# OCEANOGRAPHY - 5-YEAR BACHELOR OF SCIENCE AND MASTER OF OCEAN AND SCIENCE TECHNOLOGY

## Program Requirements

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>CHEM 119</td>
<td>Fundamentals of Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
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<tr>
<td></td>
<td>OCNG 101</td>
<td>Succeeding in Oceanography</td>
<td>1</td>
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<tr>
<td></td>
<td>OCNG 251</td>
<td>The Blue Planet - Our Oceans</td>
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<tr>
<td></td>
<td>&amp; OCNG 252</td>
<td>The Blue Planet - Our Oceans Laboratory</td>
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<tr>
<td><strong>Spring</strong></td>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
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<td></td>
<td>CHEM 120</td>
<td>Fundamentals of Chemistry II</td>
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<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>American history <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">link</a></td>
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| Semester Credit Hours | 16 |

### Second Year

<table>
<thead>
<tr>
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<th>Course Code</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
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<tr>
<td></td>
<td>OCNG 203</td>
<td>Communicating Oceanography</td>
<td>3</td>
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<tr>
<td></td>
<td>PHYS 206</td>
<td>Newtonian Mechanics for Engineering and Science</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>&amp; PHYS 226</td>
<td>and Physics of Motion Laboratory for the Sciences</td>
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</tr>
<tr>
<td></td>
<td>STAT 211</td>
<td>Principles of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Creative arts <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">link</a></td>
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| Semester Credit Hours | 15 |

### Spring

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>COMM 203</td>
<td>Public Speaking or Communication for Technical Professions</td>
<td>3</td>
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<tr>
<td>OCNG 330</td>
<td>Geological Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 207</td>
<td>Electricity and Magnetism for Engineering and Science</td>
<td>4</td>
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<tr>
<td>&amp; PHYS 227</td>
<td>and Electricity and Magnetism Laboratory for the Sciences</td>
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</tr>
<tr>
<td>American history <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">link</a></td>
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| Semester Credit Hours | 17 |

### Third Year

#### Fall

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 456</td>
<td>MATLAB Programming for Ocean Sciences</td>
<td>3</td>
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<tr>
<td>or OCNG 469</td>
<td>or Python for Geosciences</td>
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<tr>
<td>OCNG 470</td>
<td>Data Analysis Methods in Geosciences</td>
<td>4</td>
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<tr>
<td>Government/Political science <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">link</a></td>
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| Theme requirement | 3-4 |
| Theme elective    | 2-3 |

| Semester Credit Hours | 16 |

#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 303</td>
<td>Professional Communication in Oceanography</td>
<td>3</td>
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<tr>
<td>OCNG 320</td>
<td>Biological Oceanography</td>
<td>3</td>
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<tr>
<td>OCNG 340</td>
<td>Chemical Oceanography</td>
<td>3</td>
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<tr>
<td>OCNG 443</td>
<td>Oceanographic Field and Laboratory Methods</td>
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| Theme elective | 3 |

| Semester Credit Hours | 15 |

### Fourth Year

#### Fall

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 608</td>
<td>Physical Oceanography</td>
<td>6</td>
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<tr>
<td>OCNG 655</td>
<td>Experimental Design and Analysis in Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>Government/Political science <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#government-political-science">link</a></td>
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<td></td>
</tr>
<tr>
<td>Social and behavioral sciences <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">link</a></td>
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| Theme elective | 2-3 |

| Semester Credit Hours | 15 |

#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>OCNG 657</td>
<td>Data Methods and Graphical Representation in Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3</td>
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<tr>
<td>OCNG 620</td>
<td>Biological Oceanography</td>
<td></td>
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<tr>
<td>OCNG 630</td>
<td>Geological Oceanography</td>
<td></td>
</tr>
<tr>
<td>OCNG 640</td>
<td>Chemical Oceanography</td>
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</tr>
<tr>
<td>Language, philosophy and culture <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">link</a></td>
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| Technical elective | 4 |
| Theme elective    | 3 |

| Semester Credit Hours | 16 |

### Fifth Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 604</td>
<td>Ocean Observing Systems</td>
<td>3</td>
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</table>

| Semester Credit Hours | 16 |
### Ocean Science and Technology

The program includes a total of 156 hours with 6 hours being applied toward both the Bachelor of Science in Oceanography and the Master of Ocean Science and Technology.

#### Code | Title | Semester Credit Hours
---|---|---
| OCNG 656 or OCNG 669 | MATLAB Programming for Ocean Sciences or Python for Geosciences | 3 |
| | Advanced specialized OCNG graduate course | 3 |
| | Advanced specialized OCNG graduate course | 3 |

#### Semester Credit Hours
12

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Spring

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 603</td>
<td>Communicating Ocean Science</td>
<td>3</td>
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<tr>
<td>OCNG 661</td>
<td>Advanced Oceanographic Data Analysis and Communication</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Advanced specialized OCNG graduate course</td>
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</tr>
<tr>
<td></td>
<td>Advanced specialized OCNG graduate course</td>
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</tbody>
</table>

#### Semester Credit Hours
12

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**Total Semester Credit Hours:** 150

1. A grade of C or better is required.
2. Select one of the following tracks: Marine Ecological Processes, Marine Chemistry and Geochemistry, Ocean Climate, Ocean Observing Science and Technology.
3. If Marine Chemistry and Geochemistry track is chosen, this will be 4 credits instead of 3 credits.
4. Students will not be permitted to receive credit for both the 400- and 600-level versions of certain courses because the content and learning outcomes are too similar (OCNG 404/OCNG 604; OCNG 470/OCNG 655).
5. If Marine Chemistry & Geochemistry track is chosen, this will be 2 credits instead of 3 credits.
6. Applied toward both the Bachelor of Science in Oceanography and the Master of Ocean Science and Technology.

