BIOCHEMISTRY

Fall 2017

Graduation Requirements:
- *A minimum 2.0 average in all biology courses required for this major*
- *A minimum of 32 credits at or above the 300-level completed at a Purdue campus*
- *At least one 500-level Biology course other than BIOL 54200*
- *120 Total Credits*

BIOLOGY:

1. BIOL 12100 Biology I: Diversity, Ecology and Behavior (2 cr.; fall)
2. BIOL 13100 Biology II: Development, Structure, and Function of Organisms (3 cr.; spring)
3. BIOL 13500 1st Year Biology Lab (2 cr.; both) **or**
   BIOL 14501 1st Year Biology Lab w/Neuro Research Project (2 cr.; fall) **or**
   BIOL 19500 Year I Bio Lab: Disease Ecology (2 cr.; alternate fall) **or**
   IT 22600 Biotechnology Lab (2 cr.; fall)
4. BIOL 23100 Biology III: Cell Structure and Function (3 cr.; fall)
5. BIOL 23200 Laboratory in Biology III: Cell Structure and Function (2 cr.; fall)
6. BIOL 24100 Biology IV: Genetics and Molecular Biology (3 cr.; spring)
7. BIOL 24200 Laboratory in Genetics and Molecular Biology (2 cr.; spring)
8. BIOL 28600 Intro. to Ecology & Evolution (2 cr.; spring)

9. **Intermediate Requirement:** Choose one of these eight options:
   (Biochemistry majors must choose BIOL 39500, Macromolecules)
   - A. BIOL 32800 Principles of Physiology (4 cr.; spring)
   - B. BIOL 36700 Principles of Development (2 cr.; spring) plus BIOL 36701 Principles of Development Laboratory (1 cr.; spring)
   - **C. BIOL 39500 Macromolecules (3 cr.; fall)**
   - D. BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)
   - E. BIOL 41600 Viruses & Viral Diseases (3 cr.; spring)
   - F. BIOL 42000 Eukaryotic Cell Biology (3 cr.; fall)
   - G. BIOL 43600 Neurobiology (3 cr.; fall)
   - H. BIOL 43800 General Microbiology (3 cr.; fall)

10. BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)
11. BIOL 42000 Eukaryotic Cell Biology (3 cr.; fall)
12. BIOL 59500 Methods & Measurement in Biophysical Chemistry (3 cr.; fall)

13. **Biology Selective**: One of these courses:
    - A. BIOL 41600 Viruses and Viral Diseases (3 cr.; spring)
    - B. BIOL 43800 General Microbiology (3 cr.; fall)
    - C. BIOL 47800[1] Intro to Bioinformatics (3 cr.; fall)
    - D. BIOL 48100 Eukaryotic Genetics (3 cr.; spring)
    - E. BIOL 51700 Molecular Biology of Proteins (2 cr.; alternate spring)
    - F. BIOL 52900 Bacterial Physiology (3 cr.; spring)
    - G. BIOL 53700 Immunology (3 cr.; spring)
    - H. BIOL 53800 Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)
    - I. BIOL 54100 Molecular Genetics of Bacteria (3 cr.; alternate fall)
    - J. BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
    - K. BIOL 59500 Epigenetics in Human Disease (3 cr.; fall)
    - L. BIOL 59500 Genetics & -Omics of Host-Microbe Interaction (3 cr.; alternate fall)
    - M. BIOL 59500 Intro. to X-Ray Crystallography (3 cr.; spring)
    - N. BIOL 59500 Theory of Molecular Methods (3 cr.; fall)

14. **Lab Requirement:** Must meet Base Lab requirement as described below
15. BCHM 56100 General Biochemistry I (3 cr.; fall)
16. BCHM 56200 General Biochemistry II (3 cr.; spring)

Base Laboratory Requirement for all Biology Majors

1. Each student will satisfy each of the following three learning objectives:
   Objective 1 – Research planning, literature review, and writing
   Objective 2 – Observation, experimentation
   Objective 3 – Analysis, simulation, and presentation

(continued on back)

[1] This course may count for the Biology Selective and as the College of Science Multidisciplinary requirement.

Other Biochemistry requirements and the extra requirements for the Biochemistry Honors Curriculum are on the back of this page.

