Disclaimer: The 2022-23 Purdue West Lafayette catalog is considered the source for academic and programmatic requirements for students entering programs during the Fall 2022, Spring 2023, and Summer 2023 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 120 Credits that fulfill degree requirements</th>
<th>32 Residency Credits (30000-level and above) at a Purdue University campus</th>
</tr>
</thead>
</table>

**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 (3-credit 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
- 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.

* 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.
**2022-23 Microbiology Honors* 
Degree Progression Guide**

The Department of Biological Sciences has suggested the following degree progression guide for the Microbiology 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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<tbody>
<tr>
<td>2</td>
<td>BIOL 12100</td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>CHM 12901</td>
<td>ALEKS 85 or Calc Placement</td>
<td>4</td>
<td>CHM 26505-26300*</td>
<td>CHM 12901</td>
</tr>
<tr>
<td>2</td>
<td>BIOL 13500 or 19500</td>
<td>CHM 12901 co-req</td>
<td>3-5</td>
<td>MA 16600 (or 16200) Calculus II*</td>
<td>Calculus I (with min grade C-)</td>
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<td>4-5</td>
<td>MA 16500 (or 16100) Calculus I*</td>
<td>ALEKS 85</td>
<td>3-4</td>
<td>Science Core Option</td>
<td>Science Core Option</td>
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<tr>
<td>1</td>
<td>Elective (BIOL 11500 pref.)</td>
<td>BIOL 12100 co-req</td>
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<td>17-18</td>
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<table>
<thead>
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<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 2nd Year</th>
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<tr>
<td>3</td>
<td>BIOL 23100</td>
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<td>2</td>
<td>BIOL 23200</td>
<td>Co-req BIOL 23100</td>
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<td>BIOL 24200</td>
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<td>4</td>
<td>CHM 26605-26400*</td>
<td>CHM 26505</td>
<td>3</td>
<td>CHM 33900</td>
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<tr>
<td>4</td>
<td>MA 26100 Multivariate Calculus*</td>
<td>MA 16600 or 16200</td>
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<td>BIOL 28600</td>
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<tr>
<td>3</td>
<td>Free Elective (BIOL 29300 pref)</td>
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<td>Elective (BIOL 39300 pref)</td>
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<td>15</td>
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<table>
<thead>
<tr>
<th>Credit</th>
<th>Fall 3rd Year</th>
<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 3rd Year</th>
<th>Prerequisite</th>
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<tbody>
<tr>
<td>3</td>
<td>BIOL 43800</td>
<td>BIOL 23100 &amp; 24100</td>
<td>3</td>
<td>BIOL 41600</td>
<td>BIOL 23100 &amp; 24100</td>
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<td>2</td>
<td>BIOL 43900</td>
<td>BIOL 43800 co-req</td>
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<td>BIOL 52900</td>
<td>BIOL 43800, 43900* and CHM 33900</td>
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<td>PHYS I Selective*</td>
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<td>4</td>
<td>PHYS II Selective*</td>
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<td>Science Core Option</td>
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<tr>
<td>3</td>
<td>Elective</td>
<td></td>
<td>1</td>
<td>Elective (BIOL 39300 pref)</td>
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<table>
<thead>
<tr>
<th>Credit</th>
<th>Fall 4th Year</th>
<th>Prerequisite</th>
<th>Credit</th>
<th>Spring 4th Year</th>
<th>Prerequisite</th>
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<tr>
<td>3</td>
<td>Microbiology I Selective</td>
<td>BIOL 43800</td>
<td>3</td>
<td>Microbiology II Selective</td>
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<td>3-4</td>
<td>Science Core Option</td>
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<td>Science Core Option</td>
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</tr>
<tr>
<td>1-3</td>
<td>Science Core Option</td>
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<td>Science Core Option</td>
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<tr>
<td>4</td>
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<tr>
<td>3</td>
<td>Micro. Honors CHM/MA option*</td>
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<td>Micro. Honors CHM/MA option*</td>
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</tr>
<tr>
<td>14-17</td>
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</tr>
</tbody>
</table>

*Microbiology Honors requires MA 16100/16500 and 16200/16600 for calculus 1 and 2; and CHM 26505-26300 and 26605-26400 for Organic Chemistry. Other unique selections for MA, PHYS and CHM are also required -- see following pages.

