

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-22

I. CATALOG DESCRIPTION

Course Number: BIOT 2445
Course Title: Molecular Biology Techniques
Prerequisite(s): Completion with a C or higher of BIOT 2400 or BIOT 1400 AND either BIOS 1400 or CHEM 1090.
Corequisite(s): BIOT 2445L
Catalog Description: This course focuses on fundamental techniques in molecular biology with a focus on advanced methods for manipulating and analyzing nucleic acids and proteins. Documentation and experimental design are also components of the course. This is a hands-on course with significant lab time each week.
Credit Hours: 4.0
Class Hours: 45
Lab Hours: 30
Total Contact Hours: 75

II. COURSE OBJECTIVES: *Course will:*

- A. Introduce student to theory and laboratory techniques in molecular biology.
- B. Challenge students to apply critical thinking skills to their readings, class activities, laboratory exercises, and classroom discussions about current topics in biotechnology.
- C. Emphasis will be placed on topics such as DNA replication, transcription, gene expression and regulation, recombinant DNA and RNA techniques, DNA sequencing, and bioinformatics tools.
- D. Focus on documentation and quality in the bioscience workplace.
- 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. Utilize the internet to research current regulations
 - 3. Participate in class discussions
 - 4. Communicate results
 - 5. Coordinate with a team
 - 6. Produce documentation
- B. General Education Learning Outcomes
 - 1. GELO #1: Oral Communication
 - Outcome: Develop a central idea for presentations.
 - Outcome: Organize information clearly and logically, in an outline format, citing sources when appropriate.
 - 2. 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.
 - 3. 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. Quality in the Molecular Biology Lab
- B. DNA, RNA, and Protein
- C. Nucleic Acid Isolation and Analysis
- D. PCR
- E. Primer Design
- F. Cloning Procedures and Recombinant DNA Technology
- G. DNA Sequencing
- H. Real Time PCR
- I. Molecular Diagnostics
- J. Bioinformatics
- K. RNA technology

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s):
 - 1. No books required.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Lecture = Power Point lectures plus occasional short videos.
 - 2. Demonstration
 - 3. 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		

VIII. SPECIFIC COURSE REQUIREMENTS

- A. Lab Notebook
- B. Fine tip black Sharpie
- C. Scientific Calculator with statistics and linear regression capabilities
- D. Lab Coat (to be left in lab at all times)
- E. Safety glasses