

# Biochemistry and Molecular Biology

## Biochemistry and Molecular Biology Major

The Biochemistry and Molecular Biology major is designed to give students a detailed understanding of the chemistry of living matter. Careers exist in medical, pharmaceutical, food processing, and agricultural laboratories. Graduates also will have excellent preparation for graduate school or schools of medicine, dentistry, veterinary science, and business.

## Biochemistry Minor

A minor in Biochemistry also is available. Contact the department (<http://www.ndsu.edu/chemistry>) for details.

## Major Requirements

### Major: Biochemistry & Molecular Biology

Degree Type: B.A. or B.S.

Required Degree Credits to Graduate: 122

### General Education Requirements

#### First Year Experience (F):

|          |   |   |
|----------|---|---|
| UNIV 189 | Skills For Academic Success (Students transferring in 24 or more credits do not need to take UNIV 189.) | 1 |
|----------|---|---|

#### Communication (C):

|             |                                      |   |
|-------------|--------------------------------------|---|
| ENGL 110    | College Composition I                | 3 |
| ENGL 120    | College Composition II               | 3 |
| ENGL 321    | Writing in the Technical Professions | 3 |
| or ENGL 324 | Writing in the Sciences              |   |
| COMM 110    | Fundamentals of Public Speaking      | 3 |

#### Quantitative Reasoning (R):

|          |            |   |
|----------|------------|---|
| MATH 165 | Calculus I | 4 |
|----------|------------|---|

#### Science & Technology (S):

|                 |  |   |
|-----------------|--|---|
| PHYS 251 & 251L | University Physics I and University Physics I Laboratory   | 5 |
| PHYS 252 & 252L | University Physics II and University Physics II Laboratory | 5 |

**Humanities & Fine Arts (A): Select from current general education list** 6

**Social & Behavioral Sciences (B): Select from current general education list** 6

**Wellness (W): Select from current general education list** 2

**Cultural Diversity (D): Select from current general education list**

**Global Perspectives (G): Select from current general education list**

Total Credits 41

## College Requirements

**Bachelor of Science (BS) Degree** – An additional 6 credits in Humanities or Social Sciences\*

**Bachelor of Arts (BA) Degree** – An additional 12 credits Humanities and Social Sciences\* and proficiency at the second year level in a modern foreign language.

\* Humanities and Social Sciences may be fulfilled by any course having the following prefix: ADHM, ANTH, ARCH, ART, CJ, CLAS, COMM, ECON, ENGL, FREN, GEOG, GERM, HDFS, HIST, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WGS, or any course from the approved list of general education courses in humanities and social sciences (general education categories A and B). These credits must come from outside the department of the student's major.

## Major Requirements

|   |  |   |
|---|--|---|
| <b>General Education Requirements</b>               | 40   |   |
| <b>Science and Mathematics College Requirements</b> | 6-12   |   |
| <b>Biochem &amp; Molecular Biology Requirements</b> |  |   |
| BIOC 460  | Foundations of Biochemistry and Molecular Biology I                  | 3 |
| BIOC 460L   | Foundations of Biochemistry I Laboratory                             | 1 |
| BIOC 461  | Foundations of Biochemistry and Molecular Biology II                 | 3 |
| BIOC 465  | Principles of Physical Chemistry and Biophysics*                     | 4 |
| BIOC 473  | Methods of Biochemical Research                                      | 3 |
| BIOC 474  | Methods of Recombinant DNA Technology                                | 3 |
| BIOC 483  | Cellular Signal Transduction Processes and Metabolic Regulations     | 3 |
| BIOC 487  | Molecular Biology of Gene Expression                                 | 3 |
| BIOL 150 & 150L                                     | General Biology I and General Biology I Laboratory                   | 4 |
| Select one of the following:                        | 4  |   |
| CHEM 150 & CHEM 160                                 | Principles of Chemistry I and Principles of Chemistry Laboratory I   |   |
| CHEM 121 & 121L                                     | General Chemistry I and General Chemistry I Laboratory               |   |
| Select one of the following:                        | 4  |   |
| CHEM 151 & CHEM 161                                 | Principles of Chemistry II and Principles of Chemistry Laboratory II |   |
| CHEM 122 & 122L                                     | General Chemistry II and General Chemistry II Laboratory             |   |
| CHEM 341  | Organic Chemistry I  | 3 |
| CHEM 342  | Organic Chemistry II   | 3 |
| CHEM 353  | Majors Organic Chemistry Laboratory I                                | 1 |
| CHEM 354  | Majors Organic Chemistry Laboratory II                               | 2 |
| CHEM 380  | Chemistry Junior Seminar   | 1 |
| CHEM 431  | Analytical Chemistry I   | 3 |
| CHEM 491  | Seminar  | 2 |
| MATH 166  | Calculus II  | 4 |
| MICR 350 & 350L                                     | General Microbiology and General Microbiology Lab                    | 5 |
| STAT 330  | Introductory Statistics  | 3 |

|  |          |         |
|--|----------|---------|
| ZOO 315  | Genetics | 3       |
| <b>Upper-Level Science Electives</b>   |          |         |
| 300-400 level courses in BIOL, BIOC, BOT, ZOO, CHEM, CSCI, MICR, PSCI, PHYS, PPTH, or STAT. No more than 6 credits from one prefix may apply. Research credits (CHEM 494/BIOC 494) may count towards 3 of these credits. |          | 9       |
| <b>Degree Requirements: 1 credit to reach 122</b>  |          | 1       |
| <hr/> Total Credits  |          | 122-128 |

\* CHEM 364 Physical Chemistry I & CHEM 365 Physical Chemistry II will satisfy this requirement and 2 credits of upper-level science electives.

### Degree Notes:

- Except for courses offered only as pass/fail grading, no course may be taken Pass/Fail.

## Minor Requirements

### Biochemistry Minor

#### Minor Requirements

Required Credits: 16

#### Required Courses

|   |    |
|---|----|
| All minor courses must be selected in consultation with a Biochemistry adviser. | 16 |
| <hr/> Total Credits   | 16 |

### Minor Requirements and Notes

- A minimum of 8 credits must be taken at NDSU.
- The student and adviser will complete a substitution form with the courses to be used for the biochemistry minor. This form will also require the signature of the department chairperson before being submitted to the Office of Registration and Records for verification of minor program completion.
- Note: This minor will not be available for view in the Student Advisement/Requirement Report in Campus Connection.