

Biochemistry B.A. or B.S.

Biochemistry B.A. Major

The B.A. Biochemistry major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

This program provides experience in most basic areas of chemistry, with a focus on biochemistry. With appropriate choice of university electives, the B.A. Biochemistry major meets the needs of pre-medical students and students preparing for additional study in related areas such as pharmacology, medicinal chemistry, clinical chemistry, and toxicology. It is also suitable for students who wish to combine a chemistry major with a major in another discipline.

Required

| | | |
|--|--|-------|
| Mathematics: | | |
| MATH 1420 | Calculus I * | 4 |
| Biology: | | |
| BIOL 2052 | General Biology: Cell Structure and Function | 4 |
| BIOL 3140 | Genetics ** | 4 |
| Chemistry and Biochemistry: | | |
| CHEM 1110 & CHEM 1120 or CHEM 1130 | General Chemistry I and General Chemistry II (*) General Chemistry I-II | 5-8 |
| CHEM 1610 | Careers In Chemistry | 1 |
| CHEM 2010 | Chemical Safety Seminar | 1 |
| CHEM 2110 | Descriptive Inorganic Chemistry | 4-5 |
| or CHEM 2320 & CHEM 2330 | Chemical Analysis and Chemical Analysis Laboratory | |
| CHEM 2210 | Organic Chemistry I | 3 |
| CHEM 2220 | Organic Chemistry II | 3 |
| CHEM 2230 | Organic Chemistry Laboratory | 2 |
| CHEM 4420/5420 | Physical Chemistry I | 3 |
| CHEM 4510/5510 | Biochemistry I | 3 |
| CHEM 4520/5520 | Biochemistry II | 3 |
| CHEM 4530/5530 | Biochemistry Laboratory | 2 |
| Physics: | | |
| PHYSICS 1511 & PHYSICS 1512 or PHYSICS 1701 & PHYSICS 1702 | General Physics I and General Physics II Physics I for Science and Engineering and Physics II for Science and Engineering | 8 |
| Electives | | 3-4 |
| 3000-level or higher content course(s) in biology or chemistry | | |
| Total hours | | 53-58 |

* Has prerequisite of satisfactory score on ALEKS exam or subsequent remediation.

**BIOL 3140 has a prerequisite of BIOL 2051. BIOL 2051 is waived as a prerequisite for Biochemistry majors.

Biochemistry B.S. Major

The B.S. Biochemistry major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

The Bachelor of Science Biochemistry major is accredited by the American Chemical Society. This major prepares students for careers and/or advanced study in biochemistry. It also provides partial preparation appropriate for medical school and other health-related programs.

Required

| | | |
|---------------------------------------|--|-----|
| Mathematics: | | |
| MATH 1420 | Calculus I * | 4 |
| MATH 1421 | Calculus II | 4 |
| Biology: | | |
| BIOL 2052 | General Biology: Cell Structure and Function | 4 |
| BIOL 3140 | Genetics *** | 4 |
| Chemistry and Biochemistry: | | |
| CHEM 1110 & CHEM 1120 or CHEM 1130 | General Chemistry I and General Chemistry II (*) General Chemistry I-II | 5-8 |
| CHEM 1610 | Careers In Chemistry | 1 |
| CHEM 2010 | Chemical Safety Seminar | 1 |
| CHEM 2110 | Descriptive Inorganic Chemistry | 4 |
| CHEM 2210 | Organic Chemistry I | 3 |
| CHEM 2220 | Organic Chemistry II | 3 |
| CHEM 2230 | Organic Chemistry Laboratory | 2 |
| CHEM 2320 | Chemical Analysis | 3 |
| CHEM 2330 | Chemical Analysis Laboratory | 2 |
| CHEM 3600 | Undergraduate Research in Chemistry @ | 2 |
| CHEM 4220/5220 or CHEM 4310/5310 | Organic Structure Analysis Instrumental Analysis | 3 |
| CHEM 4420/5420 | Physical Chemistry I | 3 |
| CHEM 4430/5430 | Physical Chemistry II | 3 |
| CHEM 4440/5440 | Physical Chemistry Laboratory | 2 |
| CHEM 4510/5510 | Biochemistry I | 3 |
| CHEM 4520/5520 | Biochemistry II | 3 |
| CHEM 4530/5530 | Biochemistry Laboratory | 2 |
| Physics: | | |
| Select one of the following: | | |
| PHYSICS 1511 & PHYSICS 1512 | General Physics I and General Physics II | 8 |
| OR | | |

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| | | |
|--|--|-------|
| PHYSICS 1701 & PHYSICS 1702 | Physics I for Science and Engineering and Physics II for Science and Engineering | |
| Electives | | 3-4 |
| 3000-level or higher content course(s) in biology or chemistry | | |
| Total hours | | 72-75 |

* Has prerequisite of satisfactory score on ALEKS exam or subsequent remediation.

