CHEMISTRY, BS

Roosevelt University offers three chemistry-related degrees: a Bachelor of Arts (BA) in Chemistry, a Bachelor of Science (BS) in Chemistry, and a BS in Biochemistry. All three programs provide sound training in fundamental principles and experimental techniques for understanding and manipulating the interactions of matter. Course requirements differ for each degree. Regardless of the degree selected, chemistry or biochemistry majors interested in teaching science at the elementary or secondary level should meet with an advisor early in their program to plan an appropriate course sequence. Chemistry or biochemistry majors with strong academic backgrounds are encouraged to apply to the Roosevelt Scholars Program.

The BS Chemistry degree is certified by the American Chemical Society and provides 55 to 57 credit hours of rigorous training in the five major chemistry sub-disciplines, including more than 400 hours of laboratory training beyond the general chemistry level. The ACS-certified BS degree is recommended for students whose career goals include direct employment as a professional chemist or graduate school in chemistry, engineering or other physical sciences. Chemistry majors obtain substantial practical experience using modern experimental methods and scientific equipment and are prepared for careers in such diverse settings as research, education, government, and industry. Some of the options that are available to Chemistry graduates include:

- Attend graduate school and earn MS or PhD degree in chemistry or related disciplines.
- Attend medical, dental, pharmacy, or veterinary school.
- Attend law school (specializing in environmental or patent law).
- Work in industry, for example in analytical chemistry, synthesis, formulations, quality assurance, or research and development.
- Work as a clinical laboratory scientist in a medical or hospital laboratory.
- Work as an analytical or forensic chemist for private contract laboratories or for city, state or federal government agencies.
- With education coursework, teach sciences at the primary or secondary level.
- Work in technical, chemical, pharmaceutical, or scientific/clinical instrument sales.

Standards

- Chemistry, Biochemistry, Mathematics, and Physics courses may not be taken pass/fail and must be passed with a letter grade of C- or higher and a minimum cumulative math and science GPA of 2.0.
- At least 27 credit hours of the required Chemistry courses must be completed at Roosevelt University.
- All Chemistry and supporting Math and Physics courses must be taken within eight years of graduation to be accepted for credit without examination.
- Entering students with a score of at least 4 on the AP chemistry exam receive 3 credit hours of CHEM 1xx AP Chemistry credit and are waived for CHEM 201 GENERAL CHEMISTRY I. Students with a 3 on the AP chemistry exam receive 3 credit hours of CHEM 1xx AP Chemistry credit and satisfy the physical science general education lecture requirement.

**Required preparatory chemistry**  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 231</td>
<td>CALCULUS I</td>
<td>5</td>
</tr>
</tbody>
</table>

**Required chemistry foundation (21 credit hours, 172.5 lab hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 201</td>
<td>GENERAL CHEMISTRY I</td>
<td>(3 credit hour lecture, 2 credit hour lab)</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>GENERAL CHEMISTRY II</td>
<td>(3 credit hour lecture, 2 credit hour lab)</td>
</tr>
</tbody>
</table>

**Required chemistry depth courses (11 credit hours, 115 lab hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 211</td>
<td>ORGANIC CHEMISTRY I</td>
<td>(3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)</td>
</tr>
<tr>
<td>CHEM 237</td>
<td>QUANTITATIVE ENVIRONMENTAL ANALYSIS</td>
<td>(3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)</td>
</tr>
<tr>
<td>CHEM 321</td>
<td>PHYSICAL CHEMISTRY: THERMODYNAMICS</td>
<td>(3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)</td>
</tr>
<tr>
<td>CHEM 341</td>
<td>INORGANIC CHEMISTRY</td>
<td>(3 credit hour lecture)</td>
</tr>
<tr>
<td>BCHM 355</td>
<td>BIOCHEMISTRY</td>
<td>(3 credit hour lecture)</td>
</tr>
</tbody>
</table>

