CHEMISTRY, BACHELOR OF SCIENCE WITH A CONCENTRATION IN MEDICINAL CHEMISTRY

To obtain a B.S. with a major in Chemistry and a concentration in Medicinal Chemistry, a student must fulfill university, college, and departmental requirements. Minimum hour requirements follow:

- 46 hours of University General Education courses (Testing out of academic skills requirements and enrolling in General Education courses that meet both distribution and diversity requirements are likely to reduce the total number of General Education hours to 34 or fewer.)
- 12 hours college breadth requirement
- 51 hours of major courses (including the optional concentration)
- 19 hours of cognate courses
- Elective hours as required to total 120 hours

TOTAL HOURS: 120

Requirements

A Bachelor of Science degree in chemistry with a concentration in medicinal chemistry requires a minimum of 51 credit hours of course work in both chemistry and biology.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1180 &amp; CHEM 1184</td>
<td>GENERAL CHEMISTRY I and GENERAL CHEMISTRY I LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1190 &amp; CHEM 1194</td>
<td>GENERAL CHEMISTRY II and GENERAL CHEMISTRY II LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 2250</td>
<td>ORGANIC CHEMISTRY I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 2260 &amp; CHEM 2274</td>
<td>ORGANIC CHEMISTRY II and ORGANIC CHEMISTRY LABORATORY</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 2400 &amp; CHEM 2404</td>
<td>QUANTITATIVE ANALYSIS and QUANTITATIVE ANALYSIS LAB</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 2500</td>
<td>INTRODUCTION TO INORGANIC CHEMISTRY</td>
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<td>PHYSICAL CHEMISTRY I and PHYSICAL CHEMISTRY I LABORATORY</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 3710</td>
<td>ESSENTIALS OF MEDICINAL CHEMISTRY</td>
<td>3</td>
</tr>
<tr>
<td>CHEM/Biol 4650</td>
<td>BIOCHEMISTRY I (with the following lab)</td>
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</tr>
<tr>
<td>CHEM/Biol 4654</td>
<td>BIOCHEMISTRY I LABORATORY</td>
<td>1</td>
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</table>

Additional Lecture

Select one of the following: 3-4

- CHEM 3210 | INTRODUCTION TO MOLECULAR MODELING (3 cr) |
- CHEM 4230 | ADVANCED ORGANIC CHEMISTRY - SYNTHESIS (3 cr) |
- CHEM 4240 | ADVANCED ORGANIC CHEMISTRY - MECHANISM (3 cr) |
- CHEM 4250 | ADVANCED ORGANIC CHEMISTRY: MECHANISMS AND MODELING (4 cr) (additional lab not required if 4250 is taken) |

Total Credits: 51-52

Advanced Courses

Analytical

- CHEM 3030 | ENVIRONMENTAL CHEMISTRY | 3 |
- CHEM 3424 | SPECTROMETRIC CHARACTERIZATIONS (1 cr) | 1 |
- CHEM 4400 | INSTRUMENTAL ANALYSIS | 3 |
- CHEM 4404 | INSTRUMENTAL ANALYSIS LABORATORY | 1 |

Biochemistry

- CHEM/Biol 4660 | BIOCHEMISTRY II | 3 |
- CHEM/Biol 4664 | BIOCHEMISTRY II LABORATORY | 1 |
- CHEM 4670 | PROTEIN PURIFICATION AND CHARACTERIZATION | 2 |

Inorganic

- CHEM 3514 | INORGANIC PREPARATIONS | 1 |
- CHEM 4500 | ADVANCED INORGANIC CHEMISTRY | 3 |
- CHEM 4510 | SOLID STATE INORGANIC CHEMISTRY | 3 |
- CHEM 4540 | GEOCHEMISTRY | 3 |

Organic

- CHEM 3210 | INTRODUCTION TO MOLECULAR MODELING | 3 |
- CHEM 4230 | ADVANCED ORGANIC CHEMISTRY - SYNTHESIS | 3 |
- CHEM 4240 | ADVANCED ORGANIC CHEMISTRY - MECHANISM | 3 |
- CHEM 4250 | ADVANCED ORGANIC CHEMISTRY: MECHANISMS AND MODELING | 4 |

Physical Chemistry

- CHEM 3360 | PHYSICAL CHEMISTRY II | 3 |
- CHEM 3364 | PHYSICAL CHEMISTRY II LABORATORY | 1 |

Polymer

- CHEM 4310 | POLYMER CHEMISTRY | 3 |

Research

- CHEM 4950 | CHEMISTRY PROJECTS | 1 |
- CHEM 4960 | CHEMISTRY PROBLEMS | 1-3 |

Internship

- CHEM 4810 | CHEMISTRY INTERNSHIP | 1-6 |

Special Topics

- CHEM 4930 | SPECIAL TOPICS IN CHEMISTRY | 1-3 |

Biology

- BIOL 3020 | MOLECULAR BIOLOGY OF THE CELL | 3 |
- BIOL 3240 | INTRODUCTION TO IMMUNOLOGY | 3 |
- BIOL 3830 | BIOLOGY OF PATHOGENIC MICROORGANISMS | 3 |
Chemistry, Bachelor of Science with a Concentration in Medicinal Chemistry

