

PROFESSIONAL BIOCHEMISTRY CURRICULUM (BCHP)

The professional biochemistry curriculum prepares students for graduate study or a research career in biochemistry. The program includes a group minor composed of the required courses in biology, mathematics and physics. No other minor is needed to meet graduation requirements.

General Education Requirements 34 hours

Area I Symbolics and Communication

1. See page 23
2. See page 23
3. See page 23
4. MATH120 Calculus I*
5. See page 23

Area II Science and Technology

1. CHEM121/122 General Chemistry with lab*
2. BIOL110 Introductory Biology I*
3. PHY223 Mechanics and Sound*

Area III Social Sciences

1. See page 24
2. See page 24
3. See page 24
4. See page 24

Area IV Arts and Humanities

1. See page 25
2. See page 25
3. See page 25
4. See page 25

Physical Education/Graduation Requirement 2 hours

Major Requirements 79 hours

Required Courses 72 hours

- *CHEM121/122 General Chemistry I with lab (4 hrs)
- CHEM123/124 General Chemistry II with lab (4 hrs)
- CHEM281 Quantitative Analysis (4 hrs)
- CHEM371 Organic Chemistry I (3 hrs)
- CHEM372 Organic Chemistry II (3 hrs)
- CHEM373 Organic Chemistry Laboratory (2 hrs)
- CHEM451 Biochemistry I (3 hrs)
- CHEM452 Biochemistry II (3 hrs)
- CHEM453 Biochemistry Laboratory (2 hrs)
- CHEM461 Chemical Thermodynamics and Kinetics (3 hrs)
- CHEM463 Physical Chemistry Laboratory (2 hrs)
- CHEM465 Quantum and Statistical Mechanics (3 hrs)
- *BIOL110 Introductory Biology (5 hrs)
- †BIOL301 Genetics (3 hrs)
- *MATH120 Calculus I (4 hrs)
- MATH121 Calculus II (4 hrs)
- MATH122 Elementary Linear Algebra (3 hrs)
- MATH223 Multivariable Calculus (4 hrs)
- MATH325 Differential Equations (3 hrs)
- *PHY223 Mechanics and Sound (5 hrs)
- PHY224 Electricity and Light (5 hrs)

Elective Courses 7 hours

Four hours from the following:

- CHEM411 Toxicology I (2 hrs)
- CHEM412 Toxicology II (2 hrs)
- CHEM413 Toxicology Laboratory (2 hrs)
- CHEM414 Regulatory Toxicology (2 hrs)
- CHEM433 Inorganic-Organic Synthesis Laboratory (2 hrs)
- CHEM475 Introduction to Polymer Chemistry (3 hrs)
- CHEM477/478/479 Special Topics (1/2/3 hrs)
- CHEM481 Instrumental Analysis (4 hrs)
- CHEM485 Introduction to Radiotracer Techniques (2 hrs)
- CHEM487/488/489 Cooperative Education in Chemistry (1/2/3 hrs)
- CHEM497/498/499 Undergraduate Research in Chemistry (1/2/3 hrs)

- CHEM553 Enzymology (2 hrs)
- CHEM555 Neurochemistry (3 hrs)
- CHEM572 Spectrometric Organic Structure Determination (4 hrs)

†Three hours from any courses in biology 300-level or above.

Minor Requirements 0 hours
No minor is required.

University Elective Courses 9 hours

Program Total 124 hours

Note:

*This course satisfies both a general education and a major requirement.

†Completion of BIOL110, or equivalent coursework, is required for biochemistry students to obtain biology departmental permission for 300- and 400-level biology courses.

GENERAL BIOCHEMISTRY CURRICULUM (BCHG)

This curriculum is designed for students with an interest in biochemistry but who require a less extensive background than that presented in the professional biochemistry curriculum. It is often selected by students in premedical and predoctoral programs.

The program includes a group minor composed of the required courses in biology, mathematics and physics. No other minor is needed to meet graduation requirements.

General Education Requirements 34 hours

Area I Symbolics and Communication

1. See page 23
2. See page 23
3. See page 23
4. MATH120 Calculus I*
5. See page 23

Area II Science and Technology

1. CHEM121/122 General Chemistry I with Lab*
2. BIOL110 Introductory Biology I*
3. One course from the following:
*PHY221 Mechanics, Sound and Heat
*PHY223 Mechanics and Sound

Area III Social Sciences

1. See page 24
2. See page 24
3. See page 24
4. See page 24

Area IV Arts and Humanities

1. See page 25
2. See page 25
3. See page 25
4. See page 25

Physical Education/Graduation Requirement 2 hours

Major Requirements 55 hours

Required Courses 50 hours

- *CHEM121/122 General Chemistry I with lab (4 hrs)
- CHEM123/124 General Chemistry II with lab (4 hrs)
- †CHEM270/271 Survey of Organic Chemistry with lab (5 hrs)
- CHEM281 Quantitative Analysis (4 hrs)
- CHEM361 Fundamentals of Physical Chemistry (3 hrs)
- CHEM381 Instrumentation for Chemical Technology (2 hrs)
- CHEM451 Biochemistry I (3 hrs)
- CHEM452 Biochemistry II (3 hrs)
- CHEM453 Biochemistry Laboratory (2 hrs)
- *BIOL110 Introductory Biology (5 hrs)

