BIOINFORMATICS, BACHELOR OF SCIENCE (COLLEGE OF ARTS AND SCIENCES)

To obtain a BS in Bioinformatics, a student must fulfill university, college, and departmental requirements. Bioinformatics is an interdisciplinary major and, as such, satisfies the college requirement for breadth. Other hour requirements follow:

- 46 hours of University General Education courses –Most commonly, Bioinformatics majors do not complete 46 hours of coursework solely for the purpose of meeting University General Education requirements. Instead, they often do the following:
  - Test out of at least three hours of fundamental academic skills,
  - Take courses that meet both the six hours of diversity requirements and six hours of distribution requirements,
  - Meet the seven-hour natural sciences distribution requirement through completing major courses.
In such cases, the number of credit hours taken solely to meet General Education requirements is reduced to 30 or fewer.

- 77-79 hours of major courses
- 0-13 hours of electives

TOTAL HOURS: 120

Double Majors
For a double major in Bioinformatics and Biology or Bioinformatics and Molecular and Biomedical Biology, beyond BIOL 1450, BIOL 1750, BIOL 2140, and BIOL 3020, no other biology courses may count for both majors.

Major and Minors
For a Bioinformatics major and a Biology or Molecular and Biomedical Biology minor, beyond BIOL 1450, BIOL 1750, BIOL 2140, and BIOL 3020, no other biology courses may count for both major and minor.

Requirements
The Bachelor of Science in bioinformatics degree requires a minimum of 120 credit hours for its completion. Required courses are below.

The required courses are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOI 1000</td>
<td>INTRODUCTION TO BIOINFORMATICS</td>
<td>3</td>
</tr>
<tr>
<td>BIOI 2000</td>
<td>FOUNDATIONS OF BIOINFORMATICS</td>
<td>3</td>
</tr>
<tr>
<td>BIOI 3000</td>
<td>APPLIED BIOINFORMATICS</td>
<td>3</td>
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<tr>
<td>BIOI 3500</td>
<td>ADVANCED BIOINFORMATICS PROGRAMMING</td>
<td>3</td>
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<tr>
<td>BIOI 4860</td>
<td>BIOINFORMATICS ALGORITHMS</td>
<td>3</td>
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<tr>
<td>BIOI 4870</td>
<td>DATABASE SEARCH AND PATTERN DISCOVERY IN BIOINFORMATICS</td>
<td>3</td>
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<tr>
<td>BIOL 1450</td>
<td>BIOLOGY I</td>
<td>5</td>
</tr>
<tr>
<td>BIOL 1750</td>
<td>BIOLOGY II</td>
<td>5</td>
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<tr>
<td>BIOL 2140</td>
<td>GENETICS</td>
<td>4</td>
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<tr>
<td>BIOL 3020</td>
<td>MOLECULAR BIOLOGY OF THE CELL</td>
<td>3</td>
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<tr>
<td>BIOL 4130</td>
<td>MOLECULAR GENETICS</td>
<td>4</td>
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</table>

or BIOL 4140 CELLULAR BIOLOGY

CHEM 1140 FUNDAMENTALS OF COLLEGE CHEMISTRY
& CHEM 1144 and FUNDAMENTALS OF COLLEGE CHEMISTRY LABORATORY

CHEM 2210 & CHEM 2214 FUNDAMENTALS OF ORGANIC CHEMISTRY and FUNDAMENTALS OF ORGANIC CHEMISTRY LABORATORY

CHEM 3650 & CHEM 3654 FUNDAMENTALS OF BIOCHEMISTRY and FUNDAMENTALS OF BIOCHEMISTRY LABORATORY

CIST 1400 INTRODUCTION TO COMPUTER SCIENCE I
CSCI 1620 INTRODUCTION TO COMPUTER SCIENCE II
CIST 2500 INTRODUCTION TO APPLIED STATISTICS FOR IS&T
CIST 3110 INFORMATION TECHNOLOGY ETHICS
CSCI 3320 DATA STRUCTURES
MATH 1950 CALCULUS I (***)
MATH 2030 or CSCI 2030 DISCRETE MATHEMATICS
MATH 1950 or CSCI 2030 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

TOTAL CREDITS: 77-79

1 Students may substitute the pre-medicine sequence of Chemistry for the fundamentals track of Chemistry outlined in this major.

