Program Progression Guide

Disclaimer: The 2017-2018 Purdue West Lafayette catalog is considered the source for academic and programmatic requirements for students entering programs during the Fall 2017, Spring 2018, and Summer 2018 semesters. The Program Progression Guide assists students in the development of an individualized 8-semester plan. Students are encouraged to use this guide, myPurduePlan* (online degree auditing tool) and the Student Educational Planner (SEP) as they work with their academic advisor towards the completion of their degree requirements.

Notification: Each student is ultimately responsible for knowing, monitoring and completing all degree requirements.

An undergraduate degree in the College of Science requires completion of the following degree requirements.

<table>
<thead>
<tr>
<th>University Degree Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum 2.0 Cumulative GPA</td>
</tr>
<tr>
<td>Minimum 120 Credits that fulfill degree requirements</td>
</tr>
<tr>
<td>32 Residency Credits (30000 and above) at a Purdue University campus</td>
</tr>
</tbody>
</table>

University Core Curriculum**

- Human Cultures: Behavioral/Social Science
- Human Cultures: Humanities
- Information Literacy
- Oral Communication
- Quantitative Reasoning
- Science
- Science, Technology & Society Selective
- Written Communication

University Core Curriculum Course Listing

Required Major Program Courses

Minimum 2.0 cumulative GPA 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.

College of Science Core Curriculum

- Freshman Composition – 3 credits
- Technical Writing and Presentation - 3 credits
- Teaming & Collaboration (NC)
- General Education - 9 credits
- Foreign Language & Culture – 9 credits
- Great Issues - 3 credits
- Laboratory Science - 8 credits
- Mathematics - 6-10 credits
- Multidisciplinary - 3 credits
- Statistics - 3 credits
- Computing - 3 credits

Degree Electives

Any Purdue or transfer course approved to meet degree requirements in accordance with individual departmental policies. Consult the No Count course list for courses, which may not be used to meet any College of Science degree requirement.

* This audit is not your academic transcript and it is not official notification of completion of degree or certificate requirements.

** University Core Curriculum Outcomes may be met through completion of the College of Science Core curriculum. Students should consult with their academic advisors and myPurdue Plan for course selections.
**2017-18 Cell Molecular Development Biology Degree Progression Guide**

The Biology Department has suggested the following degree progression guide for the Cell Molecular Development Biology Degree. Students will work with their academic advisors to determine their best path to degree completion. Course prerequisites are specific to this degree plan.

<table>
<thead>
<tr>
<th>Credit</th>
<th>Fall 1st Year</th>
<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 1st Year</th>
<th>Prerequisite</th>
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<tbody>
<tr>
<td>2</td>
<td>BIOL 12100</td>
<td></td>
<td>3</td>
<td>BIOL 13100</td>
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<tr>
<td>2</td>
<td>BIOL 13500</td>
<td>CHM 12901 co-req</td>
<td>4</td>
<td>Organic Chem I Selective</td>
<td>CHM 11600 or 12901</td>
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<tr>
<td>5</td>
<td>CHM 12901</td>
<td>ALEKS 85</td>
<td>3-5</td>
<td>Calculus II Selective</td>
<td>Calculus I</td>
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<td>Lang 10100</td>
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<tr>
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<td>3-4</td>
<td>ENGL 10600 or 10800</td>
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<tr>
<td>1</td>
<td>Elective (BIOL 11500 pref)</td>
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<table>
<thead>
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<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 2nd Year</th>
<th>Prerequisite</th>
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<tr>
<td>3</td>
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<td>CHM 116 co-req; BIOL 13100</td>
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<td>BIOL 24100</td>
<td>BIOL 23100</td>
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<td>2</td>
<td>BIOL 23200</td>
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<td>2</td>
<td>BIOL 24200</td>
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<td>4</td>
<td>Organic Chem II Selective</td>
<td>Organic I</td>
<td>3-4</td>
<td>Chemistry Selective</td>
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<tr>
<td>3</td>
<td>Language/Culture III Selective</td>
<td>Varies</td>
<td>2</td>
<td>BIOL 28600</td>
<td>BIOL 12100</td>
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<tr>
<td>3</td>
<td>COM 21700</td>
<td></td>
<td>1</td>
<td>Free Elective (BIOL 29300 pref)</td>
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<td>3</td>
<td>General Education I Selective</td>
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<td>14-15</td>
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<table>
<thead>
<tr>
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<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 3rd Year</th>
<th>Prerequisite</th>
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<tr>
<td>3</td>
<td>Intermediate Requirement Selective</td>
<td>Varies</td>
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<td>Cell/Molecular/Developmental Selective</td>
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<td>PHYS 2 Selective</td>
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<td>Free Elective (BIOL 39300 pref)</td>
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<tr>
<td>3</td>
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<td>3</td>
<td>General Education III Selective</td>
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<td>1</td>
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<table>
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<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 4th Year</th>
<th>Prerequisite</th>
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<td>3</td>
<td>Cell/Molecular/Developmental Selective</td>
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<td>3</td>
<td>Biology Selective</td>
<td>Varies</td>
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<td>2-4</td>
<td>Base Lab Requirement</td>
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<td>500-Level Biology Selective</td>
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<td>Great Issues Selective</td>
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<td>1-3</td>
<td>Multidisciplinary Selective</td>
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<td>12-16</td>
<td></td>
<td></td>
<td>13</td>
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</table>

Courses in ( ) are recommended.