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 4130</td>
<td>MOLECULAR GENETICS</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 4140</td>
<td>CELLULAR BIOLOGY</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 4450</td>
<td>VIROLOGY</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 4640</td>
<td>MOLECULAR MICROBIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 4730</td>
<td>VERTEBRATE ENDOCRINOLOGY</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 4850</td>
<td>DEVELOPMENTAL BIOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 4860</td>
<td>COMPARATIVE GENOMICS</td>
<td>3</td>
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</table>

**Required Cognate Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 1950</td>
<td>CALCULUS I</td>
<td>5</td>
</tr>
<tr>
<td>MATH 1960</td>
<td>CALCULUS II</td>
<td>4</td>
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Select one of the following sequences: 10

**Sequence I**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYS 1110 &amp; PHYS 1154</td>
<td>GENERAL PHYSICS I and GENERAL PHYSICS LABORATORY I</td>
<td></td>
</tr>
<tr>
<td>PHYS 1120 &amp; PHYS 1164</td>
<td>GENERAL PHYSICS II and GENERAL PHYSICS LABORATORY II</td>
<td></td>
</tr>
</tbody>
</table>

**Sequence II**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 2110 &amp; PHYS 1154</td>
<td>GENERAL PHYSICS I - CALCULUS LEVEL and GENERAL PHYSICS LABORATORY I</td>
<td></td>
</tr>
<tr>
<td>PHYS 2120 &amp; PHYS 1164</td>
<td>GENERAL PHYSICS-CALCULUS LEVEL and GENERAL PHYSICS LABORATORY II</td>
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</table>

**Total Credits** 19

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 1970</td>
<td>CALCULUS III</td>
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</table>

These courses can be applied to pre-professional curricula. For example, with proper selection of electives and sequencing of requirements, pre-pharmacy students may meet UNMC College of Pharmacy entrance requirements in three years and still be able to complete a B.S. in chemistry with a concentration in medicinal chemistry in four years.

To graduate with an ACS certified degree, see your chemistry advisor for proper course selection.

**Freshman**

**Fall**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 1180 &amp; CHEM 1184</td>
<td>GENERAL CHEMISTRY I and GENERAL CHEMISTRY I LABORATORY (*)</td>
<td></td>
</tr>
<tr>
<td>CMST 1110 or CMST 2120</td>
<td>PUBLIC SPEAKING FUNDS or ARGUMENTATION AND DEBATE</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 1150</td>
<td>ENGLISH COMPOSITION I (**)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1950</td>
<td>CALCULUS I (**)</td>
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</table>

*CHEM 1180: Requires MATH 1320 or higher. Must take CHEM 1184 concurrently.

**ENGL 1150: Requires appropriate placement.

***MATH 1950: Requires appropriate Math placement. MATH 1950 is part of the BS Cognate.

**Spring**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 1190 &amp; CHEM 1194</td>
<td>GENERAL CHEMISTRY II and GENERAL CHEMISTRY II LABORATORY (*)</td>
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<tr>
<td>ENGL 1160</td>
<td>ENGLISH COMPOSITION II (**)</td>
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</tr>
<tr>
<td>MATH 1960</td>
<td>CALCULUS II (**)</td>
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</table>

**Sophomore**

**Fall**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHEM 2250</td>
<td>ORGANIC CHEMISTRY I (*)</td>
<td>3</td>
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<tr>
<td>CHEM 2400 &amp; CHEM 2404</td>
<td>QUANTITATIVE ANALYSIS and QUANTITATIVE ANALYSIS LAB (**)</td>
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</tr>
<tr>
<td>HIST 1000</td>
<td>WORLD HISTORY TO 1500 (or Minor/2nd Major course ***)</td>
<td>3</td>
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</table>

Social Science 3

Humanities and Fine Arts 3

*CHEM 2250: Requires CHEM 1190-1194.