- ‡BIOL301 Genetics (3 hrs)
- *MATH120 Calculus I (4 hrs)
- One course from the following:*
 - *PHY221 Mechanics and Sound (4 hrs)
 - *PHY223 Mechanics and Sound (5 hrs)
- One course from the following:*
 - PHY222 Electricity and Light (4 hrs)
 - PHY224 Electricity and Light (5 hrs)

Elective Courses 5 hours
 ‡Five credits from any biology courses 300-level or above.

Minor Requirements 0 hours
 No minor is required.

University Elective Courses 33 hours

Program Total 124 hours

Note:
 *This course satisfies both a general education and a major requirement.
 †Premedicine and predentistry students should substitute CHEM371, CHEM372, CHEM373 Organic Chemistry I-II with lab to satisfy the requirements for organic chemistry of most medical and dental schools.
 ‡Completion of BIOL110, or equivalent coursework, is required for Biochemistry students to obtain Biology departmental permission for 300- and 400-level biology courses.

GENERAL CHEMISTRY MAJOR (CHM)

The general chemistry major is for students who seek a general cultural education with emphasis on chemistry, who are preparing for careers in health fields such as medicine or dentistry, or who are interested in a career combining chemistry with fields such as business, patent law, technical writing or industrial health and safety. Students planning to pursue a career as a professional chemist or who are interested in graduate training in chemistry should elect the professional chemistry curriculum.

General Education Requirements 45 hours

Area I Symbolics and Communication

1. See page 23
2. See page 23
3. See page 23
4. MATH120 Calculus I (4 hrs)
5. See page 23

Area II Science and Technology

1. CHEM121/122 General Chemistry with Lab*
2. See page 24
3. *One course from the following:*
 - PHY221 Mechanics, Sound and Heat (4 hrs)
 - PHY223 Mechanics and Sound (5 hrs)

Area III Social Sciences

1. See page 24
2. See page 24
3. See page 24
4. See page 24

Area IV Arts and Humanities

1. See page 25
2. See page 25
3. See page 25
4. See page 25

Additional Requirements 4-5 hours

One course from the following:

- PHY222 Electricity and Light (4 hrs)
- PHY224 Electricity and Light (5 hrs)

Physical Education/Graduation Requirement 2 hours

Major Requirements 30 hours
Required Courses 25 hours

- *CHEM121/122 General Chemistry I with lab (4 hrs)
- CHEM123/124 General Chemistry II with lab (4 hrs)
- CHEM281 Quantitative Analysis (4 hrs)
- CHEM361 Fundamentals of Physical Chemistry (3 hrs)
- CHEM371 Organic Chemistry I (3 hrs)
- CHEM372 Organic Chemistry II (3 hrs)
- CHEM373 Organic Chemistry Laboratory (2 hrs)
- CHEM381 Instrumentation for Chemical Technology (2 hrs)

Elective Courses 5 hours

Five hours from 300- and 400-level courses in chemistry.

Minor Requirements 20 hours

University Elective Courses 23 hours

Program Total 124 hours

Note:
 *This course satisfies both a general education and a major requirement.

CHEMISTRY MAJOR (CHMT) Secondary Teacher Certification

Successful completion of this course of studies, in the context of other program requirements, qualifies the student for recommendation for certification for the Michigan Department of Education Secondary Provisional Certificate endorsed in chemistry, certification code DC, and, depending on the minor selected, an additional endorsement. This program of studies meets all requirements of the National Science Teachers Association. The Michigan Test for Teacher Certification (MTTC) covering this field is #18, "Chemistry."

General Education Requirements 47 hours

Area I Symbolics and Communication

1. See page 23
2. See page 23
3. See page 23
4. MATH120 Calculus I (4 hrs)
5. See page 23

Area II Science and Technology

1. CHEM121/122 General Chemistry with Lab*
2. See page 24
3. *One course from the following:*
 - PHY221 Mechanics, Sound and Heat (4 hrs)
 - PHY223 Mechanics and Sound (5 hrs)

Area III Social Sciences

1. See page 24
2. See page 24
3. See page 24
4. See page 24

Area IV Arts and Humanities

1. See page 25
2. See page 25
3. See page 25
4. See page 25

Additional Requirements 4-5 hours

One course from the following:

- PHY222 Electricity and Light (4 hrs)
- PHY224 Electricity and Light (5 hrs)

Physical Education/Graduation Requirement 2 hours

Major Requirements 32 hours
Required Courses 29-30 hours

- *CHEM121/122 General Chemistry I with lab (4 hrs)
- CHEM123/124 General Chemistry II with lab (4 hrs)