**BIOL 3140 has a prerequisite of BIOL 2051. BIOL 2051 is waived as a prerequisite for Biochemistry majors.

@This course meets the Bachelor of Science degree undergraduate research course requirement.

Notes:

1. The elective course should be chosen with the help of the major advisor. This is particularly important for students wishing to earn a certified degree, to assure consistency with the certification guidelines of the American Chemical Society. An appropriate advanced course in another science may be substituted with department head approval.
2. To satisfy American Chemical Society guidelines for certification of the Biochemistry major, the two hours of CHEM 3600 Undergraduate Research required for this program must include completion of a final written report.

Four-Year Plan

Biochemistry, B.A.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

| Course | Title | Hour |
|---|---|-----------|
| Freshman | | |
| Fall | | |
| MATH 1140 | Precalculus | 4 |
| BIOL 2052 | General Biology: Cell Structure and Function | 4 |
| CHEM 1110 | General Chemistry I | 4 |
| UNIFI/General Education or University Electives | | 3 |
| Hours | | 15 |
| Spring | | |
| CHEM 1120 | General Chemistry II | 4 |
| MATH 1420 | Calculus I | 4 |
| UNIFI/General Education or University Electives | | 6 |
| Hours | | 14 |
| Sophomore | | |
| Fall | | |
| CHEM 2110 | Descriptive Inorganic Chemistry (OR CHEM 2320 AND 2330) | 4 |
| CHEM 2210 | Organic Chemistry I | 3 |
| PHYSICS 1511 | General Physics I | 4 |

| | | |
|---|------------------------------|------------|
| UNIFI/General Education or University Electives | | 3 |
| Hours | | 14 |
| Spring | | |
| CHEM 2010 | Chemical Safety Seminar | 1 |
| CHEM 2220 | Organic Chemistry II | 3 |
| CHEM 2230 | Organic Chemistry Laboratory | 2 |
| PHYSICS 1512 | General Physics II | 4 |
| BIOL 3140 | Genetics | 4 |
| UNIFI/General Education or University Electives | | 3 |
| Hours | | 17 |
| Junior | | |
| Fall | | |
| CHEM 4420/5420 | Physical Chemistry I | 3 |
| CHEM 4510/5510 | Biochemistry I | 3 |
| UNIFI/General Education or University Electives | | 9 |
| Hours | | 15 |
| Spring | | |
| CHEM 4520/5520 | Biochemistry II | 3 |
| CHEM 4530/5530 | Biochemistry Laboratory | 2 |
| UNIFI/General Education or University Electives | | 10 |
| Hours | | 15 |
| Senior | | |
| Fall | | |
| BIOL or CHEM 3000/4000 Elective | | 3 |
| UNIFI/General Education or University Electives | | 12 |
| Hours | | 15 |
| Spring | | |
| UNIFI/General Education or University Electives | | 15 |
| Hours | | 15 |
| Total Hours | | 120 |

Biochemistry, B.S.

This is a sample plan of study with a suggested sequencing of classes for the major. University electives may be applied to earn additional academic majors, minors, or certificates. Students should regularly meet with their academic advisor to plan their specific semester schedule to include UNIFI/General Education program and/or university elective hours required.

| Course | Title | Hour |
|---|--|-----------|
| Freshman | | |
| Fall | | |
| CHEM 1110 | General Chemistry I | 4 |
| MATH 1420 | Calculus I | 4 |
| BIOL 2052 | General Biology: Cell Structure and Function | 4 |
| UNIFI/General Education or University Electives | | 3 |
| Hours | | 15 |
| Spring | | |
| CHEM 1120 | General Chemistry II | 4 |
| MATH 1421 | Calculus II | 4 |
| UNIFI/General Education or University Electives | | 6 |
| Hours | | 14 |
| Sophomore | | |
| Fall | | |
| CHEM 2210 | Organic Chemistry I | 3 |
| CHEM 2320 | Chemical Analysis | 3 |
| CHEM 2330 | Chemical Analysis Laboratory | 2 |
| PHYSICS 1701 | Physics I for Science and Engineering | 4 |