**College of Science Core Curriculum (SCC)**

A. Freshman Composition  
B. Technical Writing and Presentation  
C. Teamwork and Collaboration  
D. General Education  
E. Foreign Language and Culture  
F. Great Issues  
G. Laboratory Science  
H. Multidisciplinary  
I. Mathematics  
J. Statistics  
K. Computing

* Consult the University Core Requirement course list for approved courses.*
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 Biolog Lab (2 cr.; spring) or
BIOL 14501 1st Year Biolog 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 Biology Selective: Choose one of these eight options:
   (Cell, Molecular, and Developmental Biology majors must take BIOL 36700, 41500 or 42000 for this requirement.)
   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)

10. CMDB Selectives I: (choose two)
   A. BIOL 36700 Principles of Development (2 cr.; spring) plus BIOL 36701 Principles of Development Laboratory (1 cr.; spring)
   B. BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)
   C. BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)
   D. BIOL 41500 Intro. to Molecular Biology (3 cr.; spring)

11. Chemistry Selective One of these three courses:
   A. BCHM 56100 General Biochemistry I (3 cr.; fall)
   B. CHM 33900 Biochemistry: A Molecular Approach (3 cr.; spring)
   C. CHM 33900 Biochemistry: A Molecular Approach (3 cr.; spring)

12. Lab Requirement: Must meet base lab requirement as described on the back of this page.

13. CMDB Selective II: One of these six courses:
   A. BIOL 51600 Molecular Biology of Cancer (3 cr.; spring)
   B. BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
   C. BIOL 55900 Cellular Biology of Plants (3 cr.; alternate fall)
   D. BIOL 59500 Epigenetics in Human Disease (3 cr.; fall)
   E. BIOL 59500 Genetics and –Omics of Host-Microbe Interaction (3 cr.; fall)
   F. BIOL 59500 Theory of Molecular Methods (3 cr.; fall)

14. Biology Selectives: Three credits of the following:
   BIOL 39500 Macromolecules (3 cr.; fall)
   BIOL 41600 Viruses and Viral Diseases (3 cr.; spring)
   BIOL 43200 Reproductive Physiology (3 cr.; alternate fall)
   BIOL 43600 Neurobiology (3 cr.; fall)
   BIOL 43800 General Microbiology (3 cr.; fall)
   BIOL 43900 Microbiology Lab (2 cr.; fall)
   BIOL 44000 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.; 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 54900 Microbial Ecology (2 cr.; alternate spring)
   BIOL 55001 Eukaryotic Molecular Biology (3 cr.; fall)
   BIOL 55900 Endocrinology (3 cr.; fall)
   BIOL 56200 Neural Systems (3 cr.; spring)
   BIOL 56310 Protein Bioinformatics (2 cr.; spring)
   BIOL 58000 Evolution (3 cr.; spring)
   BIOL 58210 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.; fall)
   BIOL 59500 Epigenetics in Human Disease (3 cr.; fall)
   BIOL 59500 Methods & Measurement in Physical Neurobiology (3 cr.; fall)
   BIOL 59500 Genetics and –Omics of Host-Microbe Interaction (3 cr.; fall)
   BIOL 59500 Methods & Measurement in Physical Neurobiology (3 cr.; fall)
   BIOL 595000 Theory of Molecular Methods (3 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 to the following chart:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Title</th>
<th>Objective 1</th>
<th>Objective 2</th>
<th>Objective 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 43900</td>
<td>Microbiology Lab</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>BIOL 44201</td>
<td>Protein Expression</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>BIOL 44202</td>
<td>Animal Physiology</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>BIOL 44205</td>
<td>LabView</td>
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<td>X</td>
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<tr>
<td>BIOL 44207</td>
<td>Protein Structure</td>
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<td></td>
<td>X</td>
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<tr>
<td>BIOL 44211</td>
<td>Anatomy &amp; Physiology</td>
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<td>X</td>
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<tr>
<td>BIOL 44212</td>
<td>Microscopy &amp; Cell Bio</td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>BIOL 44215</td>
<td>Physiology Measurements</td>
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<td>BIOL 54200</td>
<td>Neurophysiology</td>
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<td>BIOL 58210</td>
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<td>BIOL 59100</td>
<td>Field Ecology</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>BIOL 59500</td>
<td>CryoEM 3D Reconstruction</td>
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<tr>
<td>BIOL 59500</td>
<td>Data Analysis in Neurosci</td>
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<tr>
<td>BIOL 59500</td>
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<tr>
<td>BIOL 59500</td>
<td>Neural Mech in Hlth Disease</td>
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<td>X</td>
</tr>
</tbody>
</table>

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)
   b. CHM 26505 Organic Chemistry (3 cr.; fall) and CHM 26300 Organic Chemistry Lab (1 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)

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 12-24 credits

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1 Course(s) taken for the Intermediate Biology Selective may NOT overlap with requirement #10.
2 Course(s) taken for requirement #10 may NOT overlap with requirement #14.
3 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.
4 Course chosen for requirement #13 may NOT overlap with requirement #14.
5 This course may count for a Biology Selective and as the College of Science Multidisciplinary requirement.
6 This course may count for a Biology Selective and as the College of Science Great Issues requirement.
7 Course chosen for requirement #13 or 14 may NOT count toward the Base Laboratory requirement.

CMDB 3/16