Freshman

Fall | Credits
--- | ---
ENGL 1150 | ENGLISH COMPOSITION I (’) 3
BIOI 1000 | INTRODUCTION TO BIOINFORMATICS 3
CIST 1300 or CSCI 1200 | INTRODUCTION TO WEB DEVELOPMENT (**) or COMPUTER SCIENCE PRINCIPLES 3
MATH 1950 | CALCULUS I (****) 5

*ENGL 1150: Requires appropriate English placement.

**CIST 1300 and CSCI 1200: either one requires MATH 1120 or MATH 1130 or MATH 1220 or MATH 1300 (or equivalent) with C- or better.

****MATH 1950: Requires appropriate placement.

Spring

ENGL 1160 | ENGLISH COMPOSITION II (’) 3
CMST 1110 or CMST 2120 | PUBLIC SPEAKING FUNDS or ARGUMENTATION AND DEBATE 3
MATH 2030 | DISCRETE MATHEMATICS (**) 3
CIST 1400 | INTRODUCTION TO COMPUTER SCIENCE I (****) 3
BIOI 2000 | FOUNDATIONS OF BIOINFORMATICS (**) 3

*ENGL 1160: Requires ENGL 1150 or appropriate English placement.

**MATH 2030: Requires MATH 1950.

****CIST 1400: Requires MATH 1320 or higher and CIST 1300, CSCI 1200, or CSCI 1280.
2  Bioinformatics, Bachelor of Science (College of Arts and Sciences)

# BIOI 2000: Requires BIOI 1000 or BIOL 1450.

## Credits 15

### Sophomore

#### Fall

- **BIOL 1450** BIOLOGY (***)
- **Humanties/Fine Arts + Global Diversity**
- **BIOL 3000** APPLIED BIOINFORMATICS (***)
- **CSCI 1620** INTRODUCTION TO COMPUTER SCIENCE II (***)

*BIOI 1450: Requires high school biology.

**BIOI 3000: Requires BIOI 2000 and CIST 1400.

***CSCI 1620: Requires CIST 1400 with grade of C or better and MATH 1930 or MATH 1950 with grade of C- or better.

## Credits 14

### Spring

- **CHEM 1140** FUNDAMENTALS OF COLLEGE CHEMISTRY and FUNDAMENTALS OF COLLEGE CHEMISTRY LABORATORY (**)
- **BIOL 1750** BIOLOGY II (**)
- **BIOL 3500** ADVANCED BIOINFORMATICS PROGRAMMING (***)
- **CSCI 3320** DATA STRUCTURES (*)

*CHEM 1140: Requires MATH 1220 or MATH 1300 or higher or appropriate ACT/SAT/Math Placement Exam. Must take CHEM 1144 concurrently.

**BIOL 1750: Requires BIOI 1450.

***BIOL 3500: Requires BIOI 3000 and CSCI 1620. CSCI 3320 is strongly recommended but not required.

#CSCI 3320: Requires CSCI 1620 with a grade of C or better and CSCI 2030, MATH 2030, or MATH 2230 with a grade of C- or better.

## Credits 16

### Senior

#### Fall

- **BIOI 4130** MOLECULAR GENETICS (**)
- **PHYS 1050** INTRODUCTION TO PHYSICS and INTRODUCTION TO PHYSICS LABORATORY (**)
- **CIST 2500** INTRODUCTION TO APPLIED STATISTICS FOR IS&T (***)

*BIOL 4130 or 4140: Requires BIOI 2140, BIOI 3500, and CHEM 2210 or CHEM 2214 or CHEM 2260 & CHEM 2274.

**PHYS 1050: Requires high school algebra.

***CIST 2500: Requires MATH 1220 or MATH 1300 or higher.

## Credits 15

### Spring

- **BIOI 4560** BIOINFORMATICS INTERNSHIP (*)
- **CIST 3110** INFORMATION TECHNOLOGY ETHICS (**)

Social Sciences**

*Elective (BIOI 4760 suggested)

*Elective (BIOI 4890 suggested)

*Elective if needed*

*BIOL 4560: Requires BIOI 2140, BIOI 3500, and permission of instructor.

**CIST 3110: Counts as a Humanities/Fine Arts and required major course.

**SSS: Must be in a 2nd discipline.

#Students must have a minimum of 120 credits to graduate with no less than 27 credits of 3000/4000 level coursework throughout the entire degree. Electives may be needed to reach these minimums.

## Credits 15-17

### Total Credits 120-122

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 complete an undergraduate degree in four years, you need to take an average 30 credit hours each year.

**Placement Exams:** For Math, English, and 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

**Please note:** Transfer credit or placement exam scores may change suggested plan of study

**GPA Requirements:** 2.0