

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-26

I. CATALOG DESCRIPTION

Course Number: BIOT2400
Course Title: Advanced Biotechnology and Biomanufacturing
Prerequisite(s): Introduction to Biotechnology BIOT1400 with a C or higher and CHEM 1090 with a C or higher or instructor permission
Corequisite(s): BIOT 2400L
Catalog Description: This course builds on concepts from Intro to Biotechnology I and focuses on applied laboratory skills used in academic and industry biotechnology settings. Topics include biological molecules, laboratory calculations, analytical instrumentation, medical and research biotechnology, microbiological control, and upstream and downstream biomanufacturing processes. The laboratory emphasizes hands-on experience in solution preparation, spectrophotometry, enzyme assays, microbial culture, transformation, protein purification, SDS-PAGE, and quantitative protein analysis. Students practice good laboratory practices, documentation, aseptic technique, and data analysis while exploring how biotechnology impacts medicine, agriculture, and modern biomanufacturing.
Credit Hours: 4.0
Class Hours: 45
Lab Hours: 30
Total Contact Hours: 75

II. COURSE OBJECTIVES: *Course will:*

- A. Provide practical explorations into fields of biotechnology.
- B. Challenge students to apply critical thinking skills to their readings, class activities, laboratory exercises, and classroom discussions about current topics in biotechnology
- C. Improve the student's ability to understand and use biotechnology methods and databases.
- D. Increase the problem-solving skills of students, especially in those areas related to biotechnology.
- E. Prepare the student for more advanced Biotechnology courses

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Understand and use terminology of the field
 - 2. Operate equipment
 - 3. Perform assays and experiments
 - 4. Troubleshoot experiments and equipment
 - 5. Perform data analysis
 - 6. Communicate results
 - 7. Participate in safety training
 - 8. Coordinate with a team
 - 9. Maintain lab notebook
 - 10. Produce documentation
- B. General Education Learning Outcomes
 - 1. GELO #3: Critical Thinking & Problem Solving
 - Outcome: Collect, identify, interpret and analyze data.
 - Outcome: Synthesize information to arrive at reasoned solutions to problems.
 - Outcome: Evaluate ideas presented in writing, media, speech, or artistic presentations.
 - Outcome: Acquire and integrate knowledge and construct relationships across disciplines.

2. GELO #5: Analytical, Quantitative, and Scientific Reasoning
 Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.
 Outcome: Understand and create logical arguments supported by quantitative and scientific evidence and communicate those arguments in a variety of formats.
 Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.
 Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)

- A. Laboratory Mathematics & Solution Preparation
- B. Analytical Instrumentation & Spectrophotometry
- C. Microbiological Control & Aseptic Technique
- D. Upstream Biomanufacturing Processes
- E. Downstream Processing & Protein Purification
- F. Molecular Biology Techniques (Next Generation Sequencing, Gene Expression)
- G. Enzyme Activity & Biochemical Analysis
- H. Biotechnology Workforce Skills, QA/QC, and Documentation

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s):
 1. There is no required text for this course; all materials are provided via Canvas.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture = PowerPoint lectures plus occasional short videos.
 2. Lab = hands-on experiments and activities plus occasional short videos and demonstrations.
 3. Demonstration.
 4. Computer based data analysis.

VII. METHODS OF EVALUATION

- A. Methods of evaluation typically include a combination of the following:
 1. Exams
 2. Quizzes
 3. Homework from lecture and lab
 4. In-class assignments
 5. Oral presentation
- B. SCC GRADING SCALE

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VI. SPECIFIC COURSE REQUIRMENTS

- A. None.