## CHEMISTRY - BS, ENVIRONMENTAL CHEMISTRY TRACK

Chemistry plays a major role in most environmental issues and this track recommends electives in a broad spectrum of courses designed to prepare students to address environmental problems from a variety of perspectives. Electives may be chosen from recommended courses in atmospheric sciences, bioenvironmental science, biology, geography, geology, microbiology and oceanography.

### Program Requirements

#### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 100</td>
<td>Horizons in Chemistry</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Select one of the following:</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CHEM 101</td>
<td>Fundamentals of Chemistry I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 111</td>
<td>and Fundamentals of Chemistry Laboratory I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 103</td>
<td>Structure and Bonding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 113</td>
<td>and Physical and Chemical Principles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ENGL 104</td>
<td>Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HIST 105</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>or MATH 171</td>
<td>or Analytic Geometry and Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHYS 218</td>
<td>Mechanics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td>Select one of the following:</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>CHEM 102</td>
<td>Fundamentals of Chemistry II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 112</td>
<td>and Fundamentals of Chemistry Laboratory II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHEM 104</td>
<td>Chemistry of the Elements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp; CHEM 114</td>
<td>and Qualitative Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIST 106</td>
<td>History of the United States</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>or MATH 172</td>
<td>or Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
</tbody>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 227</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 231</td>
<td>Techniques of Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 221</td>
<td>Several Variable Calculus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 253</td>
<td>Engineering Mathematics III</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHYS 208</td>
<td>Electricity and Optics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>13</td>
</tr>
<tr>
<td>Spring</td>
<td>CHEM 228</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Select one of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 234</td>
<td>Organic Synthesis and Analysis IV</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 362</td>
<td>Descriptive Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STAT 211 Principles of Statistics I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MATH course approved by chemistry advisor (<a href="http://catalog.tamu.edu/undergraduate/course-descriptions/math">http://catalog.tamu.edu/undergraduate/course-descriptions/math</a>)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STAT course approved by chemistry advisor (<a href="http://catalog.tamu.edu/undergraduate/course-descriptions/stat">http://catalog.tamu.edu/undergraduate/course-descriptions/stat</a>)</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental Chemistry Track Elective**

<table>
<thead>
<tr>
<th>Select one of the following:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMO 363</td>
<td>Introduction to Atmospheric Chemistry and Air Pollution</td>
</tr>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
</tr>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
</tr>
<tr>
<td>GEOL 104</td>
<td>Physical Geology</td>
</tr>
<tr>
<td>OCNG 401</td>
<td>Interdisciplinary Oceanography</td>
</tr>
<tr>
<td>OCNG 410</td>
<td>Physical Oceanography</td>
</tr>
</tbody>
</table>

| Semester Credit Hours | 15 |

#### Third Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 315</td>
<td>Fundamentals of Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 318</td>
<td>Quantitative Analysis Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CHEM 327</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 433</td>
<td>Advanced Inorganic Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental Chemistry Track Elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATMO 363</td>
<td>Introduction to Atmospheric Chemistry and Air Pollution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 104</td>
<td>Physical Geology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OCNG 401</td>
<td>Interdisciplinary Oceanography</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OCNG 410</td>
<td>Physical Oceanography</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>15</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td>Select two of the following:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>BESC 403</td>
<td>Sampling and Environmental Monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 324</td>
<td>Global Climatic Regions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 330</td>
<td>Resources and the Environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOG 370/ MARS 370</td>
<td>Coastal Processes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 420</td>
<td>Environmental Geology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GEOL 451</td>
<td>Introduction to Geochemistry</td>
<td></td>
</tr>
</tbody>
</table>

| Semester Credit Hours | 15 |
OCNG 420 Biological Oceanography

Select one of the following:  

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">Link</a></td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">Link</a></td>
<td></td>
</tr>
<tr>
<td>Creative arts</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">Link</a></td>
<td></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">Link</a></td>
<td></td>
</tr>
<tr>
<td>International and cultural diversity</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements">Link</a></td>
<td></td>
</tr>
</tbody>
</table>

Semester Credit Hours 16

Fourth Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 326</td>
<td>Physical Chemistry Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 415</td>
<td>Analytical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 491</td>
<td>Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:  

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 446</td>
<td>Organic Chemistry III</td>
<td></td>
</tr>
<tr>
<td>CHEM 456</td>
<td>Chemical Biology</td>
<td></td>
</tr>
<tr>
<td>CHEM 462</td>
<td>Inorganic Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 464</td>
<td>Nuclear Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 466</td>
<td>Polymer Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 468</td>
<td>Materials Chemistry of Inorganic Materials</td>
<td></td>
</tr>
<tr>
<td>CHEM 470</td>
<td>Industrial Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 483</td>
<td>Green Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 489</td>
<td>Special Topics in...</td>
<td></td>
</tr>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
<td></td>
</tr>
<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
<td></td>
</tr>
<tr>
<td>BICH 440</td>
<td>Biochemistry I</td>
<td></td>
</tr>
<tr>
<td>BICH 441</td>
<td>Biochemistry II</td>
<td></td>
</tr>
<tr>
<td>PHYS 309</td>
<td>Modern Physics</td>
<td></td>
</tr>
</tbody>
</table>

Select two of the following:  

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">Link</a></td>
<td>5</td>
</tr>
<tr>
<td>Language, philosophy and culture</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">Link</a></td>
<td></td>
</tr>
<tr>
<td>Creative arts</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">Link</a></td>
<td></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">Link</a></td>
<td></td>
</tr>
<tr>
<td>International and cultural diversity</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements">Link</a></td>
<td></td>
</tr>
</tbody>
</table>

Semester Credit Hours 15

Total Semester Credit Hours 120

---

1. Select a section designated for chemistry majors.
2. Students may substitute any 6 hours of American history courses approved by the University Core Curriculum [Link](http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum) to fulfill this requirement, but no more than 3 hours may be in Texas history. Students seeking teacher certification must take HIST 105 and HIST 106.
3. This is a designated C- pr W-course.
These electives must include 12 hours of courses which meet the language, philosophy and culture (3 hours), creative arts (3 hours), social and behavioral science (3 hours) and communication (3 hours) requirements of the University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum). (See page 17). In addition, 6 hours of courses must be in the area of International and Cultural Diversity (http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements). These may be in addition to the previous 12 hours of University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum) courses, or if a course in this category satisfies an area of the Core, it can be used to meet both requirements. Electives should be chosen in consultation with the chemistry advisor. Electives should be chosen in consultation with the chemistry advisor and should be selected to meet the residency requirement (36 hours at 300-400 level must be taken at TAMU). Electives recommended in the various track programs should be strongly considered.

The total hours of CHEM 485 and CHEM 491 taken by BS chemistry majors on a graded (A–F) basis may not exceed 15. Additional hours of these courses may be taken on a satisfactory/unsatisfactory basis.

Students wishing to complete an American Chemical Society certified degree program must take at least one semester of biochemistry (i.e., BICH 410 or BICH 440).