PURDUE UNIVERSITY

Genetics
College of Science

BIOLOGY-BS
Code-GNTC
120 Credits

Departmental/Program Major Courses (34-37 credits) *A 2.0 average is required in these courses

***Required Major Courses (25-27 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
_____ (1) BIOL 44100 Senior Seminar in Genetics
_____ (3) BIOL 48100 Eukaryotic Genetics
_____ (2-4) **Base Lab Requirement**

***Intermediate Biology Selective - Select one; cannot also be used for Major Selectives below (3-4 credits)**

_____ (3-4) Intermediate Biology Selective (Req #9)

_____ ***Major Selectives - Select course for each requirement (6 credits)**
_____ (3) 500 Level Biology Selective (Req # 13)
_____ (3) Biology Selective (Req # 13)

_____ **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 (7-22 credits)

( ) _____ ____ ( ) _____ ____ ( ) _____ ____ ( ) _____

University Core Requirements

Human Cultures Humanities	☐ _____	*Science, Technology & Society Selective*	☐ _____
Human Cultures Behavioral/Social Science	☐ _____	*Written Communication*	☐ _____
Information Literacy	☐ _____	*Oral Communication*	☐ _____
Science Selective	☐ _____	*Quantitative Reasoning*	☐ _____
Science Selective	☐ _____		

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

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Revised 5/2016(effective Fall 2016)

Genetics

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 116 coreq; 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	Biology Selective (Req # 13)	varies	3	BOL 48100	
4	PHYS 1 Selective	varies	4	PHYS 2 Selective	
3	General Education 2 Selective		3-4	Computer Science Selective	
3	Elective		1	Elective: (BIOL 39300 pref)	
3	Elective		3	General Education 3 Selective	
16			**14-15**		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
3	Intermediate Biology Selective (Req #9)		3	500 Level Biology Selective (Req # 13)	varies
3	STAT 50300		2-4	Base Lab Requirement	
1-3	Multidisciplinary Selective		3	Great Issues Selective	
1	BIOL 44100		5	Elective	
4	Elective				
1	Elective				
13-17			**13-15**		

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

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

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Revised 5/2016(effective Fall 2016)

GENETICS

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 and Evolution (2 cr.; spring)

9. Intermediate Requirement: Choose one of these eight options:
   (Genetics majors may not use BIOL 43800, General Microbiology, to satisfy this requirement)
   - **A. BIOL 32800[1] 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 44100 Senior Seminar in Genetics (1 cr.; fall) **or** BIOL 49500, Current Topics in Non-coding RNA (1 cr.; spring)
11. BIOL 48100 Eukaryotic Genetics (3 cr.; spring)

12. **Chemistry Selective:** One of these three courses:
    a. BCHM 56100 General Biochemistry I (3 cr.; fall) or
    b. CHM 33900[2] Biochemistry: A Molecular Approach (3 cr.; Spring) or
    c. CHM 53300 Introductory Biochemistry (3 cr.; fall)

13. **Lab Requirement:** Must meet Base Lab requirement as described on the back of this page.

14. **Biology Selectives**: Six credits of the following. One of the two courses must be a 500 level Biology:

BIOL 43800 General Microbiology (3 cr.; fall)
BIOL 44400 Human Genetics (3 cr.; fall)
BIOL 47800[3] Intro to Bioinformatics (3 cr.; fall)
BIOL 51600 Molecular Biology of Cancer (3 cr.; spring)
BIOL 54100 Molecular Genetics of Bacteria (3 cr.; fall)
BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
BIOL 58000 Evolution (3 cr.; spring)
BIOL 59500 Epigenetics in Human Disease (3 cr.; fall)
BIOL 59500 Genetics and –Omics of Host-Microbe Interactions (3 cr.; fall)
BIOL 59500[4] Theory of Molecular Methods (3 cr.; fall)
AGRY 53000 Plant Genetics (3 cr.; fall)
ANSC 51100 Population Genetics (3 cr.; fall)

CHEMISTRY

1. **General Chemistry:**
   1. CHM 12901[2] General Chemistry with a Biological Focus (5 cr.; fall)

2. **Organic Chemistry Selectives**: One of these two options:
   1. 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)
   2. 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:
1. PHYS 23300 Physics for Life Sciences I (4 cr.; both) and PHYS 23400 Physics for Life Sciences II (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 25200 Electricity and Optics Laboratory (1 cr.; spring)

Footnotes and other requirements are on the back of this page.

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
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 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[4]	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.

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 13-23 credits

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

[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.

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

[4] This course may NOT count for a Biology Selective and toward the Base Laboratory Requirement. It can only be used for one requirement.