Roadmap for BS Degree in Chemistry  
American Chemical Society – approved  
Department of Chemistry & Biochemistry  
2019-2020

This roadmap is a typical 4-year schedule for obtaining a BS in Chemistry which is approved by the American Chemical Society. The degree covers all foundational subdisciplines including Inorganic, Organic, Analytical, Physical and Biochemistry. In addition, in-depth coursework is required in 3 of the 5 subdisciplines.

**First Year**

*Fall Semester* 
CHEM 105X - General Chemistry I  
MATH 251X – Calculus I  
WRTG F111X - Writing Across Contexts  
LS 101X - Library and Information Research  
GER Social Sciences

*Spring Semester* 
CHEM 106X - General Chemistry II  
MATH 252X - Calculus II  
COJO 131X or 141X - Oral Communication  
GER Humanities

**Second Year**

*Fall Semester* 
CHEM 212 - Chemical Equilibrium and Analysis  
MATH 253X - Calculus III  
PHYS 103X or 211X - General Physics I  
WRTG F213X

*Spring Semester* 
CHEM 202 - Basic Inorganic Chemistry  
*CHEM 314 - Instrumental Analytical Laboratory*  
PHYS 104X or 212X - General Physics  
GER Social Sciences  
GER Arts
Third Year

**Fall Semester** 14 credits
CHEM 321 - Organic Chemistry I 4
CHEM 331 - Physical Chemistry I 4
Elective 3
GER Ethics - see catalog for courses 3

**Spring Semester** 17 credits
CHEM 325 - Organic Chemistry II 4
CHEM 332 - Physical Chemistry II 4
GER Humanities, Arts or Social Sciences 3
Electives 6

Fourth Year

**Fall Semester** 16 credits
*CHEM 402 - Inorganic Chemistry 3
or *CHEM 450 Inform & Storage (Biochem)
CHEM 434 - Chemistry Capstone Lab 3
CHEM 481 - Seminar 1
CHEM 488 - Research 3
Electives 6

**Spring Semester** 14 credits
Advanced Chem Elective 3
CHEM 351 - General Biochem - Metabolism 3
CHEM 482 - Seminar 2
CHEM 488 - Research (Recommended) 3
Elective 3

*Complete two of the following: 6 credits*

CHEM 314 - Analytical Instrumental Laboratory
CHEM 402 - Inorganic Chemistry
CHEM 450 - Information Storage and Transfer: Molecules and Pathways
Roadmap for BS Degree in Chemistry
Biochemistry Concentration
Department of Chemistry & Biochemistry
2019-2020

This roadmap is a typical 4-year schedule for obtaining a BS in Chemistry with Biochemistry Concentration. Electives must be chosen from courses listed at the bottom. Two categories are represented; Advanced Chemistry electives (4 courses) and Biology electives (10 credits). The following is an example. Consult the catalog and your advisor for course planning.

<table>
<thead>
<tr>
<th>First Year</th>
<th>16 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester</strong></td>
<td>16 credits</td>
</tr>
<tr>
<td>CHEM 105X - General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 251X – Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>WRTG F111X - Writing Across Contexts</td>
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<tr>
<td>LS 101X - Library and Information Research</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 115X - Fundamentals of Biology I</td>
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<tr>
<td><strong>Spring Semester</strong></td>
<td>15 credits</td>
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<tr>
<td>CHEM 106X - General Chemistry II</td>
<td>4</td>
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<tr>
<td>MATH 252X - Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>COJO 131X or 141X - Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 116X - Fundamentals of Biology II</td>
<td>4</td>
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<table>
<thead>
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<tr>
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<td>PHYS 103X or 211X - General Physics I</td>
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</tr>
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<td>*MATH 253X - Calculus III</td>
<td>4</td>
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<td>14 credits</td>
</tr>
<tr>
<td>CHEM 325 - Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 351 - Biochemistry Metabolism</td>
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</tr>
<tr>
<td>PHYS 104X or 212X - General Physics II</td>
<td>4</td>
</tr>
<tr>
<td>WRTG 213X - Writing for the Sciences</td>
<td>3</td>
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</tbody>
</table>
### Third Year

**Fall Semester**

- CHEM 331 - Physical Chemistry I
- CHEM 450 - Information and Storage (Biochem)
- CHEM 488 - Research
- GER Arts
- GER Social Sciences

15 credits

**Spring Semester**

- CHEM 202 - Inorganic Chemistry
- CHEM 488 - Research
- **CHEM 332 - Physical Chemistry II**
- GER Humanities
- **BIOL 260 Principles of Genetics**

