Chemistry, B.S.

Requirements

The Bachelor of Science with a major in chemistry requires a minimum of 120 s.h., including 69 s.h. of work for the major (20 s.h. in foundation chemistry courses, 27 s.h. in advanced chemistry, and 22 s.h. in supporting course work). B.S. students must earn at least 20 s.h. in advanced chemistry courses at the University of Iowa. Students must maintain a g.p.a. of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences General Education Program.

The B.S. degree with a major in chemistry is certified by the American Chemical Society (ACS) when a biochemistry course is included. An ACS-approved program offers a broad-based and rigorous chemistry education that provides students with the intellectual, experimental, and communication skills to become effective scientific professionals in chemical and other related fields. The program also provides all the prerequisites for graduate work in chemistry or biochemistry and in other biomedical areas with a molecular focus.

Courses in the chemistry major have prerequisites, so they must be taken in the correct order. Advanced chemistry courses are built on the chemistry foundation courses. Most advanced courses are taught only once a year. Students should consult their academic advisors and plan their course schedules carefully. They should take CHEM:2021 Fundamentals of Chemical Measurements during the first semester of the second year.

Students may not use a course to fulfill more than one requirement.

The B.S. with a major in chemistry requires the following course work.

Chemistry Foundation Courses 20
Advanced Chemistry Courses 27
Mathematics Courses 8
Introductory Physics Courses 8
Science Electives and Research Courses 6
Total Hours 69

Chemistry Foundation Courses

Students complete the following foundation courses.

All of these:
CHEM:1110 & CHEM:1120 Principles of Chemistry I-II 8
CHEM:2021 Fundamentals of Chemical Measurements 3
One of these sequences:
CHEM:2210 & CHEM:2220 Organic Chemistry I-II 6
CHEM:2230 & CHEM:2240 Organic Chemistry I for Majors - Organic Chemistry II for Majors (preferred) 6
One of these:
CHEM:2410 Organic Chemistry Laboratory 3

Advanced Chemistry

All of these:
CHEM:3110 & CHEM:3120 Analytical Chemistry I-II 6
CHEM:3250 Inorganic Chemistry 3
CHEM:3430 Analytical Measurements 3
CHEM:3440 Physical Measurements 3
CHEM:3530 Inorganic Chemistry Laboratory 3
CHEM:4270 Advanced Inorganic Chemistry 3
CHEM:4431-CHEM:4432 Physical Chemistry I-II 6

Mathematics

One of these sequences:
MATH:1850 & MATH:1860 Calculus I-II (preferred) 8

Introductory Physics

One of these sequences:
PHYS:1511-PHYS:1512 College Physics I-II 8
PHYS:1611-PHYS:1612 Introductory Physics I-II (preferred) 8

Science Electives and Research

A total of 6 s.h. from these:
CHEM:3994 Undergraduate Research 1-4
BIOC:3110 Biochemistry 3
BIOC:3120 Biochemistry and Molecular Biology I 3
Advanced science elective courses

ACS Certification Requirement

Students who want an ACS certified degree complete one of these optional courses (also listed above under "Science Electives and Research").

BIOC:3110 Biochemistry 3
BIOC:3120 Biochemistry and Molecular Biology I 3

B.S. with Teacher Licensure

Majors interested in earning licensure to teach in elementary and/or secondary schools must complete the College of Education's Teacher Education Program (TEP) in addition to the requirements for the major and all requirements for graduation. The TEP requires several College of Education courses and student teaching. Contact the Office of Student Services for details.
Students must satisfy all degree requirements and complete Teacher Education Program licensure before degree conferral. Majors who plan to use their work toward a minor in chemistry as academic background for earning teacher licensure should contact the Office of Student Services about requirements. Students with a strong interest in science teaching may complete a science education major. Students choose one of five emphases—biology, chemistry, earth science, physics, and all-science—and earn a Bachelor of Science degree. They may apply for admission to the Teacher Education Program. See B.S. in Science Education in the Teaching and Learning section of the Catalog.

**Honors**

**Honors in the Major**

Majors are able to graduate with departmental honors. Students must maintain a cumulative University of Iowa g.p.a. of at least 3.33. In addition, they must complete an undergraduate research project acceptable to their research advisor and must write an honors thesis based on their research. Students should register for CHEM:3994 Undergraduate Research or HONR:3994 Honors Research Practicum to earn credit for their research. They are encouraged but not required to present their research at local and regional meetings and to publish their results in professional journals.

**University of Iowa Honors Program**

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the University’s honors program.

Membership in the UI Honors Program is not required to earn honors in the chemistry major.

**Academic Plans**

**Four-Year Graduation Plan**

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the University’s Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

Courses in the chemistry major have prerequisites, so they must be taken in the correct order. Most advanced courses are taught only once a year. Students should consult their academic advisors and plan their course schedules carefully.

They should take CHEM:2021 Fundamentals of Chemical Measurements during the first semester of the second year. Typical chemistry course schedules and a regression list are available at Undergraduate Program in Chemistry on the Department of Chemistry website.

