# BIOCHEMISTRY B.S.

The Biochemistry Program is a joint program between the Department of Chemistry and Biochemistry and the Division of Biological Sciences. Biochemistry is an interdisciplinary science that integrates chemistry and biology to understand the molecular basis of life. The program offers a B.S. in Biochemistry and M.S. and Ph.D. degrees in Biochemistry & Biophysics.

Undergraduate majors receive a solid foundation in both chemistry and biology. Biochemistry courses are usually taken in the junior year allowing majors to become involved in research with faculty and to take electives in their senior year. The major also introduces students to computer science, an essential tool in modern biochemistry. The B.S. in Biochemistry prepares students for advanced degrees in biochemistry or biophysics, for medical, dental or veterinary schools and for careers in the pharmaceutical and biotechnology industries. A Health Professions option is also offered within the B.S. in Biochemistry for students whose career goals are in fields related to biochemistry. This option allows more flexibility in upper division electives, permitting students to tailor the degree to their needs.

The graduate degrees in Biochemistry & Biophysics prepare students to be independent researchers in academic laboratories or in the biotechnology and pharmaceutical industries. Through coursework and independent research, graduate students in this program will become adept at the physical and structural methods necessary to probe important problems in the life sciences at the molecular level. In collaboration with the Center for Biomolecular Structure & Dynamics, the Biochemistry Program provides state-of-the-art facilities for research in biochemistry, biophysics and structural biology.

Prospective students desiring further information on these degrees should contact the Program Director by visiting the Biochemistry Program web site: http://hs.umt.edu/biochemistry/

## High School Preparation
In addition to the general University admission requirements, it is strongly recommended that a student take four years of mathematics, four years of science, and a foreign language.

## Bachelor of Science - Biochemistry

### College Humanities & Sciences

- **Degree Specific Credits**: 96
- **Required Cumulative GPA**: 2.0
- **Catalog Year**: 2017-2018

### General Education Requirements

Information regarding these requirements can be found in the General Education Section (http://catalog.umt.edu/academics/general-education-requirements) of the catalog.

### Summary

<table>
<thead>
<tr>
<th>Lower Division Core</th>
<th>54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td></td>
</tr>
<tr>
<td>General and Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td></td>
</tr>
</tbody>
</table>

### Mathematics

- Computer Science

### Upper Division Core

- Biochemistry
- Biology
- Analytical Chemistry
- Inorganic Chemistry
- Physical Chemistry

### Advanced Electives

- 13

### Total Hours

- 96

### Lower Division Core

**Rule**: Must complete the following subcategories

- **54 Total Credits Required**

#### Biochemistry

- **Rule**: All of the following courses are required

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCH 110</td>
<td>Intro Biology for Biochemists</td>
<td>3</td>
</tr>
<tr>
<td>BCH 111</td>
<td>Intro Biol for Biochemists Lab</td>
<td>1</td>
</tr>
<tr>
<td>BCP 294</td>
<td>Seminar/Workshop</td>
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</table>

| Total Hours | 5 |

#### Biology

**Rule**: All of the following courses are required

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOB 260</td>
<td>Cellular and Molecular Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIOB 272</td>
<td>Genetics and Evolution</td>
<td>4</td>
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</table>

| Total Hours | 8 |

#### General and Organic Chemistry

**Rule**: All of the following courses are required

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHMY 141N</td>
<td>College Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHMY 142N</td>
<td>College Chemistry I Lab</td>
<td>1</td>
</tr>
<tr>
<td>CHMY 143N</td>
<td>College Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHMY 144N</td>
<td>College Chemistry II Lab</td>
<td>1</td>
</tr>
<tr>
<td>CHMY 221</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHMY 222</td>
<td>Organic Chemistry I Lab</td>
<td>2</td>
</tr>
<tr>
<td>CHMY 223</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHMY 224</td>
<td>Organic Chemistry II Lab</td>
<td>2</td>
</tr>
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</table>

| Total Hours | 20 |

#### Physics

**Rule**: All of the following courses are required

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSX 215N</td>
<td>Fund of Physics w/Calc I</td>
<td>4</td>
</tr>
<tr>
<td>PHSX 216N</td>
<td>Physics Laboratory I w/Calc</td>
<td>1</td>
</tr>
<tr>
<td>PHSX 217N</td>
<td>Fund of Physics w/Calc II</td>
<td>4</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Hours</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>PHSX 218N</td>
<td>Physics Laboratory II w/Calc</td>
<td>1</td>
</tr>
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<td></td>
<td>Total Hours</td>
<td>10</td>
</tr>
</tbody>
</table>

