MAJOR IN BIOLOGY - ORGANISMAL BIOLOGY AND ECOLOGY CONCENTRATION

Completion of this concentration provides background for advanced studies in botany, zoology, conservation biology or ecology, and/or career opportunities in environmental education, in government environmental regulatory agencies and in the private sector. Students completing this concentration are encouraged to take both BIOL 205 and BIOL 207. Those students taking BIOL 208 are required to complete an additional elective. Students in this concentration are strongly encouraged to participate in a research experience or as an intern (e.g., BIOL 491, BIOL 493 or BIOL 499). They should consult with their advisers regarding these opportunities.

Specific requirements for the Organismal Biology and Ecology concentration are listed under Requirements and outlined in the suggested Four-Year Plan of Study. A complete list of Biology courses that do not count towards the Biology major may be found on the Resources for Students (https://www.towson.edu/fcsm/departments/biology/resources) web page.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 200 &amp; 200L</td>
<td>INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 202</td>
<td>INTRODUCTION TO ECOLOGY AND EVOLUTION</td>
<td>4</td>
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<tr>
<td>BIOL 204</td>
<td>EDUCATIONAL AND CAREER PLANNING FOR THE BIOLOGIST</td>
<td>1</td>
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<tr>
<td>BIOL 309</td>
<td>GENETICS</td>
<td>4</td>
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</tbody>
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**Foundation Courses**

**Breadth Courses**

Select one of the following: 3-8

- BIOL 205 & BIOL 207: GENERAL BOTANY and GENERAL ZOOLOGY
- BIOL 208: BIODIVERSITY 1

Select one of the following: 4

- BIOL 405: MOLECULAR BIOLOGY, EVOLUTION AND CONSERVATION
- BIOL 408: CELL BIOLOGY
- BIOL 409: MOLECULAR BIOLOGY

Select BIOL 221 and BIOL 222 OR BIOL 325 OR BIOL 436: 3-8

- BIOL 221 & 221L: HUMAN ANATOMY & PHYSIOLOGY I [LECTURE] and HUMAN ANATOMY & PHYSIOLOGY I [LAB]
- BIOL 222 & BIOL 222L: HUMAN ANATOMY & PHYSIOLOGY II [LECTURE] and HUMAN ANATOMY & PHYSIOLOGY II [LAB]
- BIOL 325: ANIMAL PHYSIOLOGY
- BIOL 436: PLANT PHYSIOLOGY

**Elective Courses**

**Principles of Ecology Elective**

Select one of the following: 4

- BIOL 310: CONSERVATION BIOLOGY
- BIOL 402: GENERAL ECOLOGY
- BIOL 406: LIMNOLOGY
- BIOL 435: PLANT ECOLOGY

**Diversity Elective**

Select one of the following: 3-4

- BIOL 334: HUMANS, SCIENCE AND THE CHESAPEAKE BAY
- BIOL 347: MARINE BIOLOGY
- BIOL 353: INVERT ZOOLOGY
- BIOL 371: ANIMAL BEHAVIOR
- BIOL 413: EVOLUTION
- BIOL 432: VASCULAR PLANT TAXONOMY
- BIOL 444: WILDLIFE MANAGEMENT
- BIOL 446: TROPICAL ECOLOGY AND CONSERVATION
- BIOL 447: TROPICAL FIELD ECOLOGY
- BIOL 452: WETLAND ECOLOGY
- BIOL 455: FISH BIOLOGY
- BIOL 456: ORNITHOLOGY
- BIOL 458: MAMMALOGY
- BIOL 461: ENTOMOLOGY
- BIOL 467: HERPETOLOGY
- GEOG 221: INTRODUCTION TO GEOSPATIAL TECHNOLOGY

**Organismal Electives** 1,2

Select two electives from the list of Principles of Ecology or Diversity Electives above (BIOL 491 - Elective in Independent Research - may be used as one of the electives) 6-8

**Ancillary Courses**

**Chemistry**

Select one of the following: 13-18

- CHEM 131 & 131L: GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY
- CHEM 132 & 132L: GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY
- CHEM 330: ESSENTIALS OF ORGANIC CHEMISTRY or CHEM 331 & CHEM 332: ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY II

