

Departmental/Program Major Courses (36 credits) *A 2.0 average is required in these courses

***Required Major Courses (30 credits)**

- _____ (2) BIOL 12100 Biology I: Diversity, Ecology and Behavior (*satisfies Science, Technology & Society Selective for core*)
- _____ (3) BIOL 13100 Biology II: Development, Structure, and Function of Organisms
- _____ (2) BIOL 13500 First Year Biology Lab or BIOL 14501 First Yr Lab Neuro Res Project or IT 22600 Biotechnology Lab I
- _____ (3) BIOL 23100 Biology III: Cell Structure & Function
- _____ (2) BIOL 23200 Lab in Cell Structure & Function
- _____ (3) BIOL 24100 Biology IV: Genetics & Molecular Biology
- _____ (2) BIOL 24200 Lab in Genetics & Molecular Biology
- _____ (2) BIOL 28600 Intro to Ecology & Evolution
- _____ (3) BIOL 41600 Viruses & Viral Diseases
- _____ (3) BIOL 43800 General Microbiology
- _____ (2) BIOL 43900 Lab in General Microbiology (*meets Base Lab Requirement*)
- _____ (3) BIOL 52900 Bacterial Physiology

***Major Selectives - Select one course for each requirement (6 credits)**

- _____ (3) Microbiology Selective I (Req # 13)
- _____ (3) Microbiology Selective II (Req # 15)

Other Departmental /Program Course Requirements (64-76 credits)

- _____ (5) CHM 12901 General Chemistry
- _____ (4) Organic CHM 1 Selective
- _____ (4) Organic CHM 2 Selective
- _____ (3-4) Chemistry Selective
- _____ (4) PHYS 1 Selective – Select from PHYS 23300 or 17200 (*satisfies Science Selective for core*)
- _____ (4) PHYS 2 Selective – Select from PHYS 23400 or 27200
- _____ (3-5) Calculus 1 Selective – Select from MA 16010, 16100, or 16500 (*satisfies Quantitative Reasoning Selective for core*)
- _____ (3-5) Calculus 2 Selective– Select from MA 16020, 16200, 16600 or 17300
- _____ (3) STAT 50300
- _____ (3-4) Computer Science Selective
- _____ (3-4) ENGL 10600 or 10800 (*satisfies Written Communication for core*); (*satisfies Information Literacy Selective for core*)
- _____ (3) Language & Culture 1 Selective
- _____ (3) Language & Culture 2 Selective
- _____ (3) Language & Culture 3 Selective
- _____ (3) COM 21700 (*satisfies Oral Communication for core*)
- _____ (3) General Education 1 Selective _ (*satisfies Human Culture Behavioral/Social Science for core*)
- _____ (3) General Education 2 Selective __(*satisfies Human Cultures Humanities for core*)
- _____ (3) General Education 3 Selective
- _____ (0-3) Teambuilding & Collaboration Selective
- _____ (3) Great Issues Selective
- _____ (1-3) Multidisciplinary Selective

Electives (8-20 credits)

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| _____ () _____ | _____ () _____ | _____ () _____ | _____ () _____ |
| _____ () _____ | _____ () _____ | _____ () _____ | _____ () _____ |
| _____ () _____ | _____ () _____ | _____ () _____ | _____ () _____ |

University Core Requirements

- | | | | | | |
|--|--------------------------|-------|---|--------------------------|-------|
| Human Cultures Humanities | <input type="checkbox"/> | _____ | Science, Technology & Society Selective | <input type="checkbox"/> | _____ |
| Human Cultures Behavioral/Social Science | <input type="checkbox"/> | _____ | Written Communication | <input type="checkbox"/> | _____ |
| Information Literacy | <input type="checkbox"/> | _____ | Oral Communication | <input type="checkbox"/> | _____ |
| Science Selective | <input type="checkbox"/> | _____ | Quantitative Reasoning | <input type="checkbox"/> | _____ |
| Science Selective | <input type="checkbox"/> | _____ | | | |

The student is ultimately responsible for knowing and completing all degree requirements.

