

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

I. CATALOG DESCRIPTION

Course Number:	CSCI2320
Course Title:	Data Science
Prerequisite(s):	Must take MATH-2170 or BSAD-2170, minimum grade of “C” or appropriate score on Math placement test. Also, must take CSCI1550, minimum grade “C”
Catalog Description:	This course covers analyzing and visualizing data using the Python programming language. Topics include preparing data sets, creating visualizations, data wrangling, machine learning, supervised and unsupervised learning.
Credit Hours:	3.0
Class Hours:	45
Lab Hours:	0
Total Contact Hours:	45

II. COURSE OBJECTIVES: *Course will:*

- A.** Apply principles of data organization, preparation, and analysis to create clear, ethical, and impactful data-driven insights.
- B.** Develop student proficiency in collecting, cleaning, and preparing data through effective wrangling, transformation, and integration techniques.
- C.** Introduce principles of tidy data organization to ensure data are structured for efficient analysis and visualization.
- D.** Foster the ability to construct and critically evaluate data visualizations using the grammar of graphics to support accurate and ethical data storytelling.
- E.** Equip students with analytical skills to perform descriptive statistics, measure variability, and conduct exploratory data analysis to identify trends and outliers.
- F.** Strengthen student capacity to manage and manipulate datasets through filtering, summarization, and merging operations.
- G.** Expose students to machine learning, emphasizing both supervised and unsupervised methods such as regression, classification, and clustering.
- H.** Encourage the synthesis and communication of analytical results through clear, ethical, and evidence-based storytelling supported by visual and statistical insights.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A.** Student Learning Outcomes: *Student will be able to:*
 - 1.** Collect, clean, and organize data by applying preprocessing, wrangling, and transformation techniques to prepare tidy, analyzable datasets.
 - 2.** Visualize and interpret data through using principles of the grammar of graphics to effectively communicate insights and avoid visual misrepresentation.
 - 3.** Analyze and summarize data through descriptive statistics, variability measures, and exploratory data analysis to identify trends, patterns, and outliers.
 - 4.** Manage and integrate datasets using filtering, merging, and summarization strategies to support complex analysis.
 - 5.** Apply and evaluate supervised and unsupervised machine learning strategies, including deep-learning into real world problems, to generate predictions, uncover structure, and assess model performance.

- 6. Synthesize and communicate data-driven findings through clear, ethical, and compelling storytelling supported by visual and statistical evidence.
- 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: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.

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

- A. Understanding Data Science
- B. Data Wrangling: Preprocessing
- C. Data Visualization
- D. Data Analysis
- E. Data Management
- F. Machine Learning
- G. Supervised Learning
- H. Unsupervised Learning
- I. Python, R, SQL programming

V. INSTRUCTIONAL MATERIALS

- A. Required program(s):
 - 1. *Data Science for All*, by Brennan Davis and Hunter Glanz, Pearson, Current Edition.

VI. METHOD OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 - 1. Class lecture
 - 2. Projects using data sets.
 - 3. Problem sets
 - 4. Individual student assistance as needed.
 - 5. Group activities and email.

VII. METHODS OF EVALUATION

- A. Methods of evaluation typically include a combination of the following:
 - 1. Homework/exams
 - 2. Projects
 - 3. Investigations/Activities/Reports (varies with instructor)
 - 4. Comprehensive final project (required—counts 10-25% of grade)
- 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. None.