CHEMISTRY, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the Guide.

General Education

• Breadth—Humanities/Literature/Arts: 6 credits
• Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
• Breadth—Social Studies: 3 credits
• Communication Part A Part B *
• Ethnic Studies *
• Quantitative Reasoning Part A Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Mathematics Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.

Language Complete the third unit of a language other than English.

LS Breadth Complete:
• 12 credits of Humanities, which must include at least 6 credits of Literature; and
• 12 credits of Social Science; and
• 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.

Liberal Arts and Science Coursework Complete at least 108 credits.

Depth of Intermediate/Advanced Coursework Complete at least 60 credits at the Intermediate or Advanced level.

Major Declare and complete at least one major.

Total Credits Complete at least 120 credits.

UW-Madison Experience Complete both:
• 30 credits in residence, overall, and
• 30 credits in residence after the 86th credit.

Quality of Work • 2.000 in all coursework at UW–Madison
• 2.000 in Intermediate/Advanced level coursework at UW–Madison

NON–L&S STUDENTS PURSUING AN L&S MAJOR

Non–L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

REQUIREMENTS FOR THE MAJOR

MATH & PHYSICS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 222</td>
<td>Calculus and Analytic Geometry 2</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 207</td>
<td>General Physics</td>
<td>10</td>
</tr>
<tr>
<td>PHYSICS 201</td>
<td>General Physics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 247</td>
<td>A Modern Introduction to Physics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 208</td>
<td>General Physics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 202</td>
<td>General Physics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 248</td>
<td>A Modern Introduction to Physics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 14

CHEMISTRY CORE COURSES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 104</td>
<td>General Chemistry II</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 109</td>
<td>Advanced General Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 115</td>
<td>Chemical Principles I</td>
<td></td>
</tr>
<tr>
<td>CHEM 329</td>
<td>Fundamentals of Analytical Science</td>
<td>4-5</td>
</tr>
<tr>
<td>CHEM 116</td>
<td>Chemical Principles II</td>
<td></td>
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</table>
### ADVANCED CHEMISTRY AND LABORATORY

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Advanced Non-laboratory Coursework</strong></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>CHEM 116</td>
<td>Chemical Principles II (1 credit counts towards requirements)</td>
<td>3</td>
</tr>
<tr>
<td>CHEM/ M S &amp; E 421</td>
<td>Polymeric Materials</td>
<td></td>
</tr>
<tr>
<td>CHEM/CBE 505</td>
<td>Aspects of Industrial Chemistry and Business Fundamentals</td>
<td></td>
</tr>
<tr>
<td>CHEM 524</td>
<td>Chemical Instrumentation (2 credits count towards requirement)</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 547</td>
<td>Advanced Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 555</td>
<td>Study Abroad in Advanced Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 575</td>
<td>Advanced Topics in Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 605</td>
<td>Spectrochemical Measurements</td>
<td></td>
</tr>
<tr>
<td>CHEM 629</td>
<td>Atmospheric Chemical Mechanisms</td>
<td></td>
</tr>
<tr>
<td>CHEM 654</td>
<td>Materials Chemistry of Polymers</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 501</td>
<td>Introduction to Biochemistry or BIOCHEM 50 General Biochemistry</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 508</td>
<td>General Biochemistry II</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM/ NUTR SCI 510</td>
<td>Nutritional Biochemistry and Metabolism</td>
<td></td>
</tr>
<tr>
<td>CHEM 625</td>
<td>Mechanisms of Action of Vitamins and Minerals</td>
<td></td>
</tr>
<tr>
<td>CBE 440</td>
<td>Chemical Engineering Materials</td>
<td></td>
</tr>
<tr>
<td>CBE 540</td>
<td>Polymer Science and Technology</td>
<td></td>
</tr>
<tr>
<td>CBE 547</td>
<td>Introduction to Colloid and Interface Science</td>
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</tr>
</tbody>
</table>