**Physics** 2

Select one of the following: 4

- PHYS 211: GENERAL PHYSICS I; NON CALCULUS-BASED or PHYS 241: GENERAL PHYSICS I CALCULUS-BASED

**Statistics Courses**

Select one of the following: 4

- MAT 237: ELEMENTARY BIOSTATISTICS or PSYC 212: BEHAVIORAL STATISTICS

**Recommended Courses**

Select one of the following: 5

- MAT 273: CALCULUS I or MAT 211: CALCULUS FOR APPLICATIONS
- BIOL 484: SEMINAR IN ECOLOGY, EVOLUTION, CONSERVATION AND BEHAVIOR

Total Units 57-75

1 If BIOL 208 was selected, an additional elective must be selected from among the list of Principles of Ecology or Diversity Electives.
PHYS 212 or PHYS 242 may be taken in place of one of the Organismal electives.

Transfer Credit Policy

All Biology majors must complete a minimum of 19 biology units toward the major at Towson University, with at least 10 of these units at the upper (300–400) level.

Suggested Four-Year Plan

Based on course availability and student needs and preferences, the selected sequences will probably vary from those presented below. Students should consult with their adviser to make the most appropriate elective choices.

### Freshman

**Term 1** | Units | **Term 2** | Units |
--- | --- | --- | --- |
Biol 200 & 200L (Core 7) | 4 | Biol 202 (Core 8) | 4 |
MATH 115 or 119 (Core 3) | 3 | Chem 131 & 131L | 4 |
Core 1 (or Core 2) | 3 | MATH 237 or PSYC 212 (Core 3 if taking MATH 237) | 4 |
Core 4 | 3 | Core 2 (or Core 1) | 3 |
Core 5 | 3 | Core 6 | 3 |
**Total** | 16 | **Total** | 18 |

### Sophomore

**Term 1** | Units | **Term 2** | Units |
--- | --- | --- | --- |
Biol 204 (Core 2) | 1 | Biol 205 (or elective if taking Biol 208) | 4 |
Biol 207 or 208 | 4 | Phys 211 or 241 | 4 |
Biol 309 | 4 | Core 10 | 3 |
Chem 132 & 132L | 4 | Required Elective | 4 |
Core 9 | 3 | **Total** | 16 |
Core 11 | 3 | **Total** | 15 |

### Junior

**Term 1** | Units | **Term 2** | Units |
--- | --- | --- | --- |
Biol 221, 325, or 436 | 3 | Biol 222 & 222L (if Biol 221 & 221L taken) (or elective) | 4 |
Biol 405, 408, or 409 | 4 | Biol 484 (recommended) | 1 |
Required Elective | 3-4 | Chem 330 or 331 | 5 |
Core 11 | 3 | Required Elective | 3-4 |
**Students should meet with their advisers to discuss REU programs, internships, etc., for next summer** | 13-14 | **Core 12** | 3 |

### Senior

**Term 1** | Units | **Term 2** | Units |
--- | --- | --- | --- |
Chem 332 (if Chem 331 taken) (or elective) | 5 | Core 14 | 3 |
Required Elective | 3-4 | Elective | 4 |
Core 13 | 3 | Elective | 4 |

Total Units 124-127

1. Decisions regarding which class to take should be based on Mathematics placement tests and/or required prerequisites for MATH 211, 237, 273 or PSYC 212. If neither course is necessary, then another course may be taken. Note that PSYC 212 is not a Core 3 course.
2. A key assignment in BIOL 204 (http://catalog.towson.edu/search/?P=BIOL%20204) is completion of your own Degree Completion Plan.
3. PHYS 241 and PHYS 242 can be substituted for PHYS 211 and PHYS 212 if Calculus prerequisites are met (requires MATH 273 and MATH 274).
4. CHEM 331 and CHEM 332 may be be required for graduate programs. Such choices should always be discussed with your adviser.
5. Contact the instructor regarding format and expectations

**NOTE:** Unit range totals are listed for options on a term-by-term basis. If you take the minimum number of units each semester, you may not have the minimum 120 units needed to graduate. You must review your overall progress toward your degree every term when you meet with your adviser.

1. Explain the core concepts and principles of Biology.
2. Demonstrate the scientific method through the use of hypothesis testing in the design and implementation of an experiment.
3. Utilize scientific methodologies from the biological sciences in the evaluation of issues in society.
4. Apply appropriate critical-thinking/problem-solving skills in biological sciences.
5. Communicate both verbally and in writing in discipline specific contexts.
6. Identify fundamental similarities and differences among various fields of study within the Biological Sciences.