**Elective chemistry depth courses**  

Select at least two of the following for at least 10 credit hours; and at least 112.5 lab hours:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 313</td>
<td>ADVANCED ORGANIC CHEMISTRY LAB</td>
<td>(3 credit hour lecture, 2 credit hour lab, 75 lab hours)</td>
</tr>
<tr>
<td>CHEM 337</td>
<td>INSTRUMENTAL ANALYSIS</td>
<td>(3 credit hour lecture, 2 credit hour lab, 75 lab hours)</td>
</tr>
<tr>
<td>CHEM 347</td>
<td>ADVANCED INORGANIC CHEMISTRY LAB</td>
<td>(3 credit hour lecture, 2 credit hour lab, 75 lab hours)</td>
</tr>
<tr>
<td>BCHM 354</td>
<td>EXPERIMENTAL METHODS IN BIOCHEMISTRY &amp; BIOTECHNOLOGY</td>
<td>(Combination provides 5 credit hours and 45 lab hours)</td>
</tr>
<tr>
<td>BCHM 357</td>
<td>EXPERIMENTAL METHODS IN INSTRUMENTAL ANALYSIS</td>
<td>(3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)</td>
</tr>
<tr>
<td>CHEM 323</td>
<td>ATOMIC AND MOLECULAR SPECTROSCOPY</td>
<td>(3 credit hour lecture, 2 credit hour lab, 57.5 lab hours)</td>
</tr>
</tbody>
</table>

**Chemistry or Biochemistry major elective or research**  

Select one of the following for at least 3 credit hours

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 392</td>
<td>RESEARCH IN CHEMISTRY</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 3xx</td>
<td>Any 3 credit hour CHEM course not otherwise applied to BS Chemistry requirements</td>
<td>1</td>
</tr>
<tr>
<td>BCHM 3xx</td>
<td>Any 3 credit hour BCHM course not otherwise applied to BS Chemistry requirements, excluding BCHM 320</td>
<td>1</td>
</tr>
</tbody>
</table>

**Required supporting sequence**  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 231</td>
<td>CALCULUS I</td>
<td>(5 credit hours)</td>
</tr>
</tbody>
</table>
MATH 232  CALCULUS II (5 credit hours)

PHYS 201  INTRODUCTION TO NON-CALCULUS BASED PHYSICS I (4 credit hours)

PHYS 202  INTRO TO NON-CALCULUS PHYSICS II (4 credit hours)

PHYS 233  CALCULUS-BASED PHYSICS I DISCUSSION (1 credit hour)

PHYS 234  CALCULUS-BASED PHYSICS II DISCUSSION (1 credit hour)

Required mathematics elective. Select one course for 3 credit hours from the following

MATH 217  ELEMENTARY STATISTICS

MATH 233  CALCULUS III

MATH 238  APPLIED PROBABILITY AND STATISTICS

MATH 245  DISCRETE STRUCTURES

MATH 246  LINEAR ALGEBRA

MATH 280  MATHEMATICAL MODELING

MATH 307  DIFFERENTIAL EQUATION/MODELING

General Education Requirements including University Writing Requirement

See College of Arts & Sciences General Education Requirements below, as well as B.S. Chemistry major footnotes 2-4

Minor or free elective courses to total 120 credit hours

Total Credit Hours 120-123

1  To apply to the major, chemistry research should be a substantial laboratory or computational project, performed under the direction of a faculty sponsor, resulting in a report, paper, poster or presentation, and completed with a minimum acceptable grade of C. Each credit hour of CHEM 392 requires the equivalent of 3 hours of active research per week over a 15-week semester.

2  B.S. Chemistry majors satisfy the general education mathematics requirement through the major (Math 231)

3  B.S. Chemistry majors satisfy all science general education requirements, including biology, physical science and laboratory requirements through the major.

4  B.S. Chemistry majors are highly encouraged to fill one of their social science or humanities general education electives with a course that simultaneously satisfies the nonwestern attribute. Additionally, B.S. Chemistry majors intending to pursue graduate programs in pharmacy should fulfill one social science requirement with ECON 101 or ECON 102, and should fulfill one humanities general education requirement with SPCH 101.