### Inorganic Chemistry (1 course)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 311</td>
<td>Chemistry Across the Periodic Table</td>
<td>4</td>
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### Organic Chemistry (3 courses)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 343</td>
<td>Organic Chemistry I</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 345</td>
<td>Organic Chemistry II</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 344</td>
<td>Introductory Organic Chemistry Laboratory</td>
<td>2</td>
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</table>

### Physical Chemistry

**Part 1 (1 course)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 561</td>
<td>Physical Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 665</td>
<td>Biophysical Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CBE 310</td>
<td>Chemical Process Thermodynamics</td>
<td>2</td>
</tr>
<tr>
<td>M S &amp; E 330</td>
<td>Thermodynamics of Materials</td>
<td>2</td>
</tr>
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</table>

**Part 2 (1 course)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 562</td>
<td>Physical Chemistry</td>
<td>2</td>
</tr>
</tbody>
</table>

**Part 3 (2 courses)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 563</td>
<td>Physical Chemistry Laboratory I</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 564</td>
<td>Physical Chemistry Laboratory II</td>
<td>2</td>
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</table>

### Total Credits

<table>
<thead>
<tr>
<th>Credit Range</th>
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<tbody>
<tr>
<td>29-31</td>
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</tbody>
</table>

### ADvanced Laboratory Work

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 346</td>
<td>Intermediate Organic Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 512</td>
<td>Advanced Synthesis and Laboratory Techniques</td>
<td></td>
</tr>
<tr>
<td>CHEM 524</td>
<td>Chemical Instrumentation (1 credit counts towards requirement)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 681</td>
<td>Senior Honors Thesis (and Senior Honors Thesis)</td>
<td></td>
</tr>
<tr>
<td>CHEM 691</td>
<td>Senior Thesis (and Senior Thesis)</td>
<td></td>
</tr>
<tr>
<td>CHEM 699</td>
<td>Directed Study</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 681</td>
<td>Senior Honors Thesis (and Senior Honors Thesis)</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 691</td>
<td>Senior Thesis</td>
<td></td>
</tr>
<tr>
<td>BIOCHEM 699</td>
<td>Special Problems</td>
<td></td>
</tr>
<tr>
<td>CBE 599</td>
<td>Special Problems</td>
<td></td>
</tr>
</tbody>
</table>

### RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in all CHEM and major courses
- 15 credits in CHEM, taken on the UW–Madison campus

### HONORS IN THE MAJOR

Students may declare Honors in the Chemistry Major in consultation with the chemistry major advisor (https://www.chem.wisc.edu/content/undergraduate-advising/). To be admitted to the Honors Program in Chemistry, students must have declared a major in chemistry and achieved a 3.200 overall GPA. They must also have achieved a 3.200 GPA in all CHEM courses taken and courses accepted for the major.

### HONORS IN THE CHEMISTRY MAJOR REQUIREMENTS

To earn Honors in the Major in Chemistry, students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 overall university GPA
- Earn a 3.300 GPA for all CHEM courses and all major courses
- Complete an additional 3 credits, for a total of 8 credits, of advanced non-laboratory work. This requirement is met by the same credits and courses that are accepted for "Advanced Non-laboratory Work" in the regular major.
• Complete a two-semester Senior Honors Thesis in CHEM 681 Senior Honors Thesis and CHEM 682 Senior Honors Thesis, for a total of 6 credits.

FOOTNOTES

1 Enrollment in CHEM 115 and CHEM 116 is by invitation only. Entering first-year students are invited to apply. Candidates are selected based on their high school record, placement test scores, and application responses.

2 CHEM 343 must be taken first, followed by CHEM 345. CHEM 344 may be taken concurrently with or after CHEM 345.

3 One credit from CHEM 116 counts towards the required 5 credits of Advanced Non-laboratory Coursework.

4 Only 2 of the 3 credits from CHEM 524 count towards Advanced Non-laboratory Coursework. The remaining 1 credit counts towards the Additional Laboratory Work requirement.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

Residency Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. “In residence” means on the UW–Madison campus with an undergraduate degree classification. “In residence” credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

Quality of Work Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.