### Bachelor of Science in Chemistry

#### Course Title | S.H.  
---|---  
**First Year Requirement - Student Success**  
YSU 1500 | Success Seminar | 1-2  
or SS 1500 | Strong Start Success Seminar  
or HONR 1500 | Intro to Honors  
**General Education Requirements**  
ENGL 1550 | Writing 1 | 3-4  
or ENGL 1549 | Writing 1 with Support  
ENGL 1551 | Writing 2 | 3  
CMST 1545 | Communication Foundations | 3  
**Mathematics requirement (met through MATH in major)**  
Some courses are categorized in more than one Knowledge Domain. Courses can only be used once within the GE model.  
Arts and Humanities (6 s.h.) | 6  
Natural Sciences (2 courses, 1 with lab) (6-7 s.h.) | 6  
Social Science (6 s.h.) | 6  
Social and Personal Awareness (6 s.h.) | 6  
**The following CHEM core courses are required (39 s.h.)**  
Grade of "C" or better is required. Courses cannot be taken "CR/NC"  
CHEM 1515 & 1515L | General Chemistry 1 and General Chemistry 1 Laboratory | 4  
CHEM 1516 & 1516L | General Chemistry 2 and General Chemistry 2 Laboratory | 4  
CHEM 1516R | Recitation for General Chemistry 2 | 1  
CHEM 2604 & 2604L | Quantitative Analysis and Quantitative Analysis Laboratory | 5  
CHEM 3719 & 3719L | Organic Chemistry 1 and Organic Chemistry 1 Laboratory | 4  
CHEM 3719R | Organic Chemistry Recitation 1 | 1  
CHEM 3720 & 3720L | Organic Chemistry 2 and Organic Chemistry 2 Laboratory | 4  
CHEM 3729 | Inorganic Chemistry | 3  
CHEM 3739 & 3739L | Physical Chemistry 1 and Physical Chemistry 1 Laboratory | 4  
CHEM 3740 & 3740L | Physical Chemistry 2 and Physical Chemistry 2 Laboratory | 4  
CHEM 3785 | Biochemistry 1 | 3  
**The following capstone is required (3 s.h.)**  
CHEM 4850 | Chemistry Research | 1  
CHEM 4850L | Chemistry Research Laboratory | 2  
**The following non-CHEM courses are required (22 s.h.)**  
MATH 1571 | Calculus 1 | 4  
MATH 1572 | Calculus 2 | 4  
MATH 2673 | Calculus 3 | 4  
PHYS 2610 & 2610L | General Physics 1 and General Physics Laboratory 1 | 5  
PHYS 2611 & 2611L | General Physics 2 and General Physics laboratory 2 | 5  
**Electives:**  
Select 12 hours of upper-division chemistry electives (from the list below)  
4 hours of which must be in upper-division laboratory.  
CHEM 3764 | Chemical Toxicology |  
CHEM 3785L | Biochemistry Laboratory |  
CHEM 3786 | Biochemistry 2 |  
CHEM 3790 | Undergraduate Seminar |  
CHEM 4850L | Chemistry Research Laboratory |  
CHEM 4860 | Regulatory Aspects of Industrial Chemistry |  
CHEM 4891 | Special Topics |  
CHEM 5814 & 5814L | Chemical Instrumentation and Chemical Instrumentation Laboratory |  
CHEM 5821 | Intermediate Organic Chemistry |  
CHEM 5822 & 5822L | Advanced Organic Laboratory and Advanced Organic Laboratory |  
CHEM 5830 | Intermediate Inorganic Chemistry |  
CHEM 5832 & 5832L | Solid State Structural Methods and Solid State Structural Methods Laboratory |  
CHEM 5836 | Quantum Chemistry |  
CHEM 5861 & 5861L | Polymer Science 1: Polymer Chemistry and Plastics |  
CHEM 5861 & 5862 & 5862L | Polymer Science 2: Polymer Rheology, Processing, and Composites  
CHEM 5863 | Polymer Science 2: Polymer Rheology, Processing, and Composites Laboratory |  
CHEM 5865 | Organic Chemistry 1 |  
CHEM 5866 | Organic Chemistry 2 |  
CHEM 5867 | Organic Chemistry 3 |  
CHEM 5868 | Organic Chemistry 4 |  
CHEM 5869 | Organic Chemistry 5 |  
**Total Semester Hours** | 120-122  
**Year 1**  
| Fall | S.H.  
---|---  
YSU 1500 | Success Seminar | 1  
CHEM 1515 & 1515L | General Chemistry 1 and General Chemistry 1 Laboratory | 4  
CHEM 1515R | Recitation for General Chemistry 1 | 1  
MATH 1571 | Calculus 1 | 4  
ENGL 1550 | Writing 1 | 3-4  
o ENGL 1549 or Writing 1 with Support |  
**Semester Hours** | 13-14  
| Spring |  
CHEM 1516 & 1516L | General Chemistry 2 and General Chemistry 2 Laboratory | 4  
CHEM 1516R | Recitation for General Chemistry 2 | 1  
MATH 1572 | Calculus 2 | 4  
ENGL 1551 | Writing 2 | 3  
GER | 3  
**Semester Hours** | 15  
**Year 2**  
| Fall |  
CHEM 3719 & 3719L | Organic Chemistry 1 and Organic Chemistry 1 Laboratory | 4  
CHEM 3719R | Organic Chemistry Recitation 1 | 1  
MATH 2604 & 2604L | Quantitative Analysis and Quantitative Analysis Laboratory | 5  
PHYS 2610 & 2610L | General Physics 1 and General Physics Laboratory 1 | 5  
**Semester Hours** | 15  
| Spring |  
CHEM 3720 & 3720L | Organic Chemistry 2 and Organic Chemistry 2 Laboratory | 4  
CHEM 3729 | Inorganic Chemistry | 3  
CHEM 3739 & 3739L | Physical Chemistry 1 and Physical Chemistry 1 Laboratory | 4  
CHEM 3740 & 3740L | Physical Chemistry 2 and Physical Chemistry 2 Laboratory | 4  
CHEM 3785 | Biochemistry 1 | 3  
**The following capstone is required (3 s.h.)**  
CHEM 4850 | Chemistry Research | 1  
CHEM 4850L | Chemistry Research Laboratory | 2  
**The following non-CHEM courses are required (22 s.h.)**  
MATH 1571 | Calculus 1 | 4  
MATH 1572 | Calculus 2 | 4  
MATH 2673 | Calculus 3 | 4  
PHYS 2610 & 2610L | General Physics 1 and General Physics Laboratory 1 | 5  
PHYS 2611 & 2611L | General Physics 2 and General Physics laboratory 2 | 5  
**Electives:**  
Select 12 hours of upper-division chemistry electives (from the list below)  
4 hours of which must be in upper-division laboratory.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 3720R</td>
<td>Organic Chemistry Recitation 2</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 2611</td>
<td>General Physics 2</td>
<td>5</td>
</tr>
<tr>
<td>&amp; 2611L</td>
<td>and General Physics laboratory 2</td>
<td></td>
</tr>
<tr>
<td>MATH 2673</td>
<td>Calculus 3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Hours</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

