## OCEANOGRAPHY - BS

### Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th></th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>CHEM 119</strong> Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>ENGL 104</strong> Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>GEOS 101</strong> Introduction to the Geosciences</td>
<td>1</td>
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<tr>
<td></td>
<td><strong>MATH 151</strong> Engineering Mathematics I (^1)</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>OCNG 251</strong> Oceanography</td>
<td>4</td>
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<tr>
<td></td>
<td>&amp; <strong>OCNG 252</strong> and Oceanography Laboratory</td>
<td></td>
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<tr>
<td></td>
<td><strong>Spring</strong></td>
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</tr>
<tr>
<td></td>
<td><strong>BIOL 111</strong> Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>CHEM 120</strong> Fundamentals of Chemistry II</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>MATH 152</strong> Engineering Mathematics II (^1)</td>
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<tr>
<td></td>
<td>American history (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a>)</td>
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<tr>
<td><strong>Second Year</strong></td>
<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td><strong>BIOL 112</strong> Introductory Biology II</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>OCNG 203</strong> Communicating Oceanography</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>STAT 211</strong> Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>PHYS 206</strong> Newtonian Mechanics for Engineering and Physics of Motion Laboratory for the Sciences</td>
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<tr>
<td></td>
<td>Creative arts (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a>)</td>
<td>3</td>
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<tr>
<td><strong>Spring</strong></td>
<td><strong>OCNG 330</strong> Geological Oceanography</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>COMM 203</strong> or <strong>COMM 205</strong> Public Speaking or Communication for Technical Professions</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>PHYS 207</strong> Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences</td>
<td>4</td>
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<tr>
<td></td>
<td>American history (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a>)</td>
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<tr>
<td></td>
<td><strong>Theme requirement</strong> (^2,3)</td>
<td>3-4</td>
</tr>
<tr>
<td><strong>Third Year</strong></td>
<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td><strong>OCNG 310</strong> Physical Oceanography</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>OCNG 456</strong> or <strong>OCNG 469</strong> MATLAB Programming for Ocean Sciences or Python for Geosciences</td>
<td>3</td>
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<tr>
<td><strong>Spring</strong></td>
<td><strong>GEOS 470</strong> Data Analysis Methods in Geosciences</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>SOC 300</strong> Social and behavioral sciences (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences</a>)</td>
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<tr>
<td></td>
<td><strong>Technical elective</strong> (^5)</td>
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<tr>
<td></td>
<td><strong>Theme elective</strong> (^2)</td>
<td>3</td>
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<tr>
<td><strong>Fourth Year</strong></td>
<td></td>
<td>Semester Credit Hours</td>
</tr>
<tr>
<td><strong>Fall</strong></td>
<td><strong>OCNG 461</strong> Advanced Oceanographic Data Analysis and Communication</td>
<td>3</td>
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<tr>
<td></td>
<td>Government/Political science (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science</a>)</td>
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<tr>
<td></td>
<td>Language, philosophy and culture (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a>)</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>Technical elective</strong> (^5)</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>Theme elective</strong> (^2,4)</td>
<td>2-3</td>
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<tr>
<td><strong>Spring</strong></td>
<td><strong>GEOS 444</strong> Oceanographic Field and Laboratory Methods</td>
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</tr>
<tr>
<td></td>
<td><strong>Theme elective</strong> (^2)</td>
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</tbody>
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1. A grade of C or better is required.
2. Select one of the following themes: Marine Ecological Processes, Marine Chemistry & Geochemistry, Ocean Climate, Ocean Observing Science and Technology.
3. If Marine Chemistry and Geochemistry theme is chosen, this will be 4 credits instead of 3 credits.
4. If Marine Chemistry and Geochemistry theme is chosen, this will be 2 credits instead of 3 credits.
### Marine Ecosystem Processes Theme

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 357</td>
<td>Ecology</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 12 hours from the following:

- BIOL 213 Molecular Cell Biology
- BIOL 335 Invertebrate Zoology
- BIOL 351 Fundamentals of Microbiology
- BIOL 440 Marine Biology
- BIOL 451 Bioinformatics
- CHEM 383 Chemistry of Environmental Pollution
- GENE 302 Principles of Genetics
- GEOS 410 Global Change
- OCNG 350 Marine Pollution
- OCNG 411 Global Oceanography
- OCNG 425 Microbial Oceanography
- OCNG 453 Hydrothermal Vents and Mid-Ocean Ridges
- OCNG 456 MATLAB Programming for Ocean Sciences
- OCNG 469 Python for Geosciences
- OCNG 491 Research (limit to 3 credits)
- RWFM 417 Biology of Fishes
- WFSC 425 Marine Fisheries

**Total Semester Credit Hours** 18

### Marine Chemistry and Geochemistry Theme

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 227 &amp; CHEM 237</td>
<td>Organic Chemistry I and Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 228 &amp; CHEM 238</td>
<td>Organic Chemistry II and Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>

Select 10 hours from the following:

- ATMO 363 Introduction to Atmospheric Chemistry and Air Pollution
- CHEM 315 Fundamentals of Quantitative Analysis
- CHEM 362 Descriptive Inorganic Chemistry
- CHEM 383 Chemistry of Environmental Pollution
- CHEM 415 Analytical Chemistry
- CHEM 483 Green Chemistry
- GEOS 443 Global Biogeochemical Cycles
- GEOL 451 Introduction to Geochemistry
- OCNG 350 Marine Pollution
- OCNG 411 Global Oceanography
- OCNG 425 Microbial Oceanography
- OCNG 453 Hydrothermal Vents and Mid-Ocean Ridges
- OCNG 456 MATLAB Programming for Ocean Sciences
- OCNG 469 Python for Geosciences
- OCNG 491 Research (limit to 3 credits)
- STAT 407 Principles of Sample Surveys
- PHYS 221 Optics and Thermal Physics
- STAT 212 Principles of Statistics II

**Total Semester Credit Hours** 18

### Ocean Climate Theme

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 12 hours from the following:

- ATMO 201 Weather and Climate
- ATMO 203 Weather Forecasting Laboratory
- ATMO 324 Physical and Regional Climatology
- ATMO 441 Satellite Meteorology and Remote Sensing
- GEOS 442/GEOG 442 Past Climates
- GEOS 210 Climate Change
- MATH 304 Linear Algebra
- OCNG 411 Global Oceanography
- OCNG 451 Mathematical Modeling of Ocean Climate
- OCNG 456 MATLAB Programming for Ocean Sciences
- OCNG 469 Python for Geosciences
- OCNG 491 Research (limit to 3 credits)
- PHYS 221 Optics and Thermal Physics
- STAT 212 Principles of Statistics II

**Total Semester Credit Hours** 18

### Ocean Observing Science and Technology Theme

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 404</td>
<td>Ocean Observing Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 12 hours from the following:

- ATMO 201 Weather and Climate
- ATMO 203 Weather Forecasting Laboratory
- ATMO 251 Weather Observation and Analysis
- GEOG 361 Remote Sensing in Geosciences
- OCNG 350 Marine Pollution
- OCNG 411 Global Oceanography
- OCNG 456 MATLAB Programming for Ocean Sciences
- OCNG 469 Python for Geosciences
- OCNG 491 Research (limit to 3 credits)
- STAT 407 Principles of Sample Surveys

**Total Semester Credit Hours** 18

### Oceanography - BS