Microbiology

Suggested Arrangement of Courses:

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
2	BIOL 12100		3	BIOL 13100	
2	BIOL 13500	CHM 12901 coreq	4	Organic Chem 1 Selective	CHM 11600 or 12901
5	CHM 12901	ALEKS score of 85	3-5	Calculus II Selective	Calc I
3-5	Calculus I Selective		3	Language/Culture 2 Selective	Lang 10100
3	Language/Culture 1 Selective		3-4	ENGL 10600 or 10800	
1	Elective: (BIOL 11500 pref)				
16-18			16-19		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	BIOL 23100	CHM 12901 prereq; BIOL 13100	3	BIOL 24100	BIOL 23100
2	BIOL 23200		2	BIOL 24200	
4	Organic Chem 2 Selective	Organic I	3-4	Chemistry Selective	Organic II
3	Language/Culture 3 Selective	varies	2	BIOL 28600	BIOL 12100
3	COM 21700		1	Elective: (BIOL 29300 pref)	
			3	General Education 1 Selective	
15			14-15		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	BIOL 43800	varies	3	BIOL 41600	
2	BIOL 43900		3	BIOL 52900	
4	PHYS 1 Selective		4	PHYS 2 Selective	
3	General Education 2 Selective		1	Elective: (BIOL 39300 pref)	
3	Elective		3	General Education 3 Selective	
15			14		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
3	Microbiology Selective I		3	Microbiology Selective II (Req # 15)	varies
3-4	Computer Science Selective		3	STAT 50300	
1-3	Multidisciplinary Selective		3	Great Issues Selective	
4	Elective		3	Elective	
3	Elective		3	Elective	
14-17			15		

**120 semester credits required for Bachelor of Science degree.
2.0 Graduation GPA required for Bachelor of Science degree.**

The student is ultimately responsible for knowing and completing all degree requirements.

MICROBIOLOGY

Fall 2016

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) **or**
BIOL 19500 Biodiversity, Ecology & Evolution (3 cr.; fall)
2. BIOL 13100 Biology II: Development, Structure, and Function of Organisms (3 cr.; spring) **or**
BIOL 19500 Organismal Development & Physiology (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**
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:
(Microbiology majors must choose option H, BIOL 43800)
 - 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 41600 Viruses and Viral Diseases (3 cr.; spring)
11. **Base Lab Requirement:** BIOL 43900 Microbiology Lab (2 cr.; fall)
12. BIOL 52900 Bacterial Physiology (3 cr.; spring)
13. **Microbiology Selective I:** Choose one:
 - A. BIOL 54100¹ Molecular Genetics of Bacteria (3 cr.; fall) **or**
 - B. BIOL 59500¹ Genetics and –Omics of Host-Microbe Interactions (3 cr.; fall)
14. **Chemistry Selective:** One of these three courses:
 - A. BCHM 56100 General Biochem (3 cr.; fall)
 - B. CHM 33900² Biochemistry : A Molecular Approach (3 cr.; spring)
 - C. CHM 53300 Introductory Biochemistry (3 cr.; fall)
15. **Microbiology Selective II:** Three credits of the following:
 - BIOL 44600 Molecular Biology of Pathogens (3 cr.; spring)
 - BIOL 47800 Intro to Bioinformatics (3 cr.; fall)
 - BIOL 53300 Medical Microbiology (3 cr.; fall)
 - BIOL 54100¹ Molecular Genetics of Bacteria (3 cr.; fall)
 - BIOL 54900 Microbial Ecology (2 cr.; alternate spring) plus one credit of BIOL 442xx (1-2 cr.; both) or 54200 (1 cr.; fall) or CHM 33901² Biochemistry Laboratory (1 cr.; spring)
 - BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
 - BIOL 59500¹ Genetics and –Omics of Host-Microbe Interactions (3 cr.; fall)
 - BIOL 59500 Theory of Molecular Methods (3 cr.; fall)

Footnotes, additional requirements for the Microbiology major, and the additional requirements for the Microbiology Honors major continue on the back of this page.

Base Laboratory Requirement for all Biology Majors (Microbiology majors are required to take BIOL 43900 to satisfy this)

- 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:**

A. CHM 12901² 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)

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 14-21 credits

MICR, MICH 3/16

MICROBIOLOGY HONORS CURRICULUM

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

In addition to the requirements listed for the Microbiology program, the following two choices must be completed:

- 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)
- MA 26100 Multivariate Calculus (4 cr.; both)

and at least two of the following four choices must be completed:

- PHYS 17200 Modern Mechanics (4 cr.; both) and PHYS 27200 Electric and Magnetic Interactions (4 cr.; both)
- CHM 32100 Analytical Chemistry (4 cr.; fall)
- CHM 37200 Physical Chemistry (4 cr.; spring) or [CHM 37300 Physical Chemistry (3 cr.; fall) and CHM 37400 Physical Chemistry (4 cr.; spring)]
- MA 26200 Linear Algebra and Differential Equations (4 cr.; both)

¹ This course may count for requirement #13 or #15, but not both.

² 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.