

**SOUTHEAST COMMUNITY COLLEGE
ARTS AND SCIENCES DIVISION**

Mathematics

Revision Date: 07-01-25

I. CATALOG DESCRIPTION

Course Number: MATH2790
Course Title: SPLTOP Math Research: Models & Data
Prerequisite(s): Intermediate Algebra or equivalent test score or higher-level Math course
Catalog Description: An introductory course in undergraduate research, mathematical modeling, and data analytics. This interdisciplinary course explores mathematical modeling, data analysis techniques, and their applications in various fields. Students will gain exposure to real-world problems, collaborate in teams, and enhance their communication skills. The course covers deterministic, stochastic, and discrete modeling approaches, emphasizing statistical methods and computational tools. By the end of the course, students will be proficient in analyzing data, translating everyday situations into mathematical models, and applying foundational knowledge in data science.

Credit Hours: 3.0
Class Hours: 45
Lab Hours: 0
Total Contact Hours: 45

II. COURSE OBJECTIVES: *Course will:*

- A. Gain Exposure to Interdisciplinary Skills:
 - 1. Understand the mathematical modeling process and its applications in various fields.
 - 2. Explore interdisciplinary connections between mathematics, data science, and real-world problems.
- B. Develop Interpersonal Skills Through Collaborative Teamwork:
 - 1. Work effectively in teams to tackle modeling challenges.
 - 2. Communicate and collaborate with peers, mentors, and experts.
- C. Enhance Oral and Written Communication Skills:
 - 1. Present findings clearly through oral presentations and written reports.
 - 2. Learn to communicate complex mathematical concepts to diverse audiences.
- D. Explore Mathematical Models and Data Analysis Techniques:
 - 1. Study different modeling approaches (e.g., deterministic, stochastic, discrete).
 - 2. Analyze real-world data using statistical methods and computational tools.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Enhance disciplinary skills by engaging in hands-on research experiences
 - 2. Demonstrate research literacy by evaluating scholarly literature and formulating relevant research questions
 - 3. Communicate effectively through written reports, oral presentations, and posters
 - 4. Analyze and interpret data, using statistical methods and visualization techniques.
 - 5. Translate everyday situations into mathematical models that can be analyzed and solved.
 - 6. Apply foundational knowledge in data science, including statistical methods, programming languages, and data visualization.
 - 7. Work with real-world datasets, cleaning, organizing, and interpreting data effectively.

8. Demonstrate proficiency in basic mathematical, statistical, and computational models and algorithms.
- B. General Education Learning Outcomes
 1. 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. Setting norms for research and collaboration
- B. Ethics of original research
- C. Outline the steps involved in the research process
- D. Identify and utilize campus resources for research
- E. Develop a structure for note-taking, sharing, and tracking research goals
- F. Use technology to investigate modeling and data science activities
- G. Choose research topics and form small groups
- H. Conduct research and create final paper
- I. Present research

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): None
- B. Other Resources: None

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture
 2. Discovery learning
 3. Small group exploration and discussion
 4. Technology applications
 5. In-class activities
 6. Collaborative projects

VII. METHODS OF EVALUATION

- A. Methods of evaluation typically include a combination of the following:
 1. Course grades, at the determination of the instructor, will be based on class and group participation, daily work, exams, presentations, projects, papers, and/or a portfolio.
 2. Instructor will distribute and discuss the evaluation process and grading policies with students at the beginning of the term.
- B. **SCC STANDARD GRADING SCALE POLICY:**

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. Access to a computer and the internet is required.