Bachelor of Arts in Chemistry Roadmap - Quantitative Reasoning Category III/IV and Stretch English

120 Total Units Required
Minimum Number of Units in the Major: 56

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 104</td>
<td>Writing the First Year: Finding Your Voice Stretch I 1</td>
<td>3</td>
</tr>
<tr>
<td>MATH 197</td>
<td>Prelude to Calculus I (Prerequisite for CHEM 115 and MATH 226) 2,3</td>
<td>3</td>
</tr>
<tr>
<td>GE Area A 4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area C</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Second Semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 115</td>
<td>General Chemistry I: Essential Concepts of Chemistry (Major Lower-Division)</td>
<td>5</td>
</tr>
<tr>
<td>ENG 105</td>
<td>Writing the First Year: Finding Your Voice Stretch II (A2) 1</td>
<td>3</td>
</tr>
<tr>
<td>MATH 198</td>
<td>Prelude to Calculus II (Prerequisite for MATH 226, B4) 2,3</td>
<td>3</td>
</tr>
<tr>
<td>GE Area A</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Third Semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 215 &amp; CHEM 216</td>
<td>General Chemistry II: Quantitative Applications of Chemistry Concepts and General Chemistry II Laboratory: Quantitative Applications of Chemistry Concepts (Major Lower-Division)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 226</td>
<td>Calculus I (Major Lower-Division, B4) 2,3</td>
<td>4</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

GE Area E

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

Fourth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 233 &amp; CHEM 234</td>
<td>Organic Chemistry I and Organic Chemistry I Laboratory (Major Lower-Division)</td>
<td>5</td>
</tr>
<tr>
<td>MATH 227</td>
<td>Calculus II (Major Lower-Division)</td>
<td>4</td>
</tr>
<tr>
<td>Select One Set of Courses (Major Lower-Division):</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 111 &amp; PHYS 112</td>
<td>General Physics I and General Physics I Laboratory (B1, B3)</td>
<td></td>
</tr>
<tr>
<td>PHYS 220 &amp; PHYS 222</td>
<td>General Physics with Calculus I and General Physics with Calculus I Laboratory (B1, B3)</td>
<td></td>
</tr>
<tr>
<td>GE Area B: Life Science (B2)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Fifth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 390GW</td>
<td>Contemporary Chemistry and Biochemistry Research - GWAR</td>
<td>3</td>
</tr>
<tr>
<td>Select One Set of Courses (Major Lower-Division):</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 121 &amp; PHYS 122</td>
<td>General Physics II and General Physics II Laboratory</td>
<td></td>
</tr>
<tr>
<td>PHYS 240 &amp; PHYS 242</td>
<td>General Physics with Calculus III and General Physics with Calculus III Laboratory</td>
<td></td>
</tr>
<tr>
<td>GE Area C - Take Two</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SF State Studies or University Elective - Take Two</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Sixth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 321</td>
<td>Quantitative Chemical Analysis (Major Upper-Division)</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 322</td>
<td>Quantitative Chemical Analysis Laboratory (Major Upper-Division)</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 335 &amp; CHEM 336</td>
<td>Organic Chemistry II and Organic Chemistry II Laboratory (Major Upper-Division)</td>
<td>5</td>
</tr>
<tr>
<td>SF State Studies or University Elective - Take Two</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Units

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
</tr>
</tbody>
</table>
### Seventh Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 300</td>
<td>General Physical Chemistry I (Major Upper-Division)</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 325</td>
<td>Inorganic Chemistry (Major Upper-Division)</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 340 or CHEM 349</td>
<td>Biochemistry I (Major Upper-Division) or General Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Units:** 15

### Eighth Semester

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advanced Laboratory Electives</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>SF State Studies or University Elective - Take Three</strong></td>
<td>8</td>
</tr>
</tbody>
</table>

**Units:** 14

**Total Units:** 120

---

1. ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

2. To avoid taking additional units, it is recommended that you meet SF State Studies requirements (AERM, GP, ES, SJ) within your GE or major.

3. Category III Students with a grade of B or higher in high school pre-calculus in the past year may be able to enroll in MATH 226. Please see a department advisor.

4. Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (http://cms.sfsu.edu/content/student-center). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (http://developmentalstudies.sfsu.edu).

5. PHYS 111 and PHYS 112 are prerequisites for PHYS 121 and PHYS 122. PHYS 220 and PHYS 222 are prerequisites for PHYS 240 and PHYS 242.

6. **Complementary Studies**

   Students in the BA Chemistry program will satisfy the Complementary Studies requirement with the completion of courses in physics and mathematics that are required in the major. Students who have earned AA-T or AS-T degrees and are pursuing a similar B.A. degree at SF State are required to fulfill the Complementary Studies requirement as defined by the major department. Students should consult with a major advisor about how transfer units and/or SF State units can best be applied to this requirement in order to ensure degree completion within 60 units.

7. CHEM 338 may be substituted for CHEM 336.

8. CHEM 351 may be substituted for CHEM 300 if prerequisites for CHEM 351 are met.

9. **Advanced Laboratory Electives**

   - CHEM 327 Practical GC and HPLC (4 units)
   - CHEM 343 Biochemistry I Laboratory (3 units)
   - CHEM 370 Computer Applications in Chemistry and Biochemistry (3 units)
   - CHEM 420 Environmental Analysis (3 units)
   - CHEM 422 Instrumental Analysis (4 units)
   - CHEM 426 Advanced Inorganic Chemistry Laboratory (2 units)
   - CHEM 451 Experimental Physical Chemistry Laboratory (2 units)
   - CHEM 699 Independent Study (1-6 units)