**CHEM 2400: Requires CHEM 1190-1194. Must take CHEM 2404 concurrently.

***CAS Requirement

**Total Credits** 14

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CHEM 2260 &amp; CHEM 2274</td>
<td>ORGANIC CHEMISTRY II and ORGANIC CHEMISTRY LABORATORY (*)</td>
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</tr>
<tr>
<td>CHEM 2500</td>
<td>INTRODUCTION TO INORGANIC CHEMISTRY (**)</td>
<td>3</td>
</tr>
<tr>
<td>HIST 1010</td>
<td>WORLD HISTORY SINCE 1500 (or Minor/2nd Major Course**)</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 1110 or PHYS 2110</td>
<td>GENERAL PHYSICS I (**) or GENERAL PHYSICS I - CALCULUS LEVEL</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1154</td>
<td>GENERAL PHYSICS LABORATORY I</td>
<td>1</td>
</tr>
</tbody>
</table>

*CHEM 2260: Requires CHEM 2250 within the last calendar year. Must take CHEM 2274 concurrently.

**CHEM 2500: Requires CHEM 1190.

***CAS Requirement

**Total Credits** 16

**Junior**

**Fall**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 4650 &amp; CHEM 4654</td>
<td>BIOCHEMISTRY I and BIOCHEMISTRY I LABORATORY (*)</td>
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<tr>
<td>PHYS 1120 or PHYS 2120</td>
<td>GENERAL PHYSICS II (**) or GENERAL PHYSICS-CALCULUS LEVEL</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1164</td>
<td>GENERAL PHYSICS LABORATORY II</td>
<td>1</td>
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</table>

Humanities and Fine Arts ***3

Social Science / US Diversity 3

*CHEM 4650: Requires CHEM 2260-2274 and either CHEM 2400 or BIOL 3020, all with a C- or better. CHEM 4654 must be taken concurrently.

**PHYS 1120: Requires PHYS 1110. PHYS 2120 requires PHYS 2110 and MATH 1960. PHYS 1120/2120 & 1164 are part of the BS Cognate.

***Humanities/Fine Arts course must come from 2nd discipline.

**Total Credits** 15
### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 1450</td>
<td>BIOLOGY I</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 3710</td>
<td>ESSENTIALS OF MEDICINAL CHEMISTRY (*)</td>
<td>3</td>
</tr>
<tr>
<td>NSCI 3940</td>
<td>WRITING IN CHEMISTRY (**)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Additional Chemistry Lecture***</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>Additional Chemistry Lab***</td>
<td>1</td>
</tr>
</tbody>
</table>

*CHEM 3710: Requires ENGL 1160 and CHEM 2260+2274.
**NSCI 3940: Requires ENGL 1160, and CHEM 2400 or 2500.
***Must take one additional lecture and additional lab related to Organic Chemistry or CHEM 4660+4664 or CHEM 4250. See UNO catalog for options.

### Credits

14-15

### Senior

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 2140</td>
<td>GENETICS (*)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 3350 &amp; CHEM 3354</td>
<td>PHYSICAL CHEMISTRY I and PHYSICAL CHEMISTRY I LABORATORY (**)</td>
<td>4</td>
</tr>
<tr>
<td>Social Science***</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Additional Humanities and Fine Arts or Minor/2nd Major Course*</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*BIOL 2140: Requires BIOL 1450, 1750, and CHEM 1180. BIOL 1750 is waived for Chemistry majors.
**CHEM 3350: Requires CHEM 2260+2274, 2400+2404, PHYS 2120 or 1120, and MATH 1960.
***Social Science course must be in a 2nd discipline.
*CAS Requirement: Humanities/Fine Arts Course must be in a 3rd discipline.

### Credits

14

### Spring

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Notes</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Advanced Chemistry Elective*</td>
<td>See Catalog for options.</td>
<td>4</td>
</tr>
<tr>
<td>Additional Social Science or Minor/2nd Major Course**</td>
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<td></td>
</tr>
<tr>
<td>Elective or Minor/2nd Major Course***</td>
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<td></td>
</tr>
<tr>
<td>Elective or Minor/2nd Major Course***</td>
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<td></td>
</tr>
<tr>
<td>Elective Course***</td>
<td></td>
<td>3</td>
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</table>

*Must take 4 credit hours of Advanced Chemistry Electives. **CAS Requirement: Social Science Course must be in a 3rd discipline. ***Students need a minimum of 120 credits to graduate. Electives, minors, or a 2nd major may be used to reach this minimum.

### Credits

16

### Total Credits

120-121

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**Placement Exams:** For Math, English, Foreign Language, a placement exam may be required. More information on these exams can be found at [https://www.unomaha.edu/enrollment-management/testing-center/placement-exams/information.php](https://www.unomaha.edu/enrollment-management/testing-center/placement-exams/information.php)

**GPA Requirements:** 2.0

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This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

This plan is not a contract and curriculum is subject to change.

**Additional Information About this Plan:**

**University Degree Requirements:** The minimum number of hours for a UNO undergraduate degree is 120 credit hours. Please review the requirements for your specific program to determine all requirements for the program. In order to graduate on-time (four years for an undergraduate degree), you need to take 30 hours each year.