**Before the third semester begins:** math through calculus I; CHEM:1110 Principles of Chemistry I and CHEM:1120 Principles of Chemistry II, or equivalent course work

**Before the fifth semester begins:** basic measurements; inorganic chemistry; organic chemistry I, II, and lab; calculus II; and physics I and II

**Before the seventh semester begins:** six more courses in the major and at least 90 s.h. earned toward the degree

**Before the eighth semester begins:** three more courses in the major

**During the eighth semester:** enrollment in all remaining course work in the major, all remaining General Education courses, and a sufficient number of semester hours to graduate

**Sample Plan of Study**

**Chemistry (B.S.)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td><strong>First Year</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Fall</strong></td>
<td></td>
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<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (also GE: Natural Sciences with a lab)  1</td>
<td>4</td>
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<tr>
<td>MATH:1020</td>
<td>Elementary Functions (also GE: Quantitative or Formal Reasoning)</td>
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<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric or other General Education course)  1</td>
<td>4</td>
</tr>
<tr>
<td>GE: World Languages or elective course  1</td>
<td></td>
<td>3-5</td>
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<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
<td>2</td>
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<td><strong>Spring</strong></td>
<td></td>
<td>17-19</td>
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<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II (also GE: Natural Sciences with a lab) 1</td>
<td>4</td>
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<tr>
<td>ENGL:1200</td>
<td>The Interpretation of Literature (GE: Interpretation of Literature )</td>
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<tr>
<td>MATH:1850</td>
<td>Calculus I</td>
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<tr>
<td>GE: Diversity and Inclusion</td>
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<td>3</td>
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<td>GE: World Languages or elective course</td>
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<td>3-5</td>
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<td><strong>Second Year</strong></td>
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<td>17-19</td>
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<tr>
<td><strong>Fall</strong></td>
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<tr>
<td>CHEM:2021</td>
<td>Fundamentals of Chemical Measurements</td>
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<td>CHEM:2230</td>
<td>Organic Chemistry I for Majors</td>
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<tr>
<td>MATH:1860</td>
<td>Calculus II</td>
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<tr>
<td>PHYS:1611</td>
<td>Introductory Physics I</td>
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<tr>
<td>GE: World Languages or elective course</td>
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<td>3-5</td>
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<td><strong>Spring</strong></td>
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<td>17-19</td>
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<tr>
<td>CHEM:2240</td>
<td>Organic Chemistry II for Majors</td>
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<td>CHEM:2420</td>
<td>Organic Chemistry Laboratory for Majors</td>
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<td>CHEM:3250</td>
<td>Inorganic Chemistry</td>
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<td>PHYS:1612</td>
<td>Introductory Physics II</td>
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<td>GE: World Languages or elective course</td>
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<td><strong>Third Year</strong></td>
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<td>15-18</td>
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<td>CHEM:3110</td>
<td>Analytical Chemistry</td>
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<tr>
<td>CHEM:3530</td>
<td>Inorganic Chemistry Laboratory</td>
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<tr>
<td>CHEM:4432</td>
<td>Physical Chemistry</td>
<td>3</td>
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<tr>
<td>GE: Social Sciences</td>
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<td>3</td>
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<tr>
<td>GE: Values and Culture</td>
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**Hours**
### Spring
- **CHEM:3120** Analytical Chemistry II 3
- **CHEM:3430** Analytical Measurements 3
- **CHEM:4431** Physical Chemistry I 3
- **GE:** Historical Perspectives 3
- **GE:** Literary, Visual, and Performing Arts 3

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<th>Hours</th>
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### Fourth Year
#### Fall
- **BIOC:3110** Biochemistry (or elective course) 3
- **CHEM:3440** Physical Measurements 3
- **CHEM:4270** Advanced Inorganic Chemistry 3
- Major: undergraduate research or advanced elective course 2
- **GE:** International and Global Issues 3
- Elective course 5

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#### Spring
- Major: undergraduate research or advanced elective course 2-3
- Elective course 3
- Elective course 3
- Elective course 3
- Elective course 1

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<th>Hours</th>
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<tbody>
<tr>
<td>15-16</td>
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</table>

Total Hours: 126-136

1. Enrollment in chemistry and math courses require completion of placement exams.
2. General Education (GE) courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses. For more information, view the General Education Program.
3. Students who have completed four years of a single language in high school have satisfied the College of Liberal Arts and Sciences GE: World Languages requirement. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course.
4. Students who want an ACS certified degree must complete one of these optional courses: **BIOC:3110** Biochemistry or **BIOC:3120** Biochemistry and Molecular Biology I.
5. Students may use their elective courses to complete a double major, minors, or certificates.

### Financial Support

#### Scholarships and Awards
A number of awards and scholarships are available to chemistry majors, including the American Institute of Chemists Award, the Undergraduate Award in Analytical Chemistry, the Chemistry Alumni Awards (one each for a sophomore, a junior, and a senior), the Merck Index Award, and the Viksnins, Harris & Padys PLLP Award.

Chemistry majors also may apply for the Donald J. and Margaret Burton Scholarship, Ken Sando Scholarship, Shoemaker-Strickler Scholarship, E. David Cater Scholarship, and Russell K. Simms Scholarship.

Visit Undergraduate Scholarships & Awards on the Department of Chemistry website.

### Career Advancement
The undergraduate major in chemistry provides a strong foundation for success in graduate and professional study and for positions in academic or industrial chemistry. Students with a chemistry degree can pursue careers or graduate study in a wide range of fields. Learn more about career options for chemistry majors on the American Chemical Society website.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.