# Program Progression Guides

**Disclaimer:** The 2020-21 Purdue West Lafayette catalog is considered the source for academic and programmatic requirements for students entering programs during the Fall 2020, Spring 2021, and Summer 2021 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>
<th>Minimum 2.0 Cumulative GPA</th>
<th>Minimum 120 Credits that fulfill degree requirements</th>
<th>32 Residency Credits (30000 and above) at a Purdue University campus</th>
</tr>
</thead>
</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**

Departmental specific requirements. 2.0 average GPA in classes required to fulfill biology requirements.

- Minimum 2.0 cumulative GPA
- Must have a 500-level BIOL 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
- Multidisciplinary - 3 credits
- Mathematics - 6-10 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.

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* 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.
2020-21 Neurobiology & Physiology
Degree Progression Guide

The Department of Biological Sciences has suggested the following degree progression guide for the Neurobiology & Physiology Degree. Students will work with their academic advisors to determine their best path to degree completion. Course pre-requisites 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 2nd Year</th>
<th>Prerequisite</th>
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<tr>
<td>2</td>
<td>BIOL 12100</td>
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<tr>
<td>5</td>
<td>CHM 12901</td>
<td>ALEKS 85 or Calc Placement</td>
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<td>CHM 12901</td>
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<td>BIOL 13500 or 19500</td>
<td>CHM 12901 co-req</td>
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<td>Calc I</td>
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<td>3-5</td>
<td>Calculus I selective</td>
<td>ALEKS 75 or 85</td>
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<td>BIOL 12100 co-req</td>
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<td>16-18</td>
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<th>Credit</th>
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<td>CHM 33901</td>
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<td>BIOL 28600</td>
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<td>1</td>
<td>Free Elective (BIOL 29300 pref)</td>
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<td>BIOL 32800</td>
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<td>PHYS I Selective</td>
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<td>Elective (BIOL 39300 pref)</td>
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<th>Credit</th>
<th>Spring 4th Year</th>
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<td>2-4</td>
<td>Base Lab Requirement</td>
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<td>15-16</td>
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</tbody>
</table>

Science Core Curriculum Options
(one course needed for each requirement unless otherwise noted)

Options recommended for first- and second-year students
- Freshman Composition\textsuperscript{UC}
- General Education\textsuperscript{UC} (3 courses needed)
- Foreign Language and Culture\textsuperscript{UC} (3 courses needed)
- Multidisciplinary Experience\textsuperscript{UC} (BIOL 12100 satisfies)

Options recommended for third- and fourth-year students
- Technical Writing and Presentation\textsuperscript{UC} (COM 217 recommended)
- Statistics (STAT 50300)
- Computing (CS 17700 or CS 15900)
- Great Issues

\textsuperscript{UC} Select courses may also satisfy a University Core Curriculum requirement; see the University Core Requirement course list for approved courses. Students must have 32 credits at the 30000 level or above taken at Purdue.
## BIOL 55001 Eukaryotic Molecular Biology (3 cr.; spring)