16 credits

### Fourth Year

**Fall Semester**

- **CHEM 314 - Analytical Instrumental Lab**
- **CHEM 420 - Applications NMR**
- GER Social Sciences
- CHEM 481 - Seminar
- CHEM 488 - Research (Capstone)
- **CHEM 474 Neurochemistry**

15 credits

**Spring Semester**

- GER Ethics
- GER - Humanities, Arts, or Social Sciences
- CHEM 482 - Seminar
- CHEM 488 - Research (Capstone)
- **BIOL 310 Animal Physiology**

15 credits

Electives:

**Select four (4) of the following:**

- *CHEM 314 – Analytical Instrumental Lab*
- *CHEM 332 – Physical Chemistry II*
- *CHEM 402 – Inorganic Chemistry*
- *CHEM 420 – Applications of NMR Spectroscopy*
- *Math 253 – Calculus III*

**Select ten (10) credits of the following:**

- **CHEM 360 – Cell and Molecular Biology**
- **CHEM 455 - Environmental Toxicology**
- **CHEM 470 - Cellular and Molecular Neurosci**
- **CHEM 474 - Neurochemistry**
- **BIOL 240 - Beginnings in Microbiology**
- **BIOL 260 - Principles of Genetics**
- **BIOL 310 - Animal Physiology**
- **BIOL 342 - Microbiology**
- **BIOL 402 - Biomedical and Research Ethics**
- **BIOL 417 - Neurobiology**
- **BIOL 462 - Infectious Disease**
- **BIOL 465 - Immunology**
**Roadmap for BS Degree in Chemistry**  
**Environmental Chemistry Concentration**  
**Department of Chemistry & Biochemistry**  
**2019-2020**

This roadmap is a typical 4-year schedule for obtaining a BS in Chemistry with Environmental Concentration. The pathway is similar to the ACS-approved degree, with the exception that four environmentally-related courses are required in addition to the core chemistry courses. See the catalog for a list of environmental courses to choose from. Students desiring an ACS-approved degree should also take CHEM 402 Inorganic Chemistry or CHEM 450 Information and Storage (Biochemistry).

### First Year

**Fall Semester**  
<table>
<thead>
<tr>
<th>Course Code</th>
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<td>CHEM 105X</td>
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<td>4</td>
</tr>
<tr>
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<td>Calculus I</td>
<td>4</td>
</tr>
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<td>WRTG F111X</td>
<td>Writing Across Contexts</td>
<td>3</td>
</tr>
<tr>
<td>LS 101X</td>
<td>Library and Information Research</td>
<td>1</td>
</tr>
<tr>
<td>GER</td>
<td>Social Sciences</td>
<td>3</td>
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**Spring Semester**  
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<tbody>
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<td>CHEM 106X</td>
<td>General Chemistry II</td>
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<td>Calculus II</td>
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</tr>
<tr>
<td>COJO 131X or 141X</td>
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<tr>
<td>*Environmental Elective lower level - see catalog</td>
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**Spring Semester**  
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<td>Basic Inorganic Chemistry</td>
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<tr>
<td>GER</td>
<td>Social Sciences</td>
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### Third Year

**Fall Semester**
- CHEM 321 - Organic Chemistry I: 4 credits
- CHEM 331 - Physical Chemistry I: 4 credits
- GER Arts: 3 credits
- GER Ethics: 3 credits

**Spring Semester**
- CHEM 325 - Organic Chemistry II: 4 credits
- CHEM 332 - Physical Chemistry II: 4 credits
- GER Humanities, Arts or Social Sciences: 3 credits
- GER Humanities: 3 credits
- Elective: 3 credits

### Fourth Year

**Fall Semester**
- **Environmental Elective upper level - see below**: 3 credits
- Electives: 6 credits
- CHEM 434 - Chemistry Capstone Lab: 3 credits
- CHEM 481 - Seminar: 1 credit
- CHEM 488 - Research: 3 credits

**Spring Semester**
- Elective: 3 credits
- CHEM 351 - General Biochem - Metabolism: 3 credits
- CHEM 482 - Seminar: 2 credits
- CHEM 488 - Research (recommended): 3 credits
- **Environmental elective upper level - see below**: 3 credits

*Complete two of the following: 7-8 credits*

- ATM 101X - Weather and Climate of Alaska
- BIOL 115X - Fundamentals of Biology I
- BIOL 116X - Fundamentals of Biology II
- GEOS 101X - The Dynamic Earth
- GEOS 262 - Rocks and Minerals

**Complete two from the following: 6-7 credits**

- ATM 401 - Intro to Atmospheric Sciences
- BIOL 342 - Microbiology
- CHEM 406 - Atmospheric Chemistry
- CHEM 455 - Environmental Toxicology
- GEOS 417 - Introduction to Geochemistry
- NRM 380 - Soils and the Environment