# Bachelor of Science in Environmental Science Roadmap

120 Total Units Required  
Minimum Number of Units in the Major: 68

<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)²</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area A: Written English Communication (A2)³</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>
<td></td>
</tr>
<tr>
<td>GE Area C: Arts (C1) or Humanities (C2)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Units</strong></td>
<td><strong>16</strong></td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOG 101</td>
<td>Our Physical Environment</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 102</td>
<td>The Human Environment</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 160</td>
<td>Introduction to Environmental Science</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Oral Communication (A1) or Critical Thinking (A3)²</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td><strong>Units</strong></td>
<td><strong>13</strong></td>
</tr>
<tr>
<td><strong>Third Semester</strong></td>
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<tr>
<td>Select One:</td>
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<tr>
<td>BIOL 150</td>
<td>The World of Plants</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 170</td>
<td>Animal Diversity</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 313</td>
<td>Principles of Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 205</td>
<td>Geographic Techniques</td>
<td>3</td>
</tr>
<tr>
<td>GE Area A: Written English Communication II (A4) or Written English Communication (A2) Stretch II</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>
<td></td>
</tr>
<tr>
<td>SF State Studies or University Elective</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>Units</strong></td>
<td><strong>13</strong></td>
</tr>
<tr>
<td><strong>Fourth Semester</strong></td>
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<tr>
<td>CHEM 180</td>
<td>Chemistry for the Energy and the Environment</td>
<td>3</td>
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<tr>
<td>PHYS 111 &amp; PHYS 112 or PHYS 220 and PHYS 222</td>
<td><strong>4</strong></td>
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</tr>
<tr>
<td>GE Area A: Written English Communication II (A4) if not already satisfied or SF State Studies or University Elective</td>
<td>3</td>
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| **Fifth Semester**   |                                                                       |       |
| CHEM 380             | Chemistry Behind Environmental Pollution                              | 3     |
| GEOF 500GW           | Physical and Human Dimensions of Climate Change - GWAR               | 3     |
| GE Area C: Arts (C1) |                                                                       | 3     |
| SF State Studies or University Elective – Take Two                | 6     |
|                      | **Units**                                                            | **15**|
| **Sixth Semester**   |                                                                       |       |
| GEOF 421             | Future Environments                                                  | 3     |
| Major Environmental Science Electives (12 Units Total)⁴           | 3-4   |
| Major Environmental Management Electives (12 Units Total)⁵         | 3-4   |
| Major Analytical Methods Electives (8 Units Total)⁶               | 3-4   |
|                      | **Units**                                                            | **15**|
| **Seventh Semester** |                                                                       |       |
| GEOF 603             | Introduction to Geographic Information Systems                       | 3     |
| Major Environmental Science Electives (12 Units Total)⁴           | 3-4   |
| Major Environmental Management Electives (12 Units Total)⁵         | 3-4   |
| Major Analytical Methods Electives (8 Units Total)⁶               | 3-4   |
| GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course) | 3     |
|                      | **Units**                                                            | **15**|
| **Eighth Semester**  |                                                                       |       |
| GEOF 690             | Senior Seminar in Geography and Environmental Science                | 3     |
| Major Environmental Science Electives (12 Units Total) – Take Two ⁴| 6-7   |
| Major Environmental Management Electives (12 Units Total) – Take Two ⁵| 6-7   |
|                      | **Units**                                                            | **15-17**|
|                      | **Total Units**                                                      | **120-125**|

¹ Depending on courses completed through Early Start and in high school, students in Pathway/Category 3 or 4 may be required to enroll in additional courses before they can take MATH 199 or MATH 226. Most students in Pathway/Category 3 or 4 will need to take a stretch format for MATH 199 (MATH 197 in Fall 2018 and MATH 198 in Spring 2019). Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (http://cms.sfsu.edu/content/student-center). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (http://developmentalstudies.sfsu.edu).

² All LLD and SF State Studies requirements (AERM, GP, ES, SJ) are met within the major.
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 GE Area A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

Environmental Science Electives (12 units)
CHEM 380 Chemistry Behind Environmental Pollution (3 units)
GEOG 312 Geography of Landforms (4 units)
GEOG 313 Earth’s Climate System (4 units)
GEOG 314 Bioclimatology (4 units)
GEOG 316 Biogeography (4 units)
GEOG 317 Geography of Soils (4 units)
GEOG 342/ERTH 442 Surface Water Hydrology (4 units)
GEOG 644 Water Quality (3 units)

Environmental Management Electives (12 units)
GEOG 421 Future Environments (3 units)
GEOG 427 Agriculture and Food Supply (4 units)
GEOG 642/ERTH 642 Watershed Assessment and Restoration (4 units)
GEOG 646 The Geography of Marine Resources (4 units)
GEOG 647 Geography of Water Resources (4 units)
GEOG 648 Management of National Parks and Protected Areas (4 units)
USP 652 Environmental Impact Analysis (4 units)
ENVS 657 Natural Resource Management: Biotic Resources (4 units)
GEOG 666 Geography of Garbage: Recycling and Waste Reduction (3 units)

Analytical Methods Electives (12 units)
BIOL 458 Biometry (4 units)
GEOG 602 Field Methods in Physical Geography (4 units)
GEOG 610 Remote Sensing of the Environment I (4 units)
GEOG 611 Remote Sensing of the Environment II (4 units)
GEOG 620 Geographical Information Systems (4 units)
GEOG 621 Geographic Information Systems for Environmental Analysis (4 units)
GEOG 625 Programming for Geographic Information Science (4 units)
GEOG 629 Coastal and Marine Applications of GIS (3 units)