# Bachelor of Science in Earth Sciences: Ocean, Weather and Climate Emphasis - GEOL Associate Degree for Transfer Roadmap

This is a sample pathway for students who transfer to San Francisco State University in the current Bulletin year with an AS-T in Geology. Twenty-six units in the major (CHEM 115/CHEM 215/CHEM 216, ERTH 500, MATH 226, MATH 227, five elective units) and all lower-division GE requirements have been satisfied. Additional units in the major may have been satisfied. Check with a major advisor about the most appropriate course sequence. Degree completion guaranteed in 60 units; see the Associate Degree for Transfer (ADT) section for more information (http://bulletin.sfsu.edu/undergraduate-admissions/transfer-students).

<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>ERTH 205</td>
<td>Techniques in Earth Sciences</td>
<td>2</td>
</tr>
<tr>
<td>ERTH 400</td>
<td>Earth Systems I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 111</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 112</td>
<td>or General Physics with Calculus I and</td>
<td></td>
</tr>
<tr>
<td>or PHYS 220</td>
<td>General Physics with Calculus I and</td>
<td></td>
</tr>
<tr>
<td>or PHYS 222</td>
<td>General Physics with Calculus I and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laboratory</td>
<td></td>
</tr>
<tr>
<td>Ocean, Weather, and Climate Emphasis requirement – Select One:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ERTH 335</td>
<td>Global Warming</td>
<td></td>
</tr>
<tr>
<td>ERTH 360</td>
<td>California Weather Events</td>
<td></td>
</tr>
<tr>
<td>ERTH 365</td>
<td>Extreme Weather in a Warming World</td>
<td></td>
</tr>
<tr>
<td>or University Elective if already satisfied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE Area A: Written English Communication II (A4)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or University Elective if A4 met in transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERTH 260</td>
<td>Physical Processes in the Atmosphere</td>
<td>4</td>
</tr>
<tr>
<td>ERTH 505</td>
<td>Quantitative Methods in Earth Sciences</td>
<td>3</td>
</tr>
<tr>
<td>ERTH 600GW</td>
<td>Earth’s Climate History - GWAR</td>
<td>3</td>
</tr>
</tbody>
</table>

**Upper Division GE: UD-C or UD-D – Courses Listed Also Satisfy US History – See List**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PHYS 121</td>
<td>General Physics II</td>
<td>4</td>
</tr>
<tr>
<td>&amp; PHYS 122</td>
<td>or General Physics with Calculus III and</td>
<td></td>
</tr>
<tr>
<td>or PHYS 240</td>
<td>General Physics with Calculus III and</td>
<td></td>
</tr>
<tr>
<td>and PHYS 242</td>
<td>Laboratory</td>
<td></td>
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</tbody>
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**Third Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERTH 430</td>
<td>Fluid Dynamics in Earth Systems</td>
<td>3</td>
</tr>
<tr>
<td>ERTH 465</td>
<td>Weather Analysis and Forecasting I</td>
<td>4</td>
</tr>
<tr>
<td>ERTH 697</td>
<td>Undergraduate Research</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>or University Elective if opting for Senior Project</td>
<td></td>
</tr>
<tr>
<td>U.S. and California Government (bulletin.sfsu.edu/undergraduate-education/graduation-requirements/#usg)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>or University Elective if US/CA Government met before transfer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fourth Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERTH 470</td>
<td>Physical Oceanography</td>
<td>4</td>
</tr>
<tr>
<td>ERTH 535</td>
<td>Planetary Climate Change</td>
<td>4</td>
</tr>
<tr>
<td>ERTH 690</td>
<td>Earth Sciences Capstone Presentation</td>
<td>1</td>
</tr>
</tbody>
</table>

**Culminating Experience: Senior Honors Thesis or Senior Project**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERTH 695</td>
<td>Senior Project</td>
<td>2-3</td>
</tr>
<tr>
<td>ERTH 698</td>
<td>Senior Thesis</td>
<td>0-1</td>
</tr>
</tbody>
</table>

