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>53-54</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 Name</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:1110</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 Name</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:2210</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</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 Name</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 (preferred)</td>
<td>3</td>
</tr>
</tbody>
</table>

All of these:

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

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
RHET:1030  Rhetoric (GE: Rhetoric or other General Education course)  4  
GE: World Languages or elective course  3-5  
CSI:1600  Success at Iowa  2  

Hours  17-19  

Spring  
CHEM:1120  Principles of Chemistry II (also GE: Natural Sciences with a lab)  4  
MATH:1460  Calculus for the Biological Sciences  4  
GE: Diversity and Inclusion  3  
GE: World Languages or elective course  3-5  
Elective course  1  

Hours  15-17  

Second Year  
Fall  
CHEM:2021  Fundamentals of Chemical Measurements  3  
CHEM:2230  Organic Chemistry I for Majors  3  
ENGL:1200  The Interpretation of Literature (GE: Interpretation of Literature)  3  
GE: World Languages or elective course  3-5  
Elective course  3  

Hours  15-17  

Spring  
CHEM:2240  Organic Chemistry II for Majors  3  
CHEM:2420  Organic Chemistry Laboratory for Majors  3  
STAT:3510  Biostatistics  3  
GE: Historical Perspectives  3  
GE: World Languages or elective course  3-5  

Hours  15-17  

Third Year  
Fall  
CHEM:3110  Analytical Chemistry I  3  
PHYS:1511  College Physics I  4  
GE: Social Sciences  3  
GE: Values and Culture  3  
Elective course  2-3  

Hours  15-16  

Spring  
CHEM:3250  Inorganic Chemistry  3  
PHYS:1512  College Physics II  4  
GE: Literary, Visual, and Performing Arts  3  
Elective course  3  
Elective course  3  

Hours  15-16  

Fourth Year  
Fall  
CHEM:4430  Principles of Physical Chemistry  3  
Major: advanced chemistry elective course  3  
GE: International and Global Issues  3  
Elective course  3  
Elective course  3  

Hours  15  

Spring  
CHEM:4450  Synthesis and Measurement  3  
Major: advanced chemistry elective course  3

Elective course  3  
Elective course  3  

Hours  15  

Total Hours  122-132  

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's 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.