Data Science and Analysis BS, Computer Science Emphasis

General Education Requirements
Students must satisfy the university general education requirements. Many of the courses for the degree may be used to fulfill math proficiency, information literacy, social science, and math and life/natural sciences requirements. The program recommends students take ENGL 3130, Technical Writing or ENGL 3120, Business Writing, to satisfy the Junior-Level Writing requirement. Emphasis areas may require one of these courses. There is no foreign language requirement for the degree.

Satisfactory/Unsatisfactory Option
Courses required for the major may not be taken on a satisfactory/unsatisfactory basis.

Degree Requirements
The BS in Data Science and Analysis consists of a set of core courses along with an emphasis area.

Core Course
MATH 1800 Analytic Geometry and Calculus I 1 3-5
or MATH 1100 Basic Calculus

Statistics Course
The Introduction to Statistics course should align with the student's Discipline Emphasis Area.

Choose one of the following:
SOC/ANTHRO 3220 Quantitative Data Analysis in Social Science Research
BIOL 4122 Biostatistics
ECON 3100 Economic Data and Statistics
CRIMIN 2220 Statistical Analysis in Criminology and Criminal Justice
MATH 1320 Introduction to Probability and Statistics
PSYCH 2201 Psychological Statistics
POL SCI 3000 Political Analysis
SCMA 3300 Business Analytics and Statistics

Additional Required Courses
MATH 4005 Exploratory Data Analysis with R
CMP SCI 1250 Introduction to Computing
CMP SCI 4200 Python for Scientific Computing and Data Science
CMP SCI 4342 Introduction to Data Mining

Total Hours 18-20

1 Students interested in the Computer Science emphasis area, the Mathematics Emphasis Area, or in taking additional mathematics courses should take MATH 1800.

Emphasis Area Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CMP SCI 2250</td>
<td>Programming and Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 2261</td>
<td>Object-Oriented Programming</td>
<td>3</td>
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<tr>
<td>CMP SCI 3130</td>
<td>Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 3411</td>
<td>Introduction to Data Visualization</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4151</td>
<td>Introduction to Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4340</td>
<td>Introduction to Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1900</td>
<td>Analytic Geometry and Calculus II</td>
<td>5</td>
</tr>
<tr>
<td>MATH 3000</td>
<td>Discrete Structures</td>
<td>3</td>
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Choose three of the following:
CMP SCI 3010 Web Full Stack Development
CMP SCI 3702 Introduction to Cyber Threats and Defense
CMP SCI 4030 Introduction to Intelligent Web
CMP SCI 4300 Introduction to Artificial Intelligence
CMP SCI 4320 Introduction to Evolutionary Computation
CMP SCI 4370 Introduction to Biological Data Science
CMP SCI 4390 Introduction to Deep Learning
CMP SCI 4610 Database Management Systems
MATH 2450 Elementary Linear Algebra

Total Hours 35

Other Data Science courses may be included as electives with prior approval of the program coordinator.

Learning Outcomes
Upon completion of the program, graduates will be able to:
- Apply knowledge of statistical data collection, analysis and quantitative modeling techniques
- Demonstrate proficiency in industry-standard programming languages that support data acquisition, retrieval and analysis
- Select, apply and build data-based models and visualizations to devise solutions to data science problems
- Effectively communicate technical results and recommendations in various formats to appropriate audiences
- Identify and interpret the basic computational issues in problem solving
- Apply appropriate tools and techniques necessary for programming practice
- Apply statistical concepts and data science methods to analyze real-world problems using appropriate computer science processes and techniques