Any of the required courses may be taken during the Summer Sessions to diminish the heavy semester loads during Years 2 and 3.

The program includes a total of 156 hours with 6 hours being applied toward both the Bachelor of Science in Oceanography and the Master of Ocean Science and Technology.

#### Code | Title | Semester Credit Hours
---|---|---
| BIOL 214 | Genes, Ecology and Evolution | 3 |
| BIOL 357 | Ecology | 3 |
| | Select 12 hours from the following: | 12 |
| BIOL 213 | Molecular Cell Biology | 3 |
| BIOL 335 | Invertebrate Zoology | 3 |
| BIOL 351 | Fundamentals of Microbiology | 3 |
| BIOL 440 | Marine Biology | 3 |
| BIOL 451 | Bioinformatics | 3 |
| CHEM 383 | Chemistry of Environmental Pollution | 3 |
| GEOG 410/OCNG 412 | Global Change | 3 |
| GENE 302 | Principles of Genetics | 3 |
| OCNG 350 | Marine Pollution | 3 |
| OCNG 411 | Global Oceanography | 3 |
| OCNG 425 | Microbial Oceanography | 3 |
| OCNG 453 | Hydrothermal Vents and Mid-Ocean Ridges | 3 |
| OCNG 456 | MATLAB Programming for Ocean Sciences | 3 |
| OCNG 469 | Python for Geosciences | 3 |
| OCNG 491 | Research (limit to 3 credits) | 3 |

#### Total Semester Credit Hours
18

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### Marine Chemistry and Geochemistry Theme

Select 4 hours from the following:

- CHEM 227 Organic Chemistry I & CHEM 233and Organic Chemistry Laboratory
- CHEM 257 Organic Chemistry I - Structure and Function

Select 4 hours from the following:

- CHEM 228 Organic Chemistry II & CHEM 233and Organic Chemistry Laboratory
- CHEM 258 Organic Chemistry II - Reactivity and Applications

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
- GEOL 443/Global Biogeochemical Cycles
- GEOL 445
- GEOL 451 Introduction to Geochimisty
- 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)
### Oceanography - 5-Year Bachelor of Science and Master of Ocean and Science Technology

#### Total Semester Credit Hours

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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<tbody>
<tr>
<td>OCNG 491</td>
<td>Research (limit to 3 credits)</td>
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<th>Code</th>
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<tbody>
<tr>
<td></td>
<td><strong>Ocean Climate Theme</strong></td>
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<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
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<td>MATH 308</td>
<td>Differential Equations</td>
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<td>Select 12 hours from the following:</td>
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<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
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<tr>
<td>ATMO 203</td>
<td>Weather Forecasting Laboratory</td>
<td></td>
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<tr>
<td>ATMO 210</td>
<td>Climate Change</td>
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<tr>
<td>ATMO 324</td>
<td>Physical and Regional Climatology</td>
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<tr>
<td>ATMO 441</td>
<td>Satellite Meteorology and Remote Sensing</td>
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<tr>
<td>GEOG 442</td>
<td>Past Climates</td>
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<tr>
<td>GEOL 442</td>
<td>Past Climates</td>
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<tr>
<td>MATH 304</td>
<td>Linear Algebra</td>
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<td>OCNG 411</td>
<td>Global Oceanography</td>
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<td>OCNG 451</td>
<td>Mathematical Modeling of Ocean Climate</td>
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<td>OCNG 456</td>
<td>MATLAB Programming for Ocean Sciences</td>
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<td>OCNG 469</td>
<td>Python for Geosciences</td>
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<td>OCNG 491</td>
<td>Research (limit to 3 credits)</td>
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<tr>
<td>STAT 212</td>
<td>Principles of Statistics II</td>
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<tr>
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<td>STAT 212</td>
<td>Principles of Statistics II</td>
<td>3</td>
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<td>OCNG 404</td>
<td>Ocean Observing Systems</td>
<td>3</td>
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<tr>
<td>Select 12 hours from the following:</td>
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<tr>
<td>ATMO 201</td>
<td>Weather and Climate</td>
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<tr>
<td>ATMO 203</td>
<td>Weather Forecasting Laboratory</td>
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<td>ATMO 251</td>
<td>Weather Observation and Analysis</td>
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<td>GEOG 361</td>
<td>Remote Sensing in Geosciences</td>
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<td>OCNG 350</td>
<td>Marine Pollution</td>
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<td>Global Oceanography</td>
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<td>OCNG 456</td>
<td>MATLAB Programming for Ocean Sciences</td>
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<td>OCNG 469</td>
<td>Python for Geosciences</td>
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<td>OCNG 491</td>
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<td>STAT 407</td>
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