

BTC 181 Basic Lab Techniques

COURSE DESCRIPTION:

Prerequisites: None

Corequisites: None

This course introduces the basic skills and knowledge necessary in a biological or chemical laboratory. Emphasis is placed on good manufacturing practices, safety, sustainable lab practices, solution preparation, and equipment operation and maintenance following standard operating procedures. Upon completion, students should be able to prepare and perform basic laboratory procedures using labware, solutions, and equipment according to prescribed protocols.

Course Hours Per Week: Class, 3. Lab, 3. *Semester Hours Credit:* 4.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Demonstrate comprehensive understanding of the principles and practices used in biotechnology and biomanufacturing.
2. Demonstrate an understanding of quality systems such as International Standards Organization (ISO) and Current Good Manufacturing Practices (CGMP).
3. Identify workplace safety hazards and utilize various lab instruments safely.
4. Measure length, volume, mass, and pressure using the metric system and perform basic lab calculations to prepare solutions and dilutions.
5. Summarize various biomanufacturing methods including filtration, centrifugation, and chromatography.

OUTLINE OF INSTRUCTION:

- I. Introduction to Biotechnology
 - A. The Modern Biotechnology Industry
 - B. The Business of Biotechnology and Company Layout
 - C. The Lifecycle of Pharmaceutical Products
- II. Product Quality and Biotechnology
 - A. Drug History and Introduction to Product Quality Systems
 - B. Regulatory Agencies and Current Good Manufacturing Practices (CGMP)
 - C. Standard Operating Procedures (SOP)
 - D. Good Documentation Practices (GDP)
- III. Working Safely
 - A. Introduction to a Safe Workplace
 - B. Working Safely in the Lab
 - C. Working Safely with Chemicals
 - D. Working Safely with Biological Materials
- IV. Lab Math and Calculations

- A. Basic Math Techniques
 - B. Proportional Relationships
 - C. Relationships and Graphing
 - D. Descriptive Data and Statistics
- V. Lab Measurements and Instruments
- A. Measuring Weight
 - B. Measuring Volume
 - C. Measuring Temperature
 - D. Measuring pH and Conductivity
 - E. Measuring Light: Spectrophotometry
- VI. Lab Solutions
- A. Preparing Solutions
 - B. Preparing Dilute Solutions from Concentrated Solutions
- VII. Separation Methods
- A. Introduction to Filtration
 - B. Introduction to Centrifugation
 - C. Introduction to Bioseparation

REQUIRED TEXTBOOK AND MATERIAL:

Textbook: Seidman, Lisa and Cynthia Moore. (2009). *Basic Laboratory Methods for Biotechnology*. 2nd Edition. Pearson Education, Inc. ISBN: 978-0-321-57014-7

Material: Calculator