Health & Disease
BIOLOGY-BS
College of Science
Code-HLDS
120 Credits

Departmental/Program Major Courses (39 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 30100 Human Design: Anatomy & Physiology

(3) BIOL 30200 Human Design: Anatomy & Physiology

(3) BIOL 43800 General Microbiology

(2) Base Lab Requirement: BIOL 43900 Laboratory in General Microbiology

*Major Selectives - Select course for each requirement (must total at least 9 credits)

(3) Health & Disease Selective *(Req # 13)*

(2-3) Biology Selective *(Req # 14)*

(2-3) 500 Level Biology Selective *(Req # 14)*

(0-2) Biology Selective *(Req # 14)*

Other Departmental/Program Course Requirements (70-79 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

(3) Teambuilding & Collaboration Selective

(3) Great Issues Selective

(1-3) Multidisciplinary Selective

(3) Pre-professional Selective

Electives (2-11 credits)

University Core Requirements

Human Cultures Humanities

Human Cultures Behavioral/Social Science

Information Literacy

Science Selective

Science Selective

Science, Technology & Society Selective

Written Communication

Oral Communication

Quantitative Reasoning

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

Revised 5/2016 (effective Fall 2016)
# Health & Disease

## Suggested Arrangement of Courses:

<table>
<thead>
<tr>
<th>Credits</th>
<th>Fall 1st Year</th>
<th>Prerequisite</th>
<th>Credits</th>
<th>Spring 1st Year</th>
<th>Prerequisite</th>
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<tr>
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<td>BIOL 13100</td>
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<td>CHM 12901 coreq</td>
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<td>CHM 11600 or 12901</td>
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<td>ALEKS score of 85</td>
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<th>Spring 2nd Year</th>
<th>Prerequisite</th>
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<td>3</td>
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<td>CHM 116 coreq; BIOL 13100</td>
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<td>BIOL 24200</td>
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<td>14-15</td>
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<th>Spring 4th Year</th>
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<td>500 Level Biology Selective (Req # 14)</td>
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<td>BIOL 43900</td>
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<td>Health &amp; Disease Selective (Req # 13)</td>
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<td>STAT 50300</td>
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<td>1-3</td>
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<td>Pre-professional Selective</td>
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<td>13-15</td>
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<td>14-15</td>
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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.
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Revised 5/2016 (effective 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:
   (Health & Disease 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 30100 Human Anatomy & Physiology (3 cr.; fall)
11. BIOL 30200 Human Anatomy & Physiology (3 cr.; spring)
12. **Lab Requirement:** BIOL 43900 Lab in Microbiology (2 cr.; fall)
13. **Health & Disease Selective:** One of these three courses:
   A. BIOL 41600 Viruses & Viral Diseases (3 cr.; spring) **or**
   B. BIOL 53700 Immunology (3 cr.; spring) **or**
   C. BIOL 55900 Endocrinology (3 cr.; fall)

14. **Biology Selectives:** Six credits from the following:
   BIOL 32800 Principles of Physiology (4 cr.; spring)
   BIOL 36700 Principles of Development (2 cr.; spring)
   BIOL 36701 Lab in Principles of Development (1 cr.; spring)
   BIOL 39500 Macromolecules (3 cr.; fall)
   BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)
   BIOL 41600 Viruses & Viral Diseases (3 cr.; spring)
   BIOL 42000 Eukaryotic Cell Biology (3 cr.; fall)
   BIOL 42000 Reproductive Physiology (3 cr.; alternate fall)
   BIOL 43200 Reproductive Physiology (3 cr.; alternate fall)
   BIOL 43600 Neurobiology (3 cr.; fall)
   BIOL 442xx Modular Laboratory Courses (var titles) (1-2 cr.; both)
   BIOL 44400 Human Genetics (3 cr.; fall)
   BIOL 44600 Molecular Biology of Pathogens (3 cr.; spring)
   BIOL 47800 Intro to Bioinformatics (3 cr.; fall)
   BIOL 48100 Eukaryotic Genetics (3 cr.; spring)
   BIOL 48300 Environmental & Conservation Biology (3 cr.; alternate spring)
   BIOL 49500 Biological & Structural Aspects of Drug Design & Action (3 cr.; spring)
   BIOL 51100 Intro. to X-Ray Crystallography (3 cr.; spring)
   BIOL 51600 Molecular Biology of Cancer (3 cr.; spring)
   BIOL 51700 Molecular Biology: Proteins (2 cr.; spring)
   BIOL 52900 Bacterial Physiology (3 cr.; spring)
   BIOL 53300 Medical Microbiology (3 cr.; fall)
   BIOL 53700 Immunology (3 cr.; spring)
   BIOL 53800 Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)
   BIOL 54100 Molecular Genetics of Bacteria (3 cr.; fall)
   BIOL 54200 Neurophysiology Lab (1 cr.; fall)
   BIOL 54900 Microbial Ecology (2 cr.; alternate spring)
   BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
   BIOL 55900 Endocrinology (3 cr.; fall)
   BIOL 562004 Neural Systems (3 cr.; spring)
   BIOL 56310 Protein Bioinformatics (2 cr.; spring)
   BIOL 56800 Evolution (3 cr.; spring)
   BIOL 56820 Ecological Statistics (3 cr.; fall)
   BIOL 58500 Ecology (3 cr.; fall)
   BIOL 58705 Animal Communication (3 cr.; alternate fall)
   BIOL 59100 Field Ecology (4 cr.; alternate fall)
   BIOL 59200 Evolution of Behavior (3 cr.; alternate spring)
   BIOL 59500 Cellular Biology of Plants (3 cr.; alternate fall)
   BIOL 59500 Epigenetics in Human Disease (3 cr.; fall)
   BIOL 59500 Genetics & –Oomics of Host-Microbe Interaction (3 cr.; fall)
   BIOL 59500 Methods & Measurement in Physical Biochemistry (3 cr.; fall)
   BIOL 59500 Neural Mechanisms in Health & Disease (3 cr.; fall)
   BIOL 59500 Neurobiology of Learning and Memory (3 cr.; fall)
   BIOL 59500 Sensory Ecology (3 cr.; alternate spring)
   BIOL 59500 Theory of Molecular Methods (3 cr.; fall)
   BIOL 59500 Methods & Measurement in Physical Biochemistry (3 cr.; fall)
   BIOL 59500 Plant Physiology (4 cr.; fall)