## BIOL 54100 Molecular Genetics of Bacteria (3 cr.; fall)

## BIOL 538003 Molecular, Cellular & Developmental Neurobiology

## BIOL 53601 Biological & Structural Aspects of Drug Design & Action (3 cr; spr)

## BIOL 53300 Medical Microbiology (3 cr.; fall)

## BIOL 52900 Bacterial Physiology (3 cr.; spring)

## BIOL 51700 Molecular Biology: Proteins (2 cr.; alt spring)

## BIOL 51600 Molecular Biology of Cancer (3 cr.; spring)

## BIOL 483008 Environmental & Consrv Biology (3 cr.; alt spring)

## BIOL 48100 Eukaryotic Genetics (3 cr.; spring)

## BIOL 48000 Introduction to Molecular Biology (3 cr.; spring)

## BIOL 478007 Intro to Bioinformatics (3 cr.; fall)

## BIOL 44600 Molecular Genetics of Bacteria (3 cr.; fall)

## BIOL 44400 Microbial Ecology (2 cr.; alt spring)

## BIOL 55001 Eukaryotic Molecular Biology (3 cr.; spring)

### 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 19500 Year I Bio Lab: Diet, Disease & the Immune System (2 cr.; spring) or BIOL 19500 Year I Bio Lab: Disease Ecology (2 cr.; alternate fall) or BIOL 19500 Year I Bio Lab: Phages to Folds (2 cr.; fall) or ABE 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 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. Neurobiology & Physiology Selective: Two of these seven courses:
    A. BIOL 43200 Reproductive Physiology (3 cr.; alt fall)
    B. BIOL 43600 Neurobiology (3 cr.; fall)
    C. BIOL 53800 Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)
    D. BIOL 55900 Endocrinology (3 cr.; fall)
    E. BIOL 595003,5 Neural Mechanisms in Health & Disease (3 cr.; alt spring)
    F. BIOL 59500 Neural Systems (3 cr.; spring)
    G. BIOL 59500 Neobiology of Learning & Memory (3 cr.; alt 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 43300 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 requirements:
    - BIOL 39500 Human Anatomy & Physiology II (4 cr.; spring)
    - BIOL 36700 Principles of Development (2 cr.; spring)
    - 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 43200 Reproductive Physiology (3 cr.; alt fall)
    - BIOL 43600 Neurobiology (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 43200 Reproductive Physiology (3 cr.; alt fall)
    - BIOL 43600 Neurobiology (3 cr.; fall)
    - BIOL 47800 Intro to Bioinformatics (3 cr.; fall)
    - BIOL 48100 Eukaryotic Genetics (3 cr.; spring)
    - BIOL 48300 Environmental & Conservation Biology (3 cr.; alt spring)
    - BIOL 51600 Molecular Biology of Cancer (3 cr.; spring)
    - BIOL 51700 Molecular Biology: Proteins (2 cr.; alt spring)
    - BIOL 52900 Bacterial Physiology (3 cr.; spring)
    - BIOL 53300 Medical Microbiology (3 cr.; fall)
    - BIOL 53601 Biological & Structural Aspects of Drug Design & Action (3 cr.; spring)
    - BIOL 53700 Immunology (3 cr.; fall)
    - BIOL 53800 Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)
    - BIOL 54100 Molecular Genetics of Bacteria (3 cr.; fall)
    - BIOL 54900 Microbial Ecology (2 cr.; alt spring)
    - BIOL 55001 Eukaryotic Molecular Biology (3 cr.; spring)

(Footnotes and other requirements are on the back of this page)
1. Students must complete one of the Required courses in the chart below. Undergraduate research cannot be used to meet this requirement.

2. Students must also complete Objectives A and B as listed in the chart below with courses or research or a combination of the two.

3. Descriptions of Objectives A and B (not all tasks must be met to satisfy an objective):
   a. **Objective A** – Demonstrate the ability to plan and design hypothesis-driven experiments, simulations or discovery/observational experiments
      i. Conduct an appropriate literature review for a specific scientific topic.
      ii. Generate an applicable hypothesis (-es) for your research project
      iii. Identify techniques to be used in your project, with justification of those techniques.
      iv. Write a formal research proposal.
      v. Write a detailed outline of experiments
   b. **Objective B** - Develop the ability to appropriately analyze, critically evaluate, and depict data. Demonstrate the ability to effectively communicate scientific information orally and in writing, including synthesizing and evaluating scientific literature and putting experimental results in their appropriate scientific context.
      i. Analyze data
      ii. Use appropriate ways to depict and communicate data (e.g., graphs, movies, images, etc.). Present the research at lab meetings, in a talk, or at a poster session.
      iii. Write a summary (or summaries) of the data.

4. If research is used, the research director will be the one who decides if the research meets one or both objectives.

5. If research is used, it must include at least four credits of BIOL 49400 or 49900. BIOL 29400 research does not count toward this requirement.

6. Students who successfully complete a Biology Honors Research Thesis have successfully met Objectives A and B.

7. The Microbiology and Health & Disease majors require BIOL 43900 and the Ecology, Evolution and Environmental Biology major requires BIOL 59500, Laboratory in Ecology.

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**Base Laboratory Requirement Chart**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Required</th>
<th>Obj. A</th>
<th>Obj. B</th>
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<tr>
<td>BIOL 32800</td>
<td>Principles of Physiology</td>
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<tr>
<td>BIOL 39500</td>
<td>Exper Design &amp; Quant Analysis</td>
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<td>BIOL 39500</td>
<td>Macromolecules</td>
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<td>BIOL 43900</td>
<td>Microbiology Lab</td>
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<td>BIOL 44205</td>
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<td>BIOL 44207</td>
<td>Protein Structure (5 week module)</td>
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<td>BIOL 44212</td>
<td>Microscopy &amp; Cell Bio (5 week module)</td>
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<td>BIOL 58210</td>
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<td>Field Ecology</td>
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<td>CryoEM 3D Reconstruction</td>
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<td>Data Analysis in Neurosci (5 week module)</td>
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<td>Neural Mechanisms in Health &amp; Disease</td>
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<td>BIOL 59500</td>
<td>Theory of Molecular Methods</td>
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CHEMISTRY
1. **General Chemistry:**
   A. CHM 129016 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:
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)

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

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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. A 500-level BIOL course must be taken as part of requirement #10 or #14.
3. A course chosen for requirement #10 may NOT be used for requirement #14.
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.
7. This course may count for the Biology Selective and as the College of Science Great Issues requirement and toward the Base Lab Requirement.
8. This course may count for the Biology Selective and as the College of Science Great Issues requirement and toward the Base Lab Requirement.
9. Students who do not take CHM 12901 for General Chemistry may use BIOL 44201 to satisfy this requirement

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