**Science Core Curriculum Options**

(one 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>
</tr>
</thead>
<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>Multidisciplinary^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.
**Microbiology Honors (Mich)**

**Fall 2022**

A 3.0 or higher graduation index is required to graduate in the Microbiology Honors Curriculum

Microbiology Honors requires some MA, CHM and PHYS course options that differ from the Microbiology (MICR) major. See the “Microbiology Honors Curriculum” as listed on the last page and discuss with your Academic Advisor.

### Graduation Requirements:
- A minimum 2.0 average in all biology courses required for this major
- At least one 3-credit 500-level Biology course is required
- A minimum of 32 credits at or above the 300-level completed at a Purdue campus
- 120 Total Credits

### Biology Core:

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)
4. ABE 22600 Biotechnology Lab (2 cr.; fall)
5. BIOL 23100 Biology III: Cell Structure and Function (3 cr.; fall)
6. BIOL 23200 Laboratory in Biology III: Cell Structure and Function (2 cr.; fall)
7. BIOL 24100 Biology IV: Genetics and Molecular Biology (3 cr.; spring)
8. BIOL 24200 Laboratory in Genetics and Molecular Biology (2 cr.; spring)
9. Intermediate Biology Selective: Choose one of these eight options:
    (Microbiology Honors 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)
   - 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. BIOL 41600 Viruses and Viral Diseases (3 cr.; spring)
11. Lab Requirement: BIOL 43900 Microbiology Lab (2 cr.; fall)
12. BIOL 52900 Bacterial Physiology (3 cr.; spring)
13. CHM 33901 Introductory Anatomy and Physiology Laboratory (1 cr.; spring)

14. Microbiology Selective I: Choose one:
   - A. BIOL 54100 Molecular Genetics of Bacteria (3 cr.; fall) or
   - B. BIOL 59500 Genetics and -Oomics of Host-Microbe Interactions (3 cr.; alt spring)

15. Chemistry Selective: One of these three courses:
   - A. BCHM 56100 General Biochemistry (3 cr.; fall)
   - B. CHM 33902 Introductory Biochemistry (3 cr.; fall)

16. Microbiology Selective II: Three credits of the following:
   - BIOL 44600 Molecular Biology of Pathogens (3 cr.; alt spring)
   - BIOL 47800 Intro to Bioinformatics (3 cr.; fall)
   - BIOL 49500 Data Science for Biologists (3 cr.; fall)
   - BIOL 49500 The RNA World, CRISPR and Coronavirus (2 cr.; fall)
   - BIOL 53300 Medical Microbiology (3 cr.; fall)
   - BIOL 54100 Molecular Genetics of Bacteria (3 cr.; fall)
   - BIOL 54900 Microbial Ecology (2 cr.; alt spring) plus one credit of BIOL 442xx (1-2 cr.; both) or 54200 (1 cr.; fall)
   - BIOL 55001 Eukaryotic Molecular Biology (3 cr.; spring)
   - BIOL 59500 Building the Tree of Life (3 cr.; spring)
   - BIOL 59500 CRISPR Mechanisms and Applications (3 cr.; spring)
   - BIOL 59500 Genetics and -Oomics of Host-Microbe Interactions (3 cr.; alt spring)
   - BIOL 59500 Theory of Molecular Methods (3 cr.; fall)
   - ABE 59100 Principles of Systems/Synthetic Biology (3 cr.; fall)
   - FS 59100 Techniques in Microbial Genomics & Metabolism (3 cr.; alt spring)

Footnotes and other requirements are on the next two pages.
Base Laboratory Requirement (BLR) for all Biology Majors
(Microbiology and Microbiology Honors majors are required to take BIOL 43900 to satisfy the Base Lab Requirement)

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 B.
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 but must still complete the "Required Course."
7. The “Microbiology Honors” and the “Health & Disease” majors both require BIOL 43900: the “Ecology, Evolution and Environmental Biology” major requires BIOL 59500 Laboratory in Ecology.

