OCEANOGRAPHY - BS

The BS in Oceanography curriculum: 1) Provides students with an interdisciplinary understanding of the oceans and the processes affecting them for use in careers in marine science or other related fields; 2) Provides students with the skills to retrieve, evaluate, and analyze large oceanographic datasets such as those generated from long term oceanographic studies and observing systems; and 3) Emphasizes critical thinking and problem solving skills.

The BS in Oceanography has four themes: Ocean Observing Science and Technology (OOST), Ocean Climate (OC), Marine Ecosystems Processes (MEP) and Marine Chemistry and Geochemistry (MCG). All four themes share common requirements but allow for specialization depending on a student’s interest. The OOST theme provides more emphasis in statistics and ocean observing systems; all students will gain skill in handling, evaluating and analyzing large datasets. The OC theme provides more emphasis in advanced math skills that can be applied to understanding ocean climate interactions; all students will gain skill in handling, evaluating and analyzing large datasets. The MEP theme provides more emphasis in biological and ecological processes; all students will gain skill in understanding and applying a biological framework to understanding the ocean. The MCG theme provides more emphasis on marine chemistry and geochemistry; all students will gain skill in understanding and applying a chemical and geochemical framework to understanding the ocean.

Many graduates will obtain jobs in in a variety of fields including marine technical support, energy and transportation industries, insurance industries, hazard mitigation, marine operations, homeland security, oil spill response, etc. Students planning on attending graduate school are encouraged to also complete a minor in a STEM field.

For additional information, please visit https://ocean.tamu.edu/.

Program Requirements

First Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th>First Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>CHEM 119</td>
<td>Fundamentals of Chemistry I</td>
</tr>
<tr>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
</tr>
<tr>
<td>GEOS 101</td>
<td>Introduction to the Geosciences</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
</tr>
<tr>
<td>OCNG 251 &amp; OCNG 252</td>
<td>Oceanography and Oceanography Laboratory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
</tr>
<tr>
<td>CHEM 120</td>
<td>Fundamentals of Chemistry II</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
</tr>
<tr>
<td>American history</td>
<td><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>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Second Year</strong></td>
<td></td>
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<tr>
<td>Fall</td>
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<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>OCNG 203</td>
<td>Communicating Oceanography</td>
</tr>
<tr>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
</tr>
<tr>
<td>PHYS 206 &amp; PHYS 226</td>
<td>Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences</td>
</tr>
<tr>
<td>Creative arts</td>
<td><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>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>OCNG 330</td>
<td>Geological Oceanography</td>
</tr>
<tr>
<td>COMM 203 or COMM 205</td>
<td>Public Speaking or Communication for Technical Professions</td>
</tr>
<tr>
<td>PHYS 207 &amp; PHYS 227</td>
<td>Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences</td>
</tr>
<tr>
<td>American history</td>
<td><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>Theme requirement 2,3</td>
<td>3-4</td>
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<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>OCNG 303</td>
<td>Professional Communication in Oceanography</td>
</tr>
<tr>
<td>OCNG 456 or OCNG 469</td>
<td>MATLAB Programming for Ocean Sciences or Python for Geosciences</td>
</tr>
<tr>
<td>Government/Political science</td>
<td><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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<tbody>
<tr>
<td><strong>Fall</strong></td>
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</tr>
<tr>
<td>GEOS 470</td>
<td>Data Analysis Methods in Geosciences</td>
</tr>
<tr>
<td>Social and behavioral sciences</td>
<td><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>Technical elective 5</td>
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<tr>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fourth Year</strong></td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology II</td>
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</tbody>
</table>
Spring

OCNG 461 Advanced Oceanographic Data Analysis and Communication 3

Government/Political science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science) 3

Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture) 3

Technical elective 5 3

Theme elective 2,4 2-3

Semester Credit Hours 15

Total Semester Credit Hours 120

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.


Oceanography - BS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<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: 12

- 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

Ocean Climate Theme

- MATH 251 Engineering Mathematics III 3
- MATH 308 Differential Equations 3

Select 12 hours from the following: 12

- 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 Past Climates
- GEOS 442
- GEOS 210 Climate Change
- MATH 304 Linear Algebra

Marine Chemistry and Geochemistry Theme

- CHEM 227 Organic Chemistry I
- CHEM 237 and Organic Chemistry Laboratory 4
- CHEM 228 Organic Chemistry II
- CHEM 238 and Organic Chemistry Laboratory 4

Select 10 hours from the following: 10

- 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) 3

Total Semester Credit Hours 18

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 453</td>
<td>Hydrothermal Vents and Mid-Ocean Ridges</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 456</td>
<td>MATLAB Programming for Ocean Sciences</td>
<td>3</td>
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<tr>
<td>OCNG 469</td>
<td>Python for Geosciences</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 491</td>
<td>Research (limit to 3 credits)</td>
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<tr>
<td>RWFM 417</td>
<td>Biology of Fishes</td>
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<tr>
<td>WFSC 425</td>
<td>Marine Fisheries</td>
<td>3</td>
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Total Semester Credit Hours 18
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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>OCNG 411</td>
<td>Global Oceanography</td>
<td></td>
</tr>
<tr>
<td>OCNG 451</td>
<td>Mathematical Modeling of Ocean Climate</td>
<td></td>
</tr>
<tr>
<td>OCNG 456</td>
<td>MATLAB Programming for Ocean Sciences</td>
<td></td>
</tr>
<tr>
<td>OCNG 469</td>
<td>Python for Geosciences</td>
<td></td>
</tr>
<tr>
<td>PHYS 221</td>
<td>Optics and Thermal Physics</td>
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</tr>
<tr>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
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**Total Semester Credit Hours** 18

**Ocean Observing Science and Technology Theme**

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<thead>
<tr>
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</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>
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</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