Data Science and Analysis BS, Biology 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 3
CMP SCI 1250 Introduction to Computing 3
CMP SCI 4200 Python for Scientific Computing and Data Science 3
CMP SCI 4342 Introduction to Data Mining 3

Total Hours 18-20

Emphasis Area Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 1821</td>
<td>Introductory Biology: Organisms and the Environment (MOTR BIOL 150L)</td>
<td>5</td>
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<tr>
<td>BIOL 1831</td>
<td>Introductory Biology: From Molecules to Organisms (MOTR BIOL 150L)</td>
<td>5</td>
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<tr>
<td>BIOL 2012</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1111</td>
<td>Introductory Chemistry I (MOTR CHEM 150L)</td>
<td>5</td>
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<tr>
<td>BIOL 4436</td>
<td>Applied Bioinformatics</td>
<td>3</td>
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<td>Choose three of the following:</td>
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<tr>
<td>BIOL 2102</td>
<td>Ecology</td>
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<td>BIOL 3302</td>
<td>Evolution</td>
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<td>BIOL 3622</td>
<td>Cell Biology</td>
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<td>BIOL 4182</td>
<td>Population Biology</td>
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<td>BIOL 4602</td>
<td>Molecular Biology</td>
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<tr>
<td>BIOL 4732</td>
<td>Principles of Biochemistry</td>
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Total Hours 30

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
- Demonstrate an understanding of the fundamental principles of biology including the structure and functions of cells and their components, heredity and variation in populations, and evolution
- Apply statistical concepts and data science methods to analyze real-world problems in biology

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