

NEUROBIOLOGY AND PHYSIOLOGY

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 Biology Selective:** Choose one of these eight options:
(Neurobiology and Physiology majors must choose BIOL 32800, Principles of Physiology)
 - A. BIOL 32800¹ 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. **Neurobiology & Physiology Selective:** Two of these seven courses²:
 - A. BIOL 43200³ Reproductive Physiology (3 cr.; alt fall)
 - B. BIOL 43600³ Neurobiology (3 cr.; fall)
 - C. BIOL 53800³ Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)
 - D. BIOL 55900³ Endocrinology (3 cr.; fall)
 - E. BIOL 56200^{3,5} Neural Systems (3 cr.; spring)
 - F. BIOL 59500³ Neural Mechanisms in Health & Disease (3 cr.; fall)
 - G. BIOL 59500³ Neurobiology of Learning & Memory (3 cr.; alternate fall)
11. **Chemistry Selective:** One of these five courses:
 - A. BCHM 56100 General Biochem (3 cr.; fall)
 - B. CHM 37200 Physical Chemistry (4 cr.; spring)
 - C. CHM 37300 Physical Chemistry (3 cr.; fall)
 - D. CHM 33900⁶ Biochemistry : A Molecular Approach (3 cr.; spring)
 - E. CHM 53300 Introductory Biochemistry (3 cr.; fall)
12. **Lab Requirement:** Must meet Base Lab requirement as described on the back of this page.
13. **Biology Selective:** Three credits of the following in addition to the above requirements²:

BIOL 30200 Human Anatomy & Physiology (3 cr.; spring)	BIOL 54100 Molecular Genetics of Bacteria (3 cr.; alternate fall)
BIOL 36700 Principles of Development (2 cr.; spring)	BIOL 54900 Microbial Ecology (2 cr.; alternate spring)
BIOL 36701 Lab in Principles of Development (1 cr.; spring)	BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)	BIOL 55900 ³ Endocrinology (3 cr.; fall)
BIOL 41600 Viruses and Viral Diseases (3 cr.; spring)	BIOL 56200 ^{3,5,7} Neural Systems (3 cr.; spring)
BIOL 42000 Eukaryotic Cell Biology (3 cr.; fall)	BIOL 56310 Protein Bioinformatics (2 cr.; alternate spring)
BIOL 43200 ³ Reproductive Physiology (3 cr.; alternate fall)	BIOL 58000 Evolution (3 cr.; spring)
BIOL 43600 ³ Intro. to Neurobiology (3 cr.; fall)	BIOL 58210 Ecological Statistics (3 cr.; fall)
BIOL 43800 General Microbiology (3 cr.; fall)	BIOL 58705 Animal Communication (3 cr.; alternate fall)
BIOL 43900 Microbiology Lab (2 cr.; fall)	BIOL 59100 Field Ecology (4 cr.; alternate fall)
BIOL 44400 Human Genetics (3 cr.; fall)	BIOL 59200 Evolution of Behavior (3 cr.; alternate spring)
BIOL 44600 Molecular Biology of Pathogens (3 cr.; alternate spring)	BIOL 59500 Cellular Biology of Plants (3 cr.; alternate fall)
BIOL 47800 ⁷ Intro to Bioinformatics (3 cr.; fall)	BIOL 59500 Disease Ecology (3 cr.; fall)
BIOL 48100 Eukaryotic Genetics (3 cr.; spring)	BIOL 59500 Ecology (3 cr.; fall)
BIOL 48300 ⁹ Environmental & Conservation Biology (3 cr.; alternate spring)	BIOL 59500 Epigenetics in Human Disease (3 cr.; fall)
BIOL 49500 Biological & Structural Aspects of Drug Design & Action (3 cr.; spring)	BIOL 59500 Genetics and -Omics of Host-Microbe Interactions (3 cr.; alternate fall)
BIOL 51600 Molecular Biology of Cancer (3 cr.; spring)	BIOL 59500 Intro. to X-Ray Crystallography (3 cr.; spring)
BIOL 51700 Molecular Biology: Proteins (2 cr.; alternate spring)	BIOL 59500 Methods & Measurement in Physical Biochemistry (3 cr.; fall)
BIOL 52900 Bacterial Physiology (3 cr.; spring)	BIOL 59500 ³ Neural Mechanisms in Health & Disease
BIOL 53300 Medical Microbiology (3 cr.; fall)	BIOL 59500 ³ Neurobiology of Learning & Memory (3 cr.; alternate fall)
BIOL 53700 Immunology (3 cr.; spring)	BIOL 59500 Sensory Ecology (3 cr.; alternate spring)
BIOL 53800 ³ Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)	BIOL 59500 Theory of Molecular Methods (3 cr.; fall)

(Footnotes and other requirements are on the back of this page)

Base Laboratory Requirement for all Biology Majors (recommended choices are **bolded**)

- 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

- Objectives may be met by taking courses according to 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 58210	Ecological Statistics	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	Theory of Molecular Methods	X		X
BIOL 59500	Neural Mech in Hlth Disease	X		X

- Students who successfully complete a Biology Honors Research Thesis have successfully met all three objectives.
- 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.
- A combination of courses and research may be used to meet this requirement.

CHEMISTRY1. **General Chemistry:**

- CHM 12901⁶ General Chemistry with a Biological Focus (5 cr.; fall)

2. **Organic Chemistry Selectives:** One of these two options:

- 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)
- 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)

PHYSICS Selectives: One of these two options:

- PHYS 23300 Physics for Life Sciences I (4 cr.; both) and PHYS 23400 Physics for Life Sciences II (4 cr.; both)
- PHYS 17200 Modern Mechanics (4 cr.; both) and one of the following two choices:
 - PHYS 27200 Electric and Magnetic Interactions (4 cr.; both) or
 - PHYS 24100 Electricity and Optics (3 cr.; both) and PHYS 25200 Electricity and Optics Laboratory (1 cr.; spring)

UNIVERSITY CORE and 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 14-26 credits

¹ This course may count as the Intermediate Biology Selective and as the College of Science Teambuilding and Collaboration requirement.

² A 500-level BIOL course must be taken as part of requirement #10 or #13.

³ A course chosen for requirement #10 may NOT be used for requirement #13.

⁴ (omitted)

⁵ This course may count for one of [a Neurobiology & Physiology Selective or as a Biology Selective] and as the College of Science Multidisciplinary requirement.

⁶ Students who select 12901 for General Chemistry must take CHM 33900 and 33901. Students who end up with Special Case approval for some other Gen Chem courses may choose the other Chem Selective options. Credit is not allowed for both BIOL 44201 and CHM 33901.

⁷ This course may count for a Biology Selective and as the College of Science Multidisciplinary requirement.

⁸ This course may count for the Biology Selective and as the College of Science Great Issues requirement.