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, a B.S. in Computational Biochemistry, and M.S. and Ph.D. degrees in Biochemistry & Biophysics. The Biochemistry Program is accredited by the American Society for Biochemistry and Molecular Biology (ASBMB).

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.

Bachelor of Science - Biochemistry

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>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Lower-Division Core</td>
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<tr>
<td>Biochemistry</td>
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<tr>
<td>Biology</td>
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<tr>
<td>General and Organic Chemistry</td>
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<tr>
<td>Physics</td>
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<tr>
<td>Mathematics</td>
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<tr>
<td>Computer Science</td>
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<tr>
<td>Upper-Division Core</td>
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<tr>
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<tr>
<td>Analytical Chemistry</td>
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<tr>
<td>Inorganic Chemistry</td>
<td>3</td>
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<tr>
<td>Physical Chemistry</td>
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<td>Total Hours</td>
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Degree Specific Credits: 93

Required Cumulative GPA: 2.0

Lower-Division Core

Rule: Must complete the following subcategories. 54 total credits required.

Biochemistry

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Complete the following course:</td>
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<tr>
<td>BCH 294</td>
<td>Seminar/Workshop</td>
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Minimum Required Grade: C-

Biology

<table>
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<tr>
<th>Code</th>
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<th>Hours</th>
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<tr>
<td>Complete all of the following courses:</td>
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<tr>
<td>BIOB 160N</td>
<td>Principles of Living Systems</td>
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<td>BIOB 161N</td>
<td>Principles of Living Systems Lab</td>
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<td>BIOB 260</td>
<td>Cellular and Molecular Biology</td>
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<td>BIOB 272</td>
<td>Genetics and Evolution</td>
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Minimum Required Grade: C-

General and Organic Chemistry

<table>
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<th>Hours</th>
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<tbody>
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<td>Complete all of the following courses:</td>
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<tr>
<td>CHMY 141N&amp; CHMY 142N</td>
<td>College Chemistry I and College Chemistry I Lab</td>
<td>5</td>
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<tr>
<td>CHMY 143N&amp; CHMY 144N</td>
<td>College Chemistry II and College Chemistry II Lab</td>
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<td>CHMY 221 &amp; CHMY 222</td>
<td>Organic Chemistry I and Organic Chemistry I Lab</td>
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<tr>
<td>CHMY 223 &amp; CHMY 224</td>
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Minimum Required Grade: C-

Physics

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<th>Hours</th>
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<td>Complete all of the following courses:</td>
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<tr>
<td>PHSX 215N&amp; PHSX 216N</td>
<td>Fundamentals of Physics with Calculus I and Physics Laboratory I with Calculus</td>
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</tr>
<tr>
<td>PHSX 217N &amp; PHSX 218N</td>
<td>Fundamentals of Physics with Calculus II and Physics Laboratory II with Calculus</td>
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Minimum Required Grade: C-

Mathematics

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<tr>
<td>M 171</td>
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<tr>
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Minimum Required Grade: C-
## Computer Science

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<td>CSCI 150</td>
<td>Introduction to Computer Science</td>
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**Total Hours:** 3

Minimum Required Grade: C-

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## Biochemistry

**Upper Division Core**

**Rule:** Must complete the following subcategories. 27 total credits required.

### Biochemistry

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BCH 480</td>
<td>Advanced Biochemistry I</td>
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<td>BCH 482</td>
<td>Advanced Biochemistry II</td>
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<td>BCH 486</td>
<td>Biochemistry Research Lab</td>
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**Total Hours:** 9

Minimum Required Grade: C-

### Biology

<table>
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<tr>
<td>BIOB 425</td>
<td>Advanced Cellular &amp; Molecular Biology</td>
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**Total Hours:** 3

Minimum Required Grade: C-

### Analytical Chemistry

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<tr>
<td>CHMY 311</td>
<td>Analytical Chemistry-Quantitative Analysis</td>
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<tr>
<td>CHMY 421</td>
<td>Advanced Instrument Analysis</td>
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**Total Hours:** 8

Minimum Required Grade: C-

### Inorganic Chemistry

<table>
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<tr>
<td>CHMY 401</td>
<td>Advanced Inorganic Chemistry</td>
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**Total Hours:** 3

Minimum Required Grade: C-

### Physical Chemistry

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

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CHMY 373</td>
<td>Physical Chemistry-Kinetics &amp; Thermodynamics</td>
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**Total Hours:** 4

Minimum Required Grade: C-

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## Advanced Electives

**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.

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<th>Hours</th>
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<td>BCH 490</td>
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<td>BIOB 301</td>
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<td>BIOB 375</td>
<td>General Genetics</td>
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<tr>
<td>BIOB 410</td>
<td>Immunology</td>
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<td>BIOB 411</td>
<td>Immunology Laboratory</td>
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<td>BIOB 486</td>
<td>Genomics</td>
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<tr>
<td>BIOB 490</td>
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<td>BIOH 365</td>
<td>Human Anatomy and Physiology for Health Professions I</td>
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<td>BIOH 370</td>
<td>Human Anatomy and Physiology for Health Professions II</td>
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<td>BIOH 405</td>
<td>Hematology</td>
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<td>BIOH 462</td>
<td>Principles of Medical Physiology</td>
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<td>BIOM 360</td>
<td>General Microbiology</td>
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<td>General Microbiology Lab</td>
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<td>BIOM 410</td>
<td>Microbial Genetics</td>
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<td>BIOM 411</td>
<td>Experimental Microbial Genetics Lab</td>
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<td>BIOM 427</td>
<td>General Parasitology</td>
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<td>BIOM 435</td>
<td>Virology</td>
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<tr>
<td>CHMY 371</td>
<td>Physical Chemistry-Quantum Chemistry &amp; Spectroscopy</td>
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<td>CHMY 397</td>
<td>Teaching Chemistry</td>
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<td>CHMY 402</td>
<td>Advanced Inorganic Chemistry Lab</td>
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<td>CHMY 442</td>
<td>Aquatic Chemistry</td>
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<td>CHMY 465</td>
<td>Organic Spectroscopy</td>
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<td>CHMY 466</td>
<td>FT-NMR Option for Undergraduate Research</td>
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<td>CHMY 485</td>
<td>Laboratory Safety</td>
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<tr>
<td>CHMY 490</td>
<td>Undergraduate Research</td>
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<tr>
<td>CHMY 494</td>
<td>Seminar/Workshop</td>
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<tr>
<td>CHMY 498</td>
<td>Internship/Cooperative Education</td>
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<td>CSCI 451</td>
<td>Computational Biology</td>
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<td>PHAR 421</td>
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<td>PHAR 422</td>
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**Total Hours:** 12

Minimum Required Grade: C-

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## Advanced College Writing Requirement

**Rule:** To complete the Advanced College Writing Requirement, Biochemistry students may take the following courses or any other stand-alone advanced writing course.
<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BCH 482</td>
<td>Advanced Biochemistry II</td>
<td>3</td>
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<td>BCH 486</td>
<td>Biochemistry Research Lab</td>
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Minimum Required Grade: C-