CHEMISTRY, BA

Degree: Bachelor of Arts (BA)
Major: Chemistry

Program Overview

The BA program in chemistry is intended for pre-professional students who plan careers in medicine, dentistry, veterinary medicine, pharmacy, or other fields for which a baccalaureate degree in chemistry provides appropriate training. BA majors may supplement their required courses with additional chemistry courses or may utilize the curriculum’s flexibility to develop an interdisciplinary program of their choice. Many chemistry BA majors participate in undergraduate research in the Department of Chemistry (CHEM 397 / CHEM 398) or in other science departments, including those in the medical school.

Learning Outcomes

- Students will be able to demonstrate proficiency in the content knowledge of the main sub disciplines of chemistry including general, organic, analytical and physical.
- Students will be able to solve chemistry problems, and carry out, record and analyze the results of chemical experiments.
- Students will be able to utilize peer-reviewed scientific literature effectively, and evaluate technical articles critically.
- Students will be able to design and carry out experiments in a safety-focused manner.
- Students will be able to utilize ethically sound judgements when working with scientific results.

Teacher Licensure

Case Western Reserve University offers licensure programs in music education and art education as degree programs in each of those departments. Additionally, CWRU’s Teacher Education Program offers a licensure track for students who wish to pursue a teaching career in their content area in grades 7-12 Adolescent to Young Adult. Licensure areas are: English Language Arts (English major), Integrated Social Studies (history major), Integrated Mathematics (math major), Life Science (biology major), Physical Science (chemistry major), or Physical Science (physics major). A Multi-Age license in grades PreK-12 is available in French, Spanish or Latin. Students must fulfill the degree requirements for their primary major and declare Teacher Education as a second major. The Teacher Education major consists of 36 hours in education, including a student teaching semester. The program places students in mentored teaching situations at every stage of their training, capitalizing on the relationships the university has built with area schools.

For the subject area requirements for teacher licensure, please visit the program page for Teacher Education, BA.

Undergraduate Policies

For undergraduate policies and procedures, please review the Undergraduate Academics section of the General Bulletin.

Accelerated Master’s Programs

Undergraduate students may participate in accelerated programs toward graduate or professional degrees. For more information and details of the policies and procedures related to accelerated studies, please visit the Undergraduate Academics section of the General Bulletin.

Program Requirements

Students seeking to complete this major and degree program must meet the general requirements for bachelor’s degrees and the Unified General Education Requirements. Students completing this program as a secondary major while completing another undergraduate degree program do not need to satisfy the school-specific requirements associated with this major.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 105</td>
<td>Principles of Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 106</td>
<td>Principles of Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Principles of Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 223</td>
<td>Introductory Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 323</td>
<td>Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM 224</td>
<td>Introductory Organic Chemistry II</td>
<td>3</td>
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<tr>
<td>or CHEM 324</td>
<td>Organic Chemistry II</td>
<td></td>
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<tr>
<td>CHEM 233</td>
<td>Introductory Organic Chemistry Laboratory I</td>
<td>2</td>
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<tr>
<td>or CHEM 322</td>
<td>Laboratory Methods in Organic Chemistry</td>
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<tr>
<td>CHEM 301</td>
<td>Introductory Physical Chemistry I</td>
<td>3</td>
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<tr>
<td>or CHEM 335</td>
<td>Physical Chemistry I</td>
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<td>CHEM 302</td>
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<tr>
<td>or CHEM 336</td>
<td>Physical Chemistry II</td>
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<td>CHEM 304</td>
<td>Quantitative Analysis Laboratory</td>
<td>2</td>
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<td>CHEM 305</td>
<td>Introductory Physical Chemistry Laboratory</td>
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<td>CHEM 310</td>
<td>Foundations of Analytical Chemistry</td>
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<tr>
<td>PHYS 115</td>
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<tr>
<td>or PHYS 121</td>
<td>General Physics I - Mechanics</td>
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<tr>
<td>PHYS 116</td>
<td>Introductory Physics II</td>
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<tr>
<td>or PHYS 122</td>
<td>General Physics II - Electricity and Magnetism</td>
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<tr>
<td>MATH 125</td>
<td>Math and Calculus Applications for Life, Managerial, and Social Sci I</td>
<td>4</td>
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<tr>
<td>or MATH 121</td>
<td>Calculus for Science and Engineering I</td>
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<tr>
<td>MATH 126</td>
<td>Math and Calculus Applications for Life, Managerial, and Social Sci II</td>
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<tr>
<td>or MATH 122</td>
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<td>Total Hours</td>
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Sample Plan of Study

