**BACHELOR OF SCIENCE IN STATISTICS ROADMAP**

120 Total Units Required  
Minimum Number of Units in the Major: 54

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 226</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area A: Written English Communication (A2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area C: Arts (C1) or Humanities (C2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</td>
<td>3</td>
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</tr>
<tr>
<td><strong>Units</strong></td>
<td></td>
<td>16</td>
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<tr>
<td><strong>Second Semester</strong></td>
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<td></td>
</tr>
<tr>
<td>MATH 227</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area A: Written English Communication (A2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or Written English Communication II (A4)</td>
<td>3</td>
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<tr>
<td>GE Area D: Social Sciences (D1)</td>
<td>3</td>
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</tr>
<tr>
<td>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</td>
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<tr>
<td><strong>Units</strong></td>
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<td>16</td>
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<tr>
<td><strong>Third Semester</strong></td>
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<td></td>
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<tr>
<td>CSC 210 or CSC 309</td>
<td>Introduction to Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>or Computer Programming for Scientists and Engineers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 228</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Written English Communication II (A4) if not already satisfied</td>
<td>3</td>
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</tr>
<tr>
<td>or SF State Studies or University Elective</td>
<td></td>
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<tr>
<td>GE Area B: Physical Science (B1) and Laboratory Science (B3)</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>GE Area C: Humanities: Literature (C3)</td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>16-17</td>
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<tr>
<td><strong>Fourth Semester</strong></td>
<td></td>
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</tr>
<tr>
<td>MATH 301GW</td>
<td>Exploration and Proof - GWAR</td>
<td>3</td>
</tr>
<tr>
<td>MATH 325</td>
<td>Linear Algebra</td>
<td>3</td>
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<tr>
<td>GE Area B: Life Science (B2) and Laboratory Science (B3)</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>GE Area C: Arts (C1)</td>
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<tr>
<td>SF State Studies or University Elective</td>
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<tr>
<td><strong>Units</strong></td>
<td></td>
<td>15-16</td>
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<tr>
<td><strong>Fifth Semester</strong></td>
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<tr>
<td>MATH 338</td>
<td>Introduction to SAS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 440</td>
<td>Probability and Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>GE Area UD–B: Upper Division Physical and/or Life Sciences (Consider SF State Studies Course)</td>
<td>3</td>
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</tr>
<tr>
<td>SF State Studies or University Elective</td>
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<tr>
<td><strong>Units</strong></td>
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<tr>
<td><strong>Sixth Semester</strong></td>
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<tr>
<td>MATH 441</td>
<td>Probability and Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 448</td>
<td>Introduction to Statistical Learning and Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>Major Emphasis (12 Units Total)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course)</td>
<td>3</td>
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</tbody>
</table>
### Bachelor of Science in Statistics Roadmap

<table>
<thead>
<tr>
<th>SF State Studies or University Elective</th>
<th>Units</th>
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<tbody>
<tr>
<td></td>
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#### Seventh Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 424</td>
<td>Introduction to Linear Models</td>
<td>3</td>
</tr>
<tr>
<td>MATH 442</td>
<td>Probability Models</td>
<td>3</td>
</tr>
<tr>
<td>MATH 447</td>
<td>Design and Analysis of Experiments</td>
<td>3</td>
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</tbody>
</table>

**Major Emphasis (12 Units Total)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Units</th>
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<tbody>
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</tbody>
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**GE Area UD–D: Upper Division Social Sciences (Consider SF State Studies Course)**

<table>
<thead>
<tr>
<th>Units</th>
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<tr>
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#### Eighth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Units</th>
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<tbody>
<tr>
<td>MATH 449</td>
<td>Categorical Data Analysis</td>
<td>3</td>
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</tbody>
</table>

**Major Emphasis (12 units)**

Select four courses from one emphasis in consultation with the statistics advisor.

**Business Emphasis**

- DS 408 Computer Simulation (3 units)
- DS 412 Operations Management (3 units)
- DS 604 Applied Business Forecasting (3 units)
- DS 624 Quality Management (3 units)
- ISYS 363 Information Systems for Management (3 units)
- ISYS 463 Information Systems Analysis and Design (3 units)
- ISYS 464 Managing Enterprise Data (3 units)
- ISYS 569 Information Systems for Business Process Management (3 units)
- ISYS 650 Business Intelligence (3 units)

**Economics Emphasis**

- ECON 301 Intermediate Microeconomic Theory (3 units)
- ECON 302 Intermediate Macroeconomic Theory (3 units)
- ECON 312 Introduction to Econometrics (3 units)
- ECON 715 Mathematical Economics (3 units)
- ECON 731 Econometric Theory (3 units)
- ECON 825 Applied Time Series Econometrics (3 units)

**Science Emphasis**

- MATH 370 Real Analysis I (3 units)
- MATH 376 Ordinary Differential Equations I (3 units)
- MATH 400 Numerical Analysis (3 units)
- MATH 430 Mathematics of Optimization (3 units)
- MATH 460 Mathematical Modeling (3 units)
- MATH 491 Game Theory (3 units)
- MATH 493 Introduction to Actuarial Mathematics (3 units)
- MATH 494 Non-Parametric Statistics (3 units)

**Total Units**

<table>
<thead>
<tr>
<th>Units</th>
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<tr>
<td>15</td>
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</table>

1. To avoid taking additional units, it is recommended that you meet LLD and SF State Studies requirements (AERM, GP, ES, SJ) within your GE or major.

2. ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

3. Consider taking a class combined with a laboratory or a separate lab to fulfill B3 if not already satisfied.

4. **Major Emphasis (12 units)**

Select four courses from one emphasis in consultation with the statistics advisor.

- **Business Emphasis**
  - DS 408 Computer Simulation (3 units)
  - DS 412 Operations Management (3 units)
  - DS 604 Applied Business Forecasting (3 units)
  - DS 624 Quality Management (3 units)
  - ISYS 363 Information Systems for Management (3 units)
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  - MATH 376 Ordinary Differential Equations I (3 units)
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