Research (49400 or 49900, maximum of 3 credits) will count toward the Biology Selective requirement.

Footnotes and other requirements are on the back of this page.
Base Laboratory Requirement for all Biology Majors  (Health & Disease majors are required to take BIOL 43900 to satisfy this)

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:

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<tr>
<th>Courses</th>
<th>Title</th>
<th>Objective 1</th>
<th>Objective 2</th>
<th>Objective 3</th>
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<td>Microbiology Lab</td>
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<td>BIOL 44201</td>
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<td>BIOL 44202</td>
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<td>BIOL 44205</td>
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<td>BIOL 44207</td>
<td>Protein Structure</td>
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<td>BIOL 44211</td>
<td>Anatomy &amp; Physiology</td>
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<tr>
<td>BIOL 44212</td>
<td>Microscopy &amp; Cell Bio</td>
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<td>BIOL 58210</td>
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<td>BIOL 59500</td>
<td>Neural Mech in Hlth Disease</td>
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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. Chemistry Selectives: (must choose one of the following options)
   - A. Analytical Chemistry: BCHM 22100 Analytical Biochemistry (3 cr.; both) or CHM 32100 Analytical Chemistry I (4 cr.; fall)
   - B. Biochemistry: BCHM 56100 General Biochemistry I (3 cr.; both) or CHM 33900 Biochemistry: A Molecular Approach (3 cr.; spring) or CHM 53300 Introductory Biochemistry (3 cr.; fall)
     a. Physical Chemistry: CHM 37200 Physical Chemistry (4 cr.; spr) or CHM 37300 Physical Chemistry (3 cr.; fall)

**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)
   - B. PHYS 24100 Electricity and Optics (3 cr.; both) and PHYS 25200 Electricity and Optics Laboratory (1 cr.; spring)

**PRE-PROFESSIONAL SELECTIVE**

1. ANTH 21200 Culture, Food & Health (3 cr.; both)
2. ANTH 34000 Cultural Perspectives on Health (3 cr.; both)
3. ANTH 35200 Drugs, Culture & Society (3 cr.; spring)
4. HK 44000 Human Diseases and Disorders (3 cr.; both)
5. HK 44500 Epidemiology (3 cr.; both)
6. PHIL 27000 Biomedical Ethics (3 cr.; spring)
7. PHIL 28000 Ethics & Animals (3 cr.; fall)
8. SOC 37400 The Health of Americans (3 cr.; fall)
9. SOC 57200 Comparative Healthcare Systems (3 cr.; fall)
10. SOC 57300 Human Side of Medicine (3 cr.; fall)
11. SOC 57400 Social Organization of Healthcare (3 cr.; spring)
12. SOC 57600 Health and Aging in America (3 cr.; fall)

**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 7-18 credits

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1. A 500-level BIOL course other than BIOL 54200 must be taken as part of either requirement #13 or #14.
2. A course used to satisfy requirement #13 may not also count for requirement #14.
3. This course may count as a Biology Selective and as the College of Science Teambuilding and Collaboration requirement.
4. This course may count as a Biology Selective and as the College of Science Multidisciplinary requirement.
5. This course may count as a Biology Selective and as the College of Science Great Issues 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 not be used to satisfy the College of Science General Education or Language & Culture requirements.