# Bachelor of Science in Earth Sciences: Ocean, Weather & Climate Emphasis Roadmap

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

## Course Title | Units
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**First Semester**
CHEM 100 | Preparation for Chemistry | 3
- or SF State Studies or University Elective if CHEM 115 prerequisites are already satisfied
MATH 199 | Pre-Calculus | 4
- or SF State Studies or University Elective if MATH 226 prerequisites are already satisfied
GE Area A: Oral Communication (A1) or Critical Thinking (A3) | 3
GE Area A: Written English Communication (A2) | 3
GE Area D: U.S. History (D2) or U.S. and California Government (D3) | 3

**Units** | 16

## Second Semester
CHEM 115 | General Chemistry I: Essential Concepts of Chemistry | 5
MATH 226 | Calculus I | 4
GE Area A: Oral Communication (A1) or Critical Thinking (A3) | 3
GE Area A: Written English Communication II (A4) | 3
- or Written English Communication (A2) Stretch II

**Units** | 15

## Third Semester
PHYS 111 & PHYS 112 | General Physics I or General Physics with Calculus I
- or PHYS 220 and PHYS 222 | 4

GE Area B: Life Science (B2) | 3
GE Area C: Arts (C1) | 3
GE Area C: Humanities: Literature (C3) | 3

**Units** | 13

## Fourth Semester
ERTH 260 | Physical Processes in the Atmosphere | 4
PHYS 121 & PHYS 122 | General Physics II or General Physics with Calculus III
- or PHYS 240 and PHYS 242 | 4

GE Area C: Arts (C1) or Humanities (C2) | 3
GE Area D: Social Sciences (D1) | 3
GE Area D: U.S. History (D2) or U.S. and California Government (D3) | 3

**Units** | 17

## Fifth Semester
ERTH 400 | Earth Systems I | 3
Major Emphasis – Take Two | 6-8
GE Area UD–B: Upper Division Physical and/or Life Sciences (Consider SF State Studies Course) | 3
<table>
<thead>
<tr>
<th>Roadmap</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF State Studies or University Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sixth Semester</strong></td>
<td>15-17</td>
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<tr>
<td>ERTH 205 Techniques in Earth Sciences</td>
<td>2</td>
</tr>
<tr>
<td>ERTH 600GW Earth’s Climate History - GWAR</td>
<td>3</td>
</tr>
<tr>
<td>Major Emphasis Elective – Take Two</td>
<td>6</td>
</tr>
<tr>
<td>GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course)</td>
<td>3</td>
</tr>
<tr>
<td>SF State Studies or University Elective</td>
<td>2</td>
</tr>
<tr>
<td><strong>Seventh Semester</strong></td>
<td>16</td>
</tr>
<tr>
<td>ERTH 500 Earth Systems II</td>
<td>3</td>
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<tr>
<td>ERTH 505 Quantitative Methods in Earth Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Major Emphasis – Take Two</td>
<td>6-8</td>
</tr>
<tr>
<td>GE Area UD–D: Upper Division Social Sciences (Consider SF State Studies Course)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Eighth Semester</strong></td>
<td>15-17</td>
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<tr>
<td>ERTH 690 &amp; ERTH 695 Earth Sciences Capstone Presentation or Undergraduate Research and Senior Thesis</td>
<td>4</td>
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<tr>
<td>Major Emphasis</td>
<td>3-4</td>
</tr>
<tr>
<td>Major Emphasis Elective – Take Two</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td>120-125</td>
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</tbody>
</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 **Major Emphasis Courses**
Select five of the following:
ERTH 335 Global Warming (3 units)
or ERTH 360 California Weather Events (3 units)
or ERTH 365 Extreme Weather in a Warming World (3 units)
ERTH 430 Fluid Dynamics in Earth Systems (3 units)
ERTH 434 Coastal Processes (3 units)
ERTH 465 Weather Analysis and Forecasting I (4 units)
ERTH 470 Physical Oceanography (4 units)
ERTH 535 Planetary Climate Change (4 units)
MATH 227 Calculus II (4 units)

4 **Major Emphasis Elective**
Additional Ocean, Weather, and Climate emphasis electives, selected upon advisement, needed to reach 34 units. (May include courses from the list above not selected to meet emphasis requirements)