| | | |
|---|--|------------|
| UNIFI/General Education or University Electives | | 3 |
| Hours | | 15 |
| Spring | | |
| CHEM 2010 | Chemical Safety Seminar | 1 |
| CHEM 2220 | Organic Chemistry II | 3 |
| CHEM 2230 | Organic Chemistry Laboratory | 2 |
| PHYSICS 1702 | Physics II for Science and Engineering | 4 |
| BIOL 3140 | Genetics | 4 |
| UNIFI/General Education or University Electives | | 3 |
| Hours | | 17 |
| Junior | | |
| Fall | | |
| CHEM 2110 | Descriptive Inorganic Chemistry | 4 |
| CHEM 4420/5420 | Physical Chemistry I | 3 |
| CHEM 4510/5510 | Biochemistry I | 3 |
| UNIFI/General Education or University Electives | | 5 |
| Hours | | 15 |
| Spring | | |
| CHEM 4430/5430 | Physical Chemistry II | 3 |
| CHEM 4520/5520 | Biochemistry II | 3 |
| CHEM 4530/5530 | Biochemistry Laboratory | 2 |
| UNIFI/General Education or University Electives | | 6 |
| Hours | | 14 |
| Senior | | |
| Fall | | |
| CHEM 4310/5310 | Instrumental Analysis | 3 |
| CHEM 3600 | Undergraduate Research in Chemistry | 1 |
| Biol OR Chem 3000/4000 Level Elective | | 3 |
| UNIFI/General Education or University Electives | | 8 |
| Hours | | 15 |
| Spring | | |
| CHEM 3600 | Undergraduate Research in Chemistry | 1 |
| CHEM 4440/5440 | Physical Chemistry Laboratory | 2 |
| UNIFI/General Education or University Electives | | 12 |
| Hours | | 15 |
| Total Hours | | 120 |

Learning Outcomes

Biochemistry, B.A.

University Goal: Communication

- **Program Goal 1:** Students will be able to effectively communicate chemical information to colleagues and the public.
 - **Outcome 1:** Students will be able to prepare and produce scientific written communications using standard chemistry style and format.

University Goal: Content Knowledge

- **Program Goal 2:** Students will apply chemical knowledge.
 - **Outcome 2:** Students will demonstrate proficient knowledge and application of chemistry content.

University Goal: Critical Thinking

- **Program Goal 3:** Students will be able to think critically about chemistry.

- **Outcome 3:** Students will be able to plan the collection of the data needed to test a hypothesis in chemistry.
- **Program Goal 4:** Students will demonstrate the skills needed to successfully conduct experiments and analyze data.
 - **Outcome 4:** Students will conduct experimental measurements and evaluate the accuracy and reliability of data.

Biochemistry, B.S.

University Goal: Communication

- **Program Goal 1:** Students will be able to effectively communicate chemical information to colleagues and the public.
 - **Outcome 1:** Students will be able to prepare and produce scientific written communications using standard chemistry style and format.
 - **Outcome 2:** Students will be able to prepare and deliver an oral presentation on chemical topics.

University Goal: Content Knowledge

- **Program Goal 2:** Students will apply chemical knowledge.
 - **Outcome 3:** Students will demonstrate proficient knowledge and application of chemistry content.

University Goal: Critical Thinking

- **Program Goal 3:** Students will be able to think critically about chemistry.
 - **Outcome 4:** Students will be able to plan the collection of the data needed to test a hypothesis in chemistry.
- **Program Goal 4:** Students will demonstrate the skills needed to successfully conduct experiments and analyze data.
 - **Outcome 5:** Students will conduct experimental measurements and evaluate the accuracy and reliability of data.

Policies

1. Students considering a baccalaureate chemistry major should complete two semesters of general chemistry, CHEM 1110 and CHEM 1120, in the freshman year. Well-prepared students may be permitted to take CHEM 1130, an accelerated course in general chemistry, during their first semester. It is strongly recommended that chemistry majors complete requirements in mathematics and physics within the first two years.
2. Prior to enrollment in a chemistry course, all pre-requisite courses must be completed with a grade of C- or higher.
3. A student enrolled in a chemistry course during fall or spring semester and who wishes to enroll in the same course in the subsequent spring or fall semester should contact the department. The student will be allowed to register only if space remains after all advance registrations are completed.
4. A student cannot declare a Chemistry minor if they are pursuing any B.A. or B.S. major in the Department of Chemistry and Biochemistry. Two majors cannot be earned within the department except for the combination of the B.A. Chemistry Teaching major and either the B.S. Chemistry or the B.S. Biochemistry major.

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Related Programs

- Physics B.A.
- Physics B.S.