Program Progression Guides

Disclaimer: The 2023-2024 Purdue West Lafayette catalog is considered the source for academic and programmatic requirements for students entering programs during the Fall 2023, Spring 2024, and Summer 2024 semesters. The Program Progression Guide assists students in the development of an individualized 8-semester plan. Students are encouraged to use this guide and MyPurduePlan* (online degree auditing tool) 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.

University Degree Requirements

| Minimum 2.0 Cumulative GPA | Minimum 120 Credits that fulfill degree requirements | 32 Residency Credits (30000-level and above) at a Purdue University campus |

University Core Curriculum**
https://www.purdue.edu/provost/students/s-initiatives/curriculum/courses.html

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

Civic Literacy Proficiency
https://www.purdue.edu/provost/about/provostInitiatives/civics/

Required Major Program Courses (see following pages)

Departmental specific requirements, including 2.0 average GPA in classes required to fulfill biology requirements.
Minimum 2.0 cumulative GPA
Must have a 500-level BIOL course (2-3 credit approved BIOL lecture)

College of Science Core Curriculum
https://www.purdue.edu/science/Current_Students/curriculum_and_degree_requirements/college-of-science-core-requirements.html?

- 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
- STS (Science, Tech & Society) - 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.

* 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.
# 2023-24 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 listed are notes specific to this degree plan (not all pre-requisites are listed for every course).

### Credit Fall 1st Year

<table>
<thead>
<tr>
<th>Credit</th>
<th>Prerequisite</th>
<th>Credit</th>
<th>Prerequisite</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>BIOL 12100</td>
<td>3</td>
<td>BIOL 13100</td>
</tr>
<tr>
<td>5</td>
<td>CHM 12901</td>
<td>4</td>
<td>CHM 25500-25501</td>
</tr>
<tr>
<td>2</td>
<td>BIOL 13500 or 19500</td>
<td>3-5</td>
<td>CHM 12901 co-req Calculus I (with min grade C-)</td>
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<tr>
<td>3-5</td>
<td>Calculus I selective</td>
<td>3-4</td>
<td>Science Core Option</td>
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<tr>
<td>3</td>
<td>Science Core Option</td>
<td>3</td>
<td>Science Core Option</td>
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<tr>
<td>1</td>
<td>Elective (BIOL 11500 pref.)</td>
<td>3</td>
<td>Science Core Option</td>
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<tr>
<td>16-18</td>
<td>BIOL 12100 co-req</td>
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### Credit Fall 2nd Year

<table>
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<td>BIOL 23200</td>
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<td>4</td>
<td>CHM 25600-25601</td>
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<td>Chemistry Selective</td>
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<td>CHM 33901</td>
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<td>BIOL 28600</td>
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<tr>
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<td>Free Elective (BIOL 29300 pref)</td>
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<td>Science Core Option</td>
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<tr>
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### Credit Fall 3rd Year

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<th>Prerequisite</th>
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<tr>
<td>3</td>
<td>Neurobiology &amp; Physiology Selective</td>
<td>4</td>
<td>BIOL 32800</td>
</tr>
<tr>
<td>4</td>
<td>PHYS I Selective</td>
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<td>Science Core Option</td>
<td>3</td>
<td>Science Core Option</td>
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<tr>
<td>3</td>
<td>Elective</td>
<td>1</td>
<td>Elective (BIOL 39300 pref)</td>
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### Credit Fall 4th Year

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<th>Credit</th>
<th>Prerequisite</th>
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<td>3</td>
<td>Biology Selective</td>
<td>3</td>
<td>Neurobiology &amp; Physiology Selective 500 Level</td>
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<tr>
<td>1-3</td>
<td>Science Core Option</td>
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<tr>
<td>12-16</td>
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</table>

### Science Core Curriculum Options

(last course needed for each requirement unless otherwise noted)

<table>
<thead>
<tr>
<th>Options recommended for first- and second-year students</th>
<th>Options recommended for third- and fourth-year students</th>
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<tbody>
<tr>
<td>Freshman Composition UC</td>
<td>Technical Writing and Presentation UC (COM 217 recommended)</td>
</tr>
<tr>
<td>General Education UC (3 courses needed)</td>
<td>Statistics (STAT 50300)</td>
</tr>
<tr>
<td>Foreign Language and Culture UC (3 courses needed)</td>
<td>Computing (CS 17700 or CS 18000 also meet Teambuilding)</td>
</tr>
<tr>
<td>STS UC (BIOL 12100)</td>
<td>Great Issues</td>
</tr>
</tbody>
</table>

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.
NEUROBIOLOGY AND PHYSIOLOGY (NRPH)  
Fall 2023

**Graduation Requirements:**
- A minimum 2.0 average in all biology courses required for this major
- At least one approved 2-3 credit 500-level Biology course is required (excludes lab only courses such as BIOL 54200 & 5xxxx lab modules)
- A minimum of 32 credits at or above the 300-level completed at a Purdue campus

**120 Total Credits**

### BIOLOGY CORE (19 credits):

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)  

