

## Biochemistry

College of Science, Engineering and Technology  
Department of Chemistry & Geology  
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Chair: Mary Hadley

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Biochemistry is a discipline which encompasses both biology and chemistry. This rapidly expanding science focuses on the study of the molecular aspects of living organisms. The tools and concepts of biochemistry are important as a foundation for careers in many areas of research and in medicine. Students considering a BA or BS degree in biochemistry should consult a biochemistry advisor for specific information regarding the program. This major is appropriate for students in pre-professional programs such as pre-dental, pre-medical, and pre-pharmacy programs.

**Admission to Major.** Admission to a program is necessary before a student can enroll in 300- and 400-level courses. To be eligible for admission to the biochemistry program a student must have declared biochemistry as a first major, completed 32 credits, including BIOL 105 and BIOL 106 as well as CHEM 201 and CHEM 202 and achieved a minimum grade point average of 2.0. Students should also have an assigned biochemistry advisor with whom they have discussed the program. Applications for admission to the biochemistry program are available in the department office.

### POLICIES/INFORMATION

The first year of coursework for biochemistry majors should include two semesters of chemistry (CHEM 201, CHEM 202), MATH and at least one semester of Biology (BIOL 105). Organic Chemistry should be taken during the second year. **GPA Policy.** Students obtaining a major in biochemistry must maintain an overall GPA of 2.2 in all courses required for their selected program with no more than 4 credits of "D" work in chemistry or biochemistry courses.

Students must meet a residency requirement. This means that all students who wish to receive either the Biochemistry BA or the Biochemistry BS from Minnesota State Mankato must complete the biochemistry sequence which consists of CHEM 460, CHEM 461, CHEM 465 and CHEM 466 at Minnesota State Mankato. It is important that this sequence be taken during the third (junior) year for all majors.

Students who complete the requirements for the Biochemistry BS must submit a comprehensive research report in conjunction with completion of CHEM 498. Students are encouraged to contact Professors Rife and Salerno for details regarding the research report prior to enrolling in CHEM 498.

**P/N Grading Policy.** Courses leading to a major or minor in chemistry or biochemistry may not be taken on a P/N basis, except where P/N grading is mandatory.

The department is recognized by the American Chemical Society and offers a BS (Chemistry) major that is approved by that organization. The BS Biochemistry program follows the ASBMB recommended curriculum for a biochemistry and molecular biology undergraduate major. Anyone considering a biochemistry major should choose a biochemist as an advisor and consult that advisor often throughout the course of study.

## BIOCHEMISTRY BA

Degree completion = 120 credits

### Required General Education

BIOL	105	General Biology I (4)
CHEM	201	General Chemistry I (5)

### Major Common Core

BIOL	106	General Biology II (4)
BIOL	211	Genetics (4)
BIOL	270	Microbiology (4)
BIOL	479	Molecular Biology (4)
CHEM	202	General Chemistry II (5)
CHEM	305	Analytical Chemistry (4)
CHEM	322	Organic Chemistry I (4)
CHEM	324	Organic Chemistry II (3)
CHEM	325	Organic Chemistry II Lab (1)
CHEM	340	Quantitative Skills for Chemistry and Biochemistry I (1)
CHEM	460	Biochemistry I (3)
CHEM	461	Biochemistry II (3)
CHEM	465	Biochemical Techniques I (1)
CHEM	466	Biochemical Techniques II (2)
CHEM	474	Chromatography (2)

### Capstone

(choose 1 credit from either CHEM 494 or CHEM 495)		
CHEM	494	Biochemistry Capstone Experience (1)
CHEM	495	Senior Seminar (1)

### Major Restricted Electives

Upper Division Electives

Choose a minimum of 9 credits of upper division electives from either BIOL or CHEM courses. These electives must be approved by the Biochemistry Advisor. Courses used in the core cannot count as electives.

BIOL 300 - BIOL 499
CHEM 300 - CHEM 499

### Other Graduation Requirements

Choose at least 2 additional upper division credits to meet graduation requirements.

**Required for Bachelor of Arts (BA) degree ONLY:** Language (8 credits)

**Required Minor: None.**

## BIOCHEMISTRY BS

### Required General Education

BIOL	105	General Biology I (4)
CHEM	201	General Chemistry I (5)

### MATH courses (choose 7-8 credits)

Choose 2 of the following courses. Note that GE-4 requires 1 course so the remaining credits may be considered restricted elective credits.

MATH	121	Calculus I (4)
MATH	122	Calculus II (4)
STAT	154	Elementary Statistics (3)

**Major Common Core**

BIOL	106	General Biology II (4)
BIOL	211	Genetics (4)
BIOL	270	Microbiology (4)
BIOL	479	Molecular Biology (4)
CHEM	202	General Chemistry II (5)
CHEM	305	Analytical Chemistry (4)
CHEM	322	Organic Chemistry I (4)
CHEM	324	Organic Chemistry II (3)
CHEM	325	Organic Chemistry II Laboratory (1)
CHEM	340	Quantitative Skills for Chemistry and Biochemistry I (1)
CHEM	341	Quantitative Skills for Chemistry and Biochemistry II (1)
CHEM	440	Physical Chemistry I (3)
CHEM	450	Physical Chemistry Laboratory I (1)
CHEM	460	Biochemistry I (3)
CHEM	461	Biochemistry II (3)
CHEM	465	Biochemical Techniques I (1)
CHEM	466	Biochemical Techniques II (2)
CHEM	474	Chromatography (2)
CHEM	494	Biochemistry Capstone Experience (1)
(2 credits of CHEM 498 are required for the major core)		
CHEM	498	Undergraduate Research (1-6)

**Major Restricted Electives**

## Upper Division Electives

Choose a minimum of 7 credits from upper division Biology and Chemistry courses with approval from a Biochemistry advisor. Courses used in the core cannot count as electives.

BIOL	300 - BIOL	499
CHEM	300 - BIOL	499

PHYS

(choose 8 credits from either the Principles of Physics sequence or the General Physics courses noted below)

PHYS	211	Principles of Physics I (4)
PHYS	212	Principles of Physics II (4)
PHYS	221	General Physics I (4)
PHYS	223	General Physics III (3)
PHYS	233	General Physics III Laboratory (1)

**Required Minor: None.**