**Base Laboratory Requirement Chart**

<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>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 32800</td>
<td>Principles of Physiology (4cr)</td>
<td></td>
<td>X</td>
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<td></td>
<td>Spring</td>
<td></td>
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<tr>
<td>BIOL 39500DIST</td>
<td>Exper Design &amp; Quant Analysis (3cr)</td>
<td></td>
<td>X</td>
<td>X</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>
<td>X</td>
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<td>Fall</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>5-wk module</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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<tr>
<td>BIOL 49500DSB</td>
<td>Data Science for Biologists (3cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>Fall</td>
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<tr>
<td>BIOL 49500</td>
<td>Data Science: Good vs. Bad Data (3cr)</td>
<td>X</td>
<td>X</td>
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<tr>
<td>BIOL 49500RAB</td>
<td>Research in Animal Behavior (1cr)</td>
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<td>X</td>
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<td>5-wk module</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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<tr>
<td>BIOL 58210</td>
<td>Ecological Statistics (3cr)</td>
<td>X</td>
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<td>BIOL 59100</td>
<td>Field Ecology (4cr)</td>
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<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>
<td>X</td>
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<td>PR=PHYS 23300 or 17200</td>
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<tr>
<td>BIOL 59500BN</td>
<td>Data Analysis in Neuroscience (1cr)</td>
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<td>Spring</td>
<td>5-wk module</td>
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<tr>
<td>BIOL 59500EL</td>
<td>Laboratory in Ecology (1cr)</td>
<td>X</td>
<td>X</td>
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<td>Fall</td>
<td>PR/CR=59500 or Ecology</td>
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<tr>
<td>BIOL 59500</td>
<td>Neural Mechanisms in Health &amp; Disease (3cr)</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>
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<td>5-wk module</td>
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<tr>
<td>BIOL 59500TMM</td>
<td>Theory of Molecular Methods (3cr)</td>
<td>X</td>
<td>X</td>
<td></td>
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<td>alt Spring</td>
<td>molecular biology</td>
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</tbody>
</table>
CHEMISTRY

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

2. **Organic Chemistry:**
   CHM 26505 Organic Chemistry (3 cr.; both) and CHM 26300 Organic Chemistry Lab (1 cr.; both) and
   CHM 26605 Organic Chemistry (3 cr.; both) and CHM 26400 Organic Chemistry Lab (1 cr.; both)

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)

MICROBIOLOGY HONORS CURRICULUM*
Students must fulfill all requirements listed under the “Microbiology Honors Curriculum” as shown below.

COLLEGE OF SCIENCE CORE
Composition and Presentation; Teambuilding and Collaboration; Language and Culture; Great Issues; General Education; Multidisciplinary Experience; Mathematics; Statistics; Computing

OTHER: all University Core and Civics Literacy Requirements must also be completed.

FREE ELECTIVES Approximately 10-17 credits

*MICROBIOLOGY HONORS CURRICULUM
A 3.0 or higher graduation index is required to graduate in the Microbiology Honors Curriculum

In addition to the requirements listed for the Microbiology program, the following two choices must be completed:
1. 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)
2. MA 26100 Multivariate Calculus (4 cr.; both)

and at least two of the following four choices must be completed:
1. PHYS 17200 Modern Mechanics (4 cr.; both) and PHYS 27200 Electric and Magnetic Interactions (4 cr.; both)
2. CHM 32100 Analytical Chemistry (4 cr.; fall)
3. CHM 37200 Physical Chemistry (4 cr.; spring) or [CHM 37300 Physical Chemistry (3 cr.; fall) and CHM 37400 Physical Chemistry (4 cr.; spring)]
4. MA 26200 Linear Algebra and Differential Equations (4 cr.; both)

1 This course may count for requirement #14 or #16, but not both.
2 Students who take CHM 12901 for General Chemistry must take CHM 33900 and 33901 for the Chemistry Selective. Students who end up with Special Case approval for some other Gen Chem courses may choose the other Chem Selective options. All students must take CHM 33901.
3 Microbiology Honors requires CHM 26505-26300 and CHM 26605-26400 for the Organic Chemistry sequence, which differs from other majors
4 Selecting PHYS 17200 and 27200 can help fulfill the additional requirements listed under the “Microbiology Honors Curriculum” section
5 Microbiology Honors requires MA 16100 (or 16500) for Calculus 1 and MA 16200 (or 16600) for Calculus 2 to meet pre-requisites for MA 26100.