectrophotometers
- B. Producing standard curve data
- C. Performing different graphing techniques

VII. Scientific Literacy

- A. Read and analyze science journal articles
- B. Prepare posters from scientific data
- C. Present scientific analyses

REQUIRED TEXTBOOKS AND MATERIALS:

Students will be given online readings and supplementary materials in the laboratory.

SUGGESTED REFERENCES, PERIODICALS, AND VISUAL AIDS:

Numerous supplementary texts, programmed materials, and audiovisual packages are available in the Educational Resources Center. These materials may be utilized to reinforce the lecture and lab material or to provide material for independent study by the student.