Minimum Required Grade: C-

**Mathematics**

**Rule:** All of the following courses are required

- M 171  Calculus I  4
- M 172  Calculus II  4

Total Hours: 8

Minimum Required Grade: C-

**Computer Science**

**Rule:** The following course is required

- CSCI 250  Computer Mdlng/Science Majors  3

Total Hours: 3

Minimum Required Grade: C-

**Upper Division Core**

**Rule:** Must complete the following subcategories

- 29 Total Credits Required

**Biochemistry**

**Rule:** All of the following courses are required

- BCH 480  Advanced Biochemistry I  3
- BCH 482  Advanced Biochemistry II  3
- BCH 486  Biochemistry Research Lab  3

Total Hours: 9

Minimum Required Grade: C-

**Biology**

**Rule:** The following course is required

- BIOL 425  Adv Cell & Molecular Biology  3

Total Hours: 3

Minimum Required Grade: C-

**Analytical Chemistry**

**Rule:** All of the following courses are required

- CHMY 311  Analytical Chem-Quant Analysis  4
- CHMY 421  Advanced Instrument Analysis  4

Total Hours: 8

Minimum Required Grade: C-

**Inorganic Chemistry**

**Rule:** The following course is required

- CHMY 401  Advanced Inorganic Chemistry  3

Total Hours: 3

Minimum Required Grade: C-

**Physical Chemistry**

**Rule:** Choose 1 of the following courses

**Note:** Students planning to attend graduate school in biochemistry or biophysics are strongly advised to take the CHMY 373-CHMY 371 sequence

- CHMY 360  Applied Physical Chemistry  3-4
  or CHMY 373  Phys Chem-Kntcs & Thrmodynamcs

Total Hours: 3-4

Minimum Required Grade: C-

**Advanced Electives**

**Rule:** Choose 13 credits from the courses listed

**Note:** No more than 3 credits combined of BIOB 490, CHMY 490, CHMY 498 and BCH 490. No more than 3 credits combined of CHMY 397 and CHMY 494.

Select 13 credits from the following:

- BCH 490  Undergraduate Research
- BIOB 301  Developmental Biology
- BIOB 375  General Genetics
- BIOB 410  Immunology
- BIOB 411  Immunology Laboratory
- BIOB 440  Biological Electron Microscopy
- BIOB 486  Genomics
- BIOB 490  Adv Undergrad Research
- BIOH 365  Human AP I for Health Profns
- BIOH 370  Human AP II for Health Profns
- BIOH 405  Hematology
- BIOH 462  Principles Medical Physiology
- BIOM 360  General Microbiology
- BIOM 361  General Microbiology Lab
- BIOM 400  Medical Microbiology
- BIOM 410  Microbial Genetics
- BIOM 411  Exprmntl Microbial Genetcs Lab
- BIOM 427  General Parasitology
- BIOM 428  General Parasitology Lab
- BIOM 435  Virology
- CHMY 371  Phys Chem-Qntm Chm & Sptcrscopy
- CHMY 397  Teaching Chemistry
- CHMY 402  Advanced Inorganic Chem Lab
- CHMY 403  Descriptive Inorganic Chem
- CHMY 442  Aquatic Chemistry
- CHMY 465  Organic Spectroscopy
- CHMY 466  FT-NMR Optn for Undrgrd Rsrch
- CHMY 490  Undergraduate Research
- CHMY 494  Seminar/Workshop
- CHMY 498  Internship/Cooperative Educ
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 451</td>
<td>Computational Biology</td>
</tr>
<tr>
<td>PHAR 421</td>
<td>Medicinal Chem I</td>
</tr>
<tr>
<td>PHAR 422</td>
<td>Medicinal Chem II</td>
</tr>
</tbody>
</table>

Total Hours 13

Minimum Required Grade: C-