Chemistry, B.A.

Requirements

The Bachelor of Arts with a major in chemistry requires a minimum of 120 s.h., including 53-54 s.h. of work for the major (20 s.h. in foundation chemistry courses, 12 s.h. in advanced chemistry, and 21-22 s.h. in supporting course work). B.A. students must earn at least 11 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.A. degree is a good choice for students interested in medical or other professional schools, or those interested in a teaching career (see "B.A. with Teacher Licensure" below). The program provides students with the flexibility to earn a degree in chemistry while they also complete related courses required for medical school, such as biology and biochemistry. Compared to the B.S. degree, the B.A. has modified mathematics requirements that include a one-semester physical chemistry course, an analytical chemistry course, and a single, integrated capstone laboratory that incorporates analytical, inorganic, and physical chemistry experiments.

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.A. with a major in chemistry requires the following course work.

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry Foundation Courses</td>
<td>20</td>
</tr>
<tr>
<td>Advanced Chemistry Courses</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics Courses</td>
<td>7-8</td>
</tr>
<tr>
<td>Introductory Physics Courses</td>
<td>8</td>
</tr>
<tr>
<td>Science Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>53-54</strong></td>
</tr>
</tbody>
</table>

Chemistry Foundation Courses

Students complete the following foundation courses.

All of these:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:1110 &amp;</td>
<td>Principles of Chemistry I-II</td>
<td>8</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM:2021</td>
<td>Fundamentals of Chemical Measurements</td>
<td>3</td>
</tr>
</tbody>
</table>

One of these sequences:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:2210 &amp;</td>
<td>Organic Chemistry I-II</td>
<td>6</td>
</tr>
<tr>
<td>CHEM:2220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM:2230 &amp;</td>
<td>Organic Chemistry I for Majors - Organic Chemistry II for Majors (preferred)</td>
<td>6</td>
</tr>
<tr>
<td>CHEM:2240</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Advanced Chemistry

One of these:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:3110</td>
<td>Analytical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3120</td>
<td>Analytical Chemistry II</td>
<td>3</td>
</tr>
</tbody>
</table>

All of these:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:3250</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4430</td>
<td>Principles of Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4450</td>
<td>Synthesis and Measurement</td>
<td>3</td>
</tr>
</tbody>
</table>

Mathematics

One of these:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH:1460</td>
<td>Calculus for the Biological Sciences (preferred)</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1550</td>
<td>Engineering Mathematics I: Single Variable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1850</td>
<td>Calculus I</td>
<td>4</td>
</tr>
</tbody>
</table>

One of these:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH:1560</td>
<td>Engineering Mathematics II: Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1860</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>STAT:2010</td>
<td>Statistical Methods and Computing</td>
<td>3</td>
</tr>
<tr>
<td>STAT:3510</td>
<td>Biostatistics (preferred)</td>
<td>3</td>
</tr>
</tbody>
</table>

Introductory Physics

All students complete one of these sequences.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS:1511-</td>
<td>College Physics I-II</td>
<td>8</td>
</tr>
<tr>
<td>PHYS:1512</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS:1611-</td>
<td>Introductory Physics I-II</td>
<td>8</td>
</tr>
<tr>
<td>PHYS:1612</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Science Electives

Some of these courses may be used to fulfill other requirements for the major, as listed above; students who have used a course from this list to fulfill another requirement for the major may not use that course as an elective. Students should consult their advisor to gain approval for a course that is not on the list. Undergraduate Research (CHEM:3994) may not be used to satisfy the science electives requirement.

A total of 6 s.h. from these:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:3110</td>
<td>Analytical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3120</td>
<td>Analytical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3430</td>
<td>Analytical Measurements</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3440</td>
<td>Physical Measurements</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:3530</td>
<td>Inorganic Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4171</td>
<td>Advanced Analytical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:4270</td>
<td>Advanced Inorganic Chemistry</td>
<td>3</td>
</tr>
</tbody>
</table>
B.A. 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.

Joint B.A./M.A.T. with Science Education Subprogram

Students who are interested in pursuing a graduate degree in teaching may apply to the joint Bachelor of Arts/Master of Arts in Teaching program offered by the College of Liberal Arts and Sciences and the College of Education. Designed for undergraduates majoring in biology, chemistry, environmental sciences, or physics, the joint program enables students to earn a B.A. and M.A.T. in five years by beginning to earn graduate credit during their fourth year of undergraduate study and by counting up to 18 s.h. of qualifying credit toward both degrees. For more information, see "Joint B.A./M.A.T. with Science Education Subprogram" under Science Education in the Master of Arts in Teaching (College of Education) section of the Catalog. Interested students should consult an advisor.

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 Principles of Chemistry I in 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 MATH:1460 Calculus for the Biological Sciences or 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; organic chemistry I, II, and lab; and biostatistics or calculus II

Before the seventh semester begins: two more courses in the major; physics I and II; and at least 90 s.h. earned toward the degree

Before the eighth semester begins: principles of physical chemistry and one more course 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.A.)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (also GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td>MATH:1440</td>
<td>Mathematics for the Biological Sciences (also GE: Quantitative or Formal Reasoning)</td>
<td>4</td>
</tr>
</tbody>
</table>
Chemistry, B.A.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHET:1030</td>
<td>Rhetoric (GE: Rhetoric or other General Education course)</td>
<td>4</td>
</tr>
<tr>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td>CSI:1600</td>
<td>Success at Iowa</td>
<td>2</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>CHEM:1120</td>
<td>Principles of Chemistry II (also GE: Natural Sciences with a lab)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>MATH:1460</td>
<td>Calculus for the Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GE: Diversity and Inclusion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>1</td>
<td></td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td>CHEM:2021</td>
<td>Fundamentals of Chemical Measurements</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM:2230</td>
<td>Organic Chemistry I for Majors</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGL:1200</td>
<td>The Interpretation of Literature (GE: Interpretation of Literature)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>CHEM:2240</td>
<td>Organic Chemistry II for Majors</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM:2420</td>
<td>Organic Chemistry Laboratory for Majors</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>STAT:3510</td>
<td>Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>GE: Historical Perspectives</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GE: World Languages or elective course</td>
<td>3-5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM:3110</td>
<td>Analytical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS:1511</td>
<td>College Physics I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GE: Social Sciences</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GE: Values and Culture</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>2-3</td>
<td></td>
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<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>CHEM:3250</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PHYS:1512</td>
<td>College Physics II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>GE: Literary, Visual, and Performing Arts</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>2-3</td>
<td></td>
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<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM:4430</td>
<td>Principles of Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Major: advanced chemistry elective course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GE: International and Global Issues</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>3</td>
<td></td>
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<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>CHEM:4450</td>
<td>Synthesis and Measurement</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Major: advanced chemistry elective course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Elective course

1 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.

2 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.

3 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 & Pady 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.