**Upper Division GE: UD-C or UD-D – Courses Listed Also Satisfy US History – See List**

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<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>ENG 214</td>
<td>or equivalent A4 course (0-3 units) if not taken before transfer</td>
<td></td>
</tr>
</tbody>
</table>

**To Do at SF State:**

Enough total units to reach 120 minimum for graduation; 40 units minimum at the upper-division level; to include the following:

**University-Wide Requirements: 9-15 Units**

- ENG 214 or equivalent A4 course (0-3 units) if not taken before transfer

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1. Any four of the five course options described as an “Emphasis Requirement” (and ERTH 260) satisfy the Ocean, Weather, and Climate (OWC) emphasis requirement, while the fifth course can either count as an Emphasis elective or can be replaced by another OWC emphasis elective upon advisement.

2. ERTH 335, ERTH 360, ERTH 365 also satisfy GE Area UD–B: Upper Division Physical and/or Life Sciences.

3. Take ERTH 697 Senior Honors Thesis or take University Elective (2 units) if opting for Senior Project.
• American Institutions (0-6 units): US History, US Government, California State and Local Government requirements if not taken before transfer
• Upper-division GE, areas B, C and D (6 units): UD-B met in major. Check for courses that also satisfy Major and/or American Institutions.
• Students transferring with the AS-T in Geology are not required to fulfill SF State Studies or Complementary Studies requirements.

Earth Sciences Major (Emphasis in Ocean, Weather, and Climate): 41-44 Units

CHEM 115, MATH 226, MATH 227, ERTH 500, and ten units of Ocean, Weather, and Climate emphasis electives (five units of CHEM 215/CHEM 216, one unit of four-unit Historical Geology, and four units of Physical Geology in the Geology AS-T) met in transfer.

• Basic Science & Math Foundation (8 units in PHYS) If some or all PHYS completed before transfer, consult with a major advisor about appropriate course choices.
• Earth Sciences Core/GWAR (11 units) Three of the four units of Historical Geology in the AS-T substitute for ERTH 500.
• Ocean, Weather, and Climate Emphasis (17-18 units) four units of Calculus II in the Geology AS-T count toward the Emphasis requirements.
• Electives (1-2 units) 5 units of CHEM 215/CHEM 216, one unit of four unit Historical Geology, and four units of Physical Geology in the Geology AS-T satisfy ten units of the 11-12-unit elective requirement.
• Culminating Experience (4-5 units): Take ERTH 690 (1 unit) along with one of the following two options: Senior Honors Thesis (ERTH 697/ERTH 698 (2 units each), or Senior Project (ERTH 695, 3 units).

University Electives: Three or More Units
Depends on course choices made at the community college, how transferred units are applied to the requirements above, Culminating Experience option selected, and course choices at SF State. Some courses may meet more than one requirement, e.g., UD GE and the major.

Upper-Division GE: UD-C or UD-D - Courses Listed Also Satisfy US History

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>AIS 460</td>
<td>Power and Politics in American Indian History</td>
<td>3</td>
</tr>
<tr>
<td>HIST/JS 449</td>
<td>American Jewish History</td>
<td>3</td>
</tr>
<tr>
<td>HIST 465</td>
<td>American Ethnic and Racial Relations II: 1890-Present</td>
<td>3</td>
</tr>
<tr>
<td>HIST 466/RRS 600</td>
<td>History of People of Color in the U.S.</td>
<td>3</td>
</tr>
<tr>
<td>HIST 470</td>
<td>The U.S. Constitution to 1896</td>
<td>3</td>
</tr>
<tr>
<td>HIST 471</td>
<td>The U.S. Constitution since 1896</td>
<td>3</td>
</tr>
<tr>
<td>HIST 478</td>
<td>American Mass Culture II: Gilded Age to Digital Age</td>
<td>3</td>
</tr>
<tr>
<td>MUS 506</td>
<td>Survey of Jazz</td>
<td>3</td>
</tr>
<tr>
<td>MUS 559</td>
<td>Women in Jazz</td>
<td>3</td>
</tr>
</tbody>
</table>