Statistics, BS

Requirements

The Bachelor of Science with a major in statistics requires a minimum of 120 s.h., including at least 47 s.h. of work for the major. Students must maintain a grade-point average of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences GE CLAS Core.

Students who earn the major in statistics may not earn the major in data science.

Students complete 10 core courses that provide essential instruction in statistical methods, applications, and theory. In addition, they concentrate on an area of interest by completing four or five courses in one of the major’s three emphasis tracks: statistics in business, industry, government, and research; statistical computing and data science; or mathematical statistics.

The BS with a major in statistics requires the following coursework.

Requirements

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Emphasis Track</td>
<td></td>
<td>12-16</td>
</tr>
</tbody>
</table>

Core Courses


Emphasis Track

Choose four or five courses from one of the following tracks to gain the skillset suitable for a particular career.

- Statistical Computing and Data Science Track [p. 1]
- Mathematical Statistics Track [p. 2]

Statistics in Business, Industry, Government and Research Track

The statistics in business, industry, government and research track emphasizes statistical applications and data analysis. It is appropriate for students interested in careers as applied statisticians.

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT:3210</td>
<td>Experimental Design and Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Statistical Computing and Data Science Track

The statistical computing and data science track emphasizes statistical applications and requires additional coursework in computing. It prepares students for statistical work that
requires computing expertise for data management, analysis, and reporting.

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of these:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT:5810/ BIOS:5310/ IGPI:5310</td>
<td>Research Data Management</td>
<td>3</td>
</tr>
<tr>
<td>CS:2210</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CS:2230</td>
<td>Computer Science II: Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>Two of these:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT:4520/ IGPI:4522/ PSQF:4520</td>
<td>Bayesian Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4540/ BAIS:4540/ DATA:4540/ IGPI:4540</td>
<td>Statistical Learning</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4560</td>
<td>Data Visualization and Data Technologies</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4740/ CS:4740/IGPI:4740/ MATH:4740</td>
<td>Large Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6220</td>
<td>Statistical Consulting</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6530/ IGPI:6530</td>
<td>Environmental and Spatial Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6550/ BIOS:6310/ IGPI:6310</td>
<td>Introductory Longitudinal Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6560</td>
<td>Applied Time Series Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CS:3700/ MATH:3800</td>
<td>Introduction to Numerical Methods</td>
<td>3</td>
</tr>
<tr>
<td>DATA:4750</td>
<td>Probabilistic Statistical Learning</td>
<td>3</td>
</tr>
<tr>
<td>MATH:4820/ CS:4720</td>
<td>Optimization Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MATH:4840</td>
<td>Mathematics of Machine Learning</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mathematical Statistics Track**

The mathematical statistics track provides a solid foundation in statistical theory and applications. It requires additional coursework in mathematics and is good preparation for graduate study in statistics.

Students who use STAT:4100/IGPI:4100 Mathematical Statistics I and STAT:4101/IGPI:4101 Mathematical Statistics II to satisfy the core requirements may not use those courses to satisfy the track requirement.

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH:3770</td>
<td>Fundamental Properties of Spaces and Functions I</td>
<td>4</td>
</tr>
<tr>
<td>9 s.h. from these:</td>
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<td></td>
</tr>
<tr>
<td>STAT:4100- STAT:4101</td>
<td>Mathematical Statistics I-II (same as IGPI:4100- IGPI:4101)</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT:4520/ IGPI:4522/ PSQF:4520</td>
<td>Bayesian Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4540/ BAIS:4540/ DATA:4540/ IGPI:4540</td>
<td>Statistical Learning</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4560</td>
<td>Statistics for Risk Modeling I</td>
<td>3</td>
</tr>
<tr>
<td>STAT:5120</td>
<td>Mathematical Methods for Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6220</td>
<td>Statistical Consulting</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6300- STAT:6301</td>
<td>Probability and Stochastic Processes I-II</td>
<td>6</td>
</tr>
<tr>
<td>STAT:6530/ IGPI:6530</td>
<td>Environmental and Spatial Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6560</td>
<td>Applied Time Series Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CS:3700/ MATH:3800</td>
<td>Introduction to Numerical Methods</td>
<td>3</td>
</tr>
<tr>
<td>DATA:4750</td>
<td>Probabilistic Statistical Learning</td>
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</tr>
<tr>
<td>MATH:4820/ CS:4720</td>
<td>Optimization Techniques</td>
<td>3</td>
</tr>
<tr>
<td>MATH:4840</td>
<td>Mathematics of Machine Learning</td>
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