### UPPER-LEVEL BIOLOGY COURSEWORK (13-18 credits):

9. **Intermediate Biology Selective**: Complete ONE of these:  
   (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.; fall)  
   - **C. BIOL 39500** Macromolecules (2 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 2**: Complete TWO of these (may NOT overlap with #11 Biology Selective):
   - **A. BIOL 43600** Neurobiology (3 cr.; fall)  
   - **B. BIOL 53800** Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)  
   - **C. BIOL 56200** Neural Systems (3 cr.; spring)  
   - **D. BIOL 59500** Neural Mechanisms in Health & Disease (3 cr.; alt spring)  
   - **E. BIOL 59500** Neurobiology of Learning & Memory (3 cr.; alt spring)

11. **Biology Selective**: complete ONE course (2-4 credits); may NOT overlap with #10 Neurobiology & Physiology Selectives:
   - **BIOL 20400** Human Anatomy & Physiology II (4 cr.; spring)  
   - **BIOL 36700** Principles of Development (2 cr.; fall)  
   - **BIOL 39500** Experimental Design & Quantitative Analysis (3 cr.; summer)  
   - **BIOL 39500** Macromolecules (2 cr.; fall)  
   - **BIOL 41500** Intro. to Molecular Biology (3 cr.; spring)  
   - **BIOL 41600** Viruses and Viral Diseases (3 cr.; spring)  
   - **BIOL 43600** Intro. to Neurobiology (3 cr.; fall)  
   - **BIOL 43800** General Microbiology (3 cr.; fall)  
   - **BIOL 44400** Human Medical Genetics (3 cr.; spring)  
   - **BIOL 47800** Intro to Bioinformatics (3 cr.; fall)  
   - **BIOL 48100** Eukaryotic Genetics (3 cr.; spring)  
   - **BIOL 48300** Environmental & Conservation Biol (3 cr.; alt spring)  
   - **BIOL 49500** Biodiversity & Museum Research (3 cr.; fall)  
   - **BIOL 49500** Data Science for Biologists (3 cr.; fall)  
   - **BIOL 49500** RNA World, CRISPR and Coronavirus (2 cr; spring)  
   - **BIOL 49500** Topics in Endocrinology & Cancer (2 cr.; spring)  
   - **BIOL 51600** Molecular Biology of Cancer (3 cr.; spring)  
   - **BIOL 51700** Molecular Biology: Proteins (2 cr.; alt spring)  
   - **BIOL 53300** Medical Microbiology (3 cr.; fall)  
   - **BIOL 53601** Biological & Structural Aspects of Drug Design & Action (3 cr; spr)  
   - **BIOL 53700** Immunobiology (3 cr.; fall)  
   - **BIOL 54200** Immuno Biological & Structural Aspects of Drug Design & Action (3 cr.; spring)  
   - **BIOL 55000** Immunology (3 cr.; fall)  
   - **BIOL 56200** Molecular, Cellular & Developmental Neurobiology (3 cr.; spring)  
   - **BIOL 56310** Protein Bioinformatics (2 cr.; alt spring)  
   - **BIOL 58000** Evolution (3 cr.; spring)  
   - **BIOL 58210** Ecological Statistics (3 cr.; fall)  
   - **BIOL 58705** Animal Communication (3 cr.; alt fall)  
   - **BIOL 59500** Building the Tree of Life (3 cr.; spring)  
   - **BIOL 59500** CRISPR Mechanisms & Applications (3 cr.; spring)  
   - **BIOL 59500** CryoEM 3D Reconstruction (3 cr.; fall)  
   - **BIOL 59500** Disease Ecology (3 cr.; spring)  
   - **BIOL 59500** Ecology (3 cr.; fall)  
   - **BIOL 59500** Immun of Cancer & Infectious Disease (2 cr.; spring)  
   - **BIOL 59500** Methods & Measurmt in Physical Biochem (3 cr.; fall)  
   - **BIOL 59500** Neural Mechanisms in Health & Disease (3 cr.; alt spring)  
   - **BIOL 59500** Neurobiology of Learning & Memory (3 cr.; alt fall)  
   - **BIOL 59500** Pathways in Human Health & Disease (3 cr.; fall)  
   - **BIOL 59500** Practical Biocomputing (3 cr.; spring)  
   - **BIOL 59500** X-Ray Crystallography (3 cr.; spring)  
   - **BIOL 59500** Theory of Molecular Methods (3 cr.; fall)  
   - **BCHM 43400** Medical Topics in Biochemistry (3 cr.; spring)  
   - **BCHM 52100** Comparative Genomics (3cr. spring)

12. **Base Lab Requirement**: see “Base Lab Requirement (BLR) for all Biology Majors” as described on the next page.

