

SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-19

I. CATALOG DESCRIPTION

Course Number: BIOT2452
Course Title: Bioinformatics
Prerequisite(s): Introduction to Biotechnology BIOT1400
Catalog Description: This course provides an introduction to computational techniques addressing current biological issues. It will focus on DNA, RNA, and protein sequence analysis, protein structure prediction, biological databases and database searching, genome annotation methods, and microarray technology.
Credit Hours: 3.0
Class Hours: 45
Lab Hours: 0
Total Contact Hours: 45

II. COURSE OBJECTIVES: *Course will:*

- A. Provide practical explorations into bioinformatics.
- 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.

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 computer systems to search for online data
 - 3. Perform computer based experiments
 - 4. Assess data quality
 - 5. Perform statistical analysis
 - 6. Communicate results
 - 7. Utilize computer programming basics
 - 8. Integrate data into systems biology
 - 9. Connect integrated data to biological function
- 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. Introduction to bioinformatics
- B. Genome organization
- C. Information retrieval
- D. Data Archives and access
- E. Phylogenetic trees
- F. Drug discovery
- G. Systems biology
- H. Metabolic pathways
- I. Gene regulation

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s):
 - 1. Lesk, Arthur, *Introduction to Bioinformatics*, 4th edition, Oxford University Press, 2014. ISBN: 978-0-19-965156-6.

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. Demonstration
 - 3. Computer based searches and 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 REQUIREMENTS

- A. None.