First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>CHEM 105</td>
<td>Principles of Chemistry I</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Principles of Chemistry Laboratory</td>
</tr>
<tr>
<td>MATH 121 or MATH 125</td>
<td>Calculus for Science and Engineering I or Math and Calculus Applications for Life, Managerial, and Social Sci I</td>
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</table>
### Fourth Year

**Fall**
- **Breadth, or Elective course**\(^a\) 3
- **Open Electives** 12

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>15</td>
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**Spring**
- **Breadth, or Elective course**\(^a\) 3
- **Open Electives** 12

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
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<td>15</td>
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Total Hours 120

\(^a\) Unified General Education Requirement.

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### Third Year

**Fall**
- **Breadth, or Elective course**\(^a\) 3

<table>
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**Spring**
- **Breadth, or Elective course**\(^a\) 3

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<tr>
<th>Hours</th>
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### Second Year

**Fall**
- **Breadth, or Elective course**\(^a\) 3

<table>
<thead>
<tr>
<th>Hours</th>
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<tr>
<td>16</td>
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</table>

**Spring**
- **Breadth, or Elective course**\(^a\) 3

<table>
<thead>
<tr>
<th>Hours</th>
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<tbody>
<tr>
<td>14</td>
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### First Year

<table>
<thead>
<tr>
<th>Course(s)</th>
<th>Description</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CHEM Elective</td>
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<tr>
<td>Open Elective</td>
<td>3</td>
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</tbody>
</table>

<table>
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<tbody>
<tr>
<td>15</td>
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</tbody>
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### Academic Inquiry Seminar, Breadth, or Elective course \(^a\) 3

### CHEM Elective 3

### MATH 122 or MATH 126 Hours 4

### CHEM 106 Principles of Chemistry II Hours 3

### Academic Inquiry Seminar, Breadth, or Elective course \(^a\) 3

### CHEM Elective 3

### Open Elective 3

### Hours 15

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### CHEM 223 or CHEM 323 Introductory Organic Chemistry I or Organic Chemistry I Hours 3

### CHEM 233 Introductory Organic Chemistry Laboratory I Hours 2

### Breadth, or Elective course \(^a\) 3

### CHEM Elective 3

### Open Elective 3

### Hours 14

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### CHEM 224 or CHEM 324 Introductory Organic Chemistry II or Organic Chemistry II Hours 3

### CHEM 234 or CHEM 322 Introductory Organic Chemistry Laboratory II or Laboratary Methods in Organic Chemistry Hours 2

### Breadth, or Elective course \(^a\) 3

### Open Electives 6

### Hours 14

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### CHEM 301 or CHEM 335 Introductory Physical Chemistry I or Physical Chemistry I Hours 3

### CHEM 304 Quantitative Analysis Laboratory Hours 2

### CHEM 310 Foundations of Analytical Chemistry Hours 3

### PHYS 115 or PHYS 121 Introductory Physics I or General Physics I - Mechanics Hours 4

### Breadth, or Elective course \(^a\) 3

### Hours 15

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### CHEM 302 or CHEM 336 Introductory Physical Chemistry II or Physical Chemistry II Hours 3

### CHEM 305 Introductory Physical Chemistry Laboratory Hours 3

### PHYS 116 or PHYS 122 Introductory Physics II or General Physics II - Electricity and Magnetism Hours 4

### Breadth, or Elective course \(^a\) 3

### CHEM Elective 3

### Hours 16

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### CHEM 233 Introductory Organic Chemistry Laboratory I Hours 2

### CHEM Elective 3

### Open Elective 3

### Hours 15

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### CHEM Elective 3

### Open Elective 3

### Hours 15

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### MATH 122 or MATH 126 Hours 4

### CHEM 106 Principles of Chemistry II Hours 3

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### Open Elective 3

### Hours 15

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### CHEM Elective 3

### Open Elective 3

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### CHEM 305 Introductory Physical Chemistry Laboratory Hours 3

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### CHEM Elective 3

### Hours 16

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### CHEM Elective 3

### Open Elective 3

### Hours 15

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### MATH 122 or MATH 126 Hours 4

### CHEM 106 Principles of Chemistry II Hours 3

### Academic Inquiry Seminar, Breadth, or Elective course \(^a\) 3

### CHEM Elective 3

### Open Elective 3

### Hours 15