*Footnotes are on the last page
Base Laboratory Requirement (BLR) for all Biology Majors

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 Obj A and/or Obj B.
5. If research is used, it must include at least four credits of BIOL 49400 or 49900. (BIOL 29400, non-BIOL research, and research for pay will not count toward the BLR).
6. Students who successfully complete a Biology Honors Research Thesis automatically meet Objective s A and B with the approved thesis but must still complete a “Required Course.”
   and B but must still complete a “Required Course.”
7. The “Microbiology” and the “Health & Disease” majors must use BIOL 43900 Micro Lab for the BLR; the “Ecology, Evolution and Environmental Biology” majors must use BIOL 59500 Laboratory in Ecology for the BLR.

Base Laboratory Requirement Chart:
( NOTE: BIOL 32800 meets the “Required Course” for NRPH majors).

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Required Course</th>
<th>Obj. A</th>
<th>Obj. B</th>
<th>Usually Offered</th>
<th>Format</th>
<th>Pre-Req (PR) or Co-Req (CR) beyond core courses</th>
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<tbody>
<tr>
<td>BIOL 32800</td>
<td>Principles of Physiology (4cr)</td>
<td>X</td>
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<td>Spring</td>
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<tr>
<td>BIOL 39500DIST</td>
<td>Exper Design &amp; Quant Analysis (3cr)</td>
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<td></td>
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<td>Summer</td>
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<tr>
<td>BIOL 43900</td>
<td>Microbiology Lab (2cr)</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>Fall</td>
<td>PR/CR=43800</td>
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<tr>
<td>BIOL 44212</td>
<td>Microscopy &amp; Cell Bio (1cr)</td>
<td>X</td>
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<td>Spring</td>
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<tr>
<td>BIOL 48300</td>
<td>Environmental &amp; Conservation Biology (3cr)</td>
<td>X</td>
<td>X</td>
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<td>alt Spring '24</td>
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<tr>
<td>BIOL 49500BMR</td>
<td>Biodiversity &amp; Museum Research (3cr)</td>
<td>X</td>
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<td>BIOL 49500DSB</td>
<td>Data Science for Biologists (3cr)</td>
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<td>BIOL 49500TEC</td>
<td>Topics in Endocrinology &amp; Cancer (2cr)</td>
<td>X</td>
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<td>BIOL 54200</td>
<td>Neurophysiology (1cr)</td>
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<td>BIOL 58210</td>
<td>Ecological Statistics (3cr)</td>
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<td>BIOL 59100</td>
<td>Field Ecology (4cr)</td>
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<td>PR=59500EL</td>
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<tr>
<td>BIOL 59500BTL</td>
<td>Building the Tree of Life: Phylogenetics (3cr)</td>
<td>X</td>
<td>X</td>
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<td>research experience recommended</td>
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<tr>
<td>BIOL 59500CRYO</td>
<td>CryoEM 3D Reconstruction (3cr)</td>
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<td>Fall</td>
<td>PR=PHYS 23300 or 17200</td>
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<td>BIOL 59500BN</td>
<td>Data Analysis in Neuroscience (1cr)</td>
<td>X</td>
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<td>BIOL 59500EL</td>
<td>Laboratory in Ecology (1cr)</td>
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<td>PR/CR=59500 Ecology</td>
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<tr>
<td>BIOL 59500</td>
<td>Neural Mechanisms in Health &amp; Disease (3cr)</td>
<td>X</td>
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<td>alt Spring '23</td>
<td>PR=32800 or 43600; CR=56200</td>
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<tr>
<td>BIOL 59500SBL</td>
<td>Structural Biology Lab (1cr)</td>
<td>X</td>
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<td>Spring</td>
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<tr>
<td>BIOL 59500TMM</td>
<td>Theory of Molecular Methods (3cr)</td>
<td>X</td>
<td>X</td>
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<td>alt Spring</td>
<td>BIOL 415 or other molecular biology</td>
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(Note: BIOL 32800 meets the “Required Course” for NRPH majors.)
CHEMISTRY (17 credits) -- complete all of the following:

1. **General Chemistry (5 credits):**
   - CHM 12901 General Chemistry with a Biological Focus (5 cr.; fall)

2. **Organic Chemistry (8 credits):**
   - CHM 25500 Organic Chemistry I (3 cr.; both) and
   - CHM 25501 Organic Chemistry Lab I (1 cr.; both) and
   - CHM 25600 Organic Chemistry II (3 cr.; both) and
   - CHM 25601 Organic Chemistry Lab II (1 cr.; both)

3. **Biochemistry (4 credits):**
   - CHM 33900 Biochemistry: A Molecular Approach (3 cr.; spring) and
   - CHM 33901 Biochemistry Laboratory (1 cr.; spring)

PHYSICS (8 credits) – complete one of these options (PHYS 23300+23400 are recommended):

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)

OTHER: all University Core, College of Science Core, and Civics Literacy Requirements must also be completed.

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 taken as part of requirement #10 meets the 500-level BIOL requirement.
3 A course chosen for requirement #10 may NOT be used for requirement #11.
4 This course may count toward the Base Lab Requirement (and may count for either requirement #10 or #11 but not both)
5 This course may count for the Biology Selective (#11) and toward the Base Lab Requirement
6 This course may count for the Biology Selective (#11) and as the College of Science Great Issues requirement and toward the Base Lab Requirement.