2. Objectives may be met by taking courses according the following chart:

Courses	Title	Objective 1	Objective 2	Objective 3
BIOL 43900	Microbiology Lab	X	X	X
BIOL 44201	Protein Expression		X	X
BIOL 44202	Animal Physiology		X	X
BIOL 44205	LabView		X	X
BIOL 44207	Protein Structure		X	
BIOL 44211	Anatomy & Physiology		X	
BIOL 44212	Microscopy & Cell Bio		X	X
BIOL 44215	Physiology Measurements	X		X
BIOL 54200	Neurophysiology		X	X
BIOL 59100	Field Ecology	X	X	X
BIOL 59500	CryoEM 3D Reconstruction		X	X
BIOL 59500	Data Analysis in Neurosci			X
BIOL 59500	Ecological Statistics	X		X
BIOL 59500	Theory of Molecular Methods	X		X
BIOL 59500	Neural Mech in Hlth Disease	X		X

3. Students who successfully complete a Biology Honors Research Thesis have successfully met all three objectives.
4. Undergraduate Research may be used to meet these objectives. Student must get Research Mentor approval for each objective after that objective is completed. Student must also earn at least four credits of BIOL 49400 or 49900 research. Consult with your academic advisor for the forms used to obtain Research Mentor for each objective.
5. A combination of courses and research may be used to meet this requirement.

CHEMISTRY

1. **General Chemistry:**
   - A. CHM 12901 General Chemistry with a Biological Focus (5 cr.; fall)
2. **Organic Chemistry Selectives**: One of these two options:
   - A. CHM 25500 Organic Chemistry (3 cr.; both) and CHM 25501 Organic Chemistry Lab (1 cr.; both) and CHM 25600 Organic Chemistry (3 cr.; both) and CHM 25601 Organic Chemistry Lab (1 cr.; both)
   - B. CHM 26505 Organic Chemistry (3 cr.; fall) and CHM 26300 Organic Chemistry Lab (1 cr.; fall) and CHM 26605 Organic Chemistry (3 cr.; spring) and CHM 26400 Organic Chemistry Lab (1 cr.; spring)
3. **Analytical Chemistry Selective:** BCHM 22100 Analytical Biochemistry (3 cr.; both) or CHM 32100 Analytical Chemistry (4 cr.; spr.)
4. **Physical Chemistry Selective:** One of these two options:
   - A. CHM 37200 Physical Chemistry (4 cr.; spring)
   - B. CHM 37300 Physical Chemistry (3 cr.; fall) and CHM 37400 Physical Chemistry (3 cr.; spring)

MATH: For the Biochemistry Major, you must choose one of the following calculus sequences: MA 16100-16200 or MA 16500-16600.

PHYSICS Selectives: One of these two options:

1. PHYS 23300 Physics for Life Sciences (4 cr.; both) and PHYS 23400 Physics for Life Sciences (4 cr.; both)
2. PHYS 17200 Modern Mechanics (4 cr.; both) and one of the following two choices:
   - A. PHYS 27200 Electric and Magnetic Interactions (4 cr.; both) or
   - B. PHYS 24100 Electricity and Optics (3 cr.; both) and PHYS 24200 Intro to Heat and Thermal Physics (1 cr.; spring) and PHYS 25200 Electricity and Optics Laboratory (1 cr.; spring)

COLLEGE OF SCIENCE CORE REQUIREMENTS

Composition and Presentation; Teambuilding and Collaboration; Language and Culture; Great Issues; General Education; Multidisciplinary Experience; Mathematics; Statistics; Computing (see handout).

FREE ELECTIVES Approximately 0 - 10 credits

BIOCHEMISTRY HONORS CURRICULUM

A 3.0 or higher graduation index is required to graduate in the Biochemistry Honors Curriculum.

In addition to the requirements listed for the Biochemistry program, at least two of the following courses/course sequences must be completed when fulfilling other requirements:

1. CHM 32100 Analytical Chemistry (4 cr.; fall)
2. CHM 37300 Physical Chemistry (3 cr.; fall) and CHM 374 Physical Chemistry (4 cr.; spring)
3. PHYS 17200 Modern Mechanics (4 cr.; both) and one of the following two choices:
   - A. PHYS 27200 Electric and Magnetic Interactions (4 cr.; both) or
   - B. PHYS 24100 Electricity and Optics (3 cr.; both) and PHYS 25200 Electricity and Optics Laboratory (1 cr.; spring)