General Education Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP 101</td>
<td>FIRST YEAR SEMINAR 1</td>
<td>3</td>
</tr>
<tr>
<td>ACP 110</td>
<td>PRIMARY TEXTS</td>
<td>3</td>
</tr>
<tr>
<td>ACP 250</td>
<td>GROUNDS FOR CHANGE</td>
<td>3</td>
</tr>
<tr>
<td>ENG 101</td>
<td>COMPOSITION I: CRITICAL READING &amp; WRITING</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 102</td>
<td>COMPOSITION II: INTRODUCTION TO ACADEMIC RESEARCH</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Select 9 credits from the following subject areas: African-American Studies, Art History, English (excluding ENG 101 and ENG 102), History, Languages, Music, Philosophy, Theatre, Speech and Women’s and Gender Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>QUANTITATIVE LITERACY (or above) 3</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Western requirement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Non-Western course (can be used for Humanities or Social Sciences general education requirements)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RU mission-related course 2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>LIBS 201</td>
<td>WRITING SOCIAL JUSTICE</td>
<td>3</td>
</tr>
<tr>
<td>Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 9 credits from the following subject areas: African-American Studies, Anthropology, Economics, History, Journalism, Philosophy, Political Science, Psychology, Sociology and Women’s and Gender Studies</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Total Credit Hours 49-50</td>
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</tr>
</tbody>
</table>

1  Required for students who enter RU with fewer than 12 credit hours

2  Minimum grade of C- required

3  Math, Computer Science & Technology, and Science majors have different requirements–see advisor

These quantitative requirements also apply to degrees in the College of Arts and Sciences:

- Students may apply no more than 60 credit hours of 100-level courses toward the degree.
- Students must apply no fewer than 60 credit hours of 200- and 300-level courses toward the degree.
- Students must have at least 18 credit hours (of the 60 credit hours above) at the 300 level.
- Students may transfer in no more than 66 credit hours from community colleges.
- Students must take their final 30 hours at Roosevelt University. Note that some majors have additional requirements for RU hours.
- Students must have a grade point average of 2.0 or higher to graduate. Note that some majors have additional GPA requirements.
- Students must have a minimum of 90 hours in Arts and Sciences.
- Students may apply no more than 51 hours in the major (BA) or 57 hours in the major (BS)

Your degree map is a general guide suggesting courses to complete each term on the academic pathway to your degree. It is based on the most current scheduling information from your academic program. Your program’s degree map is reviewed annually and updated as schedules change (although you retain the same course requirements as long as you are continuously enrolled in your degree program).
Always work closely with your academic advisor to understand curriculum requirements and scheduling, as each student’s academic plan can look slightly different.

### Year 1

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credit Hours</th>
<th>Spring</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP 101</td>
<td>3</td>
<td>ACP 110</td>
<td>3</td>
</tr>
<tr>
<td>ENG 101</td>
<td>3</td>
<td>ENG 102</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 201</td>
<td>5</td>
<td>CHEM 202</td>
<td>5</td>
</tr>
<tr>
<td>MATH 231</td>
<td>5</td>
<td>MATH 232</td>
<td>5</td>
</tr>
</tbody>
</table>

**Total Credit Hours 16**

### Year 2

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credit Hours</th>
<th>Spring</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 211</td>
<td>5 ACP 250 or LIBS 201</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 201</td>
<td>4 CHEM 212</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>PHYS 233</td>
<td>1 PHYS 202</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Humanities #1</td>
<td>3 PHYS 234</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Social Science #1</td>
<td>3 Humanities #2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credit Hours 16**

### Year 3

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credit Hours</th>
<th>Spring</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 237 or 341</td>
<td>3 CHEM 3XX³</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 321 or BCHM 355</td>
<td>5 CHEM 337 or 347</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>MATH 2XX²</td>
<td>3 CHEM 322, BCHM 3XX, or CHEM 3XX³</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Social Science #2</td>
<td>3 Humanities #3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credit Hours 16**

### Year 4

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credit Hours</th>
<th>Spring</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 341 or 237</td>
<td>5 CHEM 3XX³</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BCHM 355 or CHEM 321</td>
<td>3 CHEM 322, BCHM 3XX, or CHEM 3XX³</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 2XX²</td>
<td>3 CHEM 347 or 337</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>LIBS 201 or ACP 250</td>
<td>3 CHEM 393</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Non-Western Studies Course⁴</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Credit Hours 14**

1. Or course towards an optional Minor.
2. Any course at the 200 Level within the discipline.
3. Any course at the 300 Level within the discipline.
4. This requirement can be fulfilled by other requirements.
5. One Natural Science course must have a lab.