**Year 3**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 3739</td>
<td>Physical Chemistry 1</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 3739L</td>
<td>and Physical Chemistry 1 Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM 3729</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GER</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Hours</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 3740</td>
<td>Physical Chemistry 2</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 3740L</td>
<td>and Physical Chemistry 2 Laboratory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upper Level Chemistry Electives</td>
<td>6</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GER</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Hours</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

**Year 4**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 4850</td>
<td>Chemistry Research</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 4850L</td>
<td>Chemistry Research Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 3785</td>
<td>Biochemistry 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Upper Level Chemistry Elective</td>
<td>3</td>
</tr>
<tr>
<td>GER</td>
<td>Speech Communications</td>
<td>3</td>
</tr>
<tr>
<td>GER</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upper Level CHEM Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Upper Level Electives</td>
<td>9</td>
</tr>
<tr>
<td>GER</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Semester Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**Total Semester Hours** 119-120

Electives must include courses to fulfill the students chosen minor. Typically for Chemistry majors, the minor will be in Mathematics, Physics or Biology.

**Learning Outcomes**

- Undergraduate students will demonstrate an understanding of the basic principles of the chemical disciplines included in their curriculum.
- Undergraduate students will demonstrate independent and critical thinking.
- Undergraduate students will demonstrate an understanding of the fundamentals of modern chemical instrumentation.
- Undergraduate students will effectively communicate their ideas both orally and in writing.
- Undergraduate students will acquire basic research skills including planning and performing an experiment and analyzing the results.