

MAJOR IN BIOLOGY - ECOLOGY, EVOLUTION AND CONSERVATION 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. 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 Ecology, Evolution and Conservation 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 web page.

Requirements

The Ecology, Evolution & Conservation Concentration consists of 54-75 units. All Biology majors must complete minimum 19 units toward the major at Towson University, with at least 10 of these units at the upper (300–400) level. Courses taken to fulfill Ancillary Course requirements do not count toward units in residence.

Code	Title	Units
Foundation Courses		
BIOL 200 & 200L	BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LECTURE] and BIOLOGY I: INTRODUCTION TO CELLULAR BIOLOGY AND GENETICS [LAB]	4
BIOL 204	EDUCATIONAL AND CAREER PLANNING FOR THE BIOLOGIST	1
BIOL 206 & 206L	BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LECTURE] and BIOLOGY II: INTRODUCTION TO ECOLOGY AND EVOLUTION [LAB]	4
Intermediate Courses: Genetics, Biodiversity and Physiology		
BIOL 309	GENETICS	4
Select one Biodiversity option from the following:		3-8
BIOL 205 & BIOL 207	GENERAL BOTANY and GENERAL ZOOLOGY	
BIOL 208	BIODIVERSITY	
Select one Physiology option from the following:		3-8
BIOL 325	ANIMAL PHYSIOLOGY ¹	
BIOL 436	PLANT PHYSIOLOGY	
BIOL 342 & BIOL 343	HUMAN ANATOMY AND PHYSIOLOGY I FOR BIOLOGY MAJORS and HUMAN ANATOMY AND PHYSIOLOGY II FOR BIOLOGY MAJORS ¹	
Ancillary Courses		
Chemistry		

CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
CHEM 330 or CHEM 331 & CHEM 332	ESSENTIALS OF ORGANIC CHEMISTRY or ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY II	5-10
Mathematics		
Select one of the following:		3-4
MATH 211	CALCULUS FOR APPLICATIONS	
MATH 237	ELEMENTARY BIostatISTICS	
MATH 273	CALCULUS I	
PSYC 212	BEHAVIORAL STATISTICS	
Physics		
PHYS 211 or PHYS 241	GENERAL PHYSICS I; NON CALCULUS-BASED or GENERAL PHYSICS I CALCULUS-BASED	4
Ecology, Evolution and Conservation Concentration Courses		
BIOL 310 or BIOL 402	CONSERVATION BIOLOGY or GENERAL ECOLOGY	4
BIOL 405 or BIOL 413	MOLECULAR ECOLOGY, EVOLUTION AND CONSERVATION or EVOLUTION	3-4
Electives		
Select minimum three upper (300-400) elective courses. Minimum two courses must be from the following list of Ecology, Evolution and Conservation Concentration Electives. The remaining course may be selected from the list or from any course not already taken that may be counted toward any concentration of the major (excluding ancillary and UTeach courses). One elective course must be a lecture/laboratory course, a laboratory course, or BIOL 491.		8-12
Total Units		54-75
Ecology, Evolution and Conservation Concentration Electives		
BIOL 310	CONSERVATION BIOLOGY (if not taken as required)	4
BIOL 334	HUMANS, SCIENCE AND THE CHESAPEAKE BAY	3
BIOL 347	MARINE BIOLOGY	3
BIOL 353	INVERTEBRATE ZOOLOGY	4
BIOL 355	ANIMAL PARASITOLOGY	3
BIOL 371	ANIMAL BEHAVIOR	4
BIOL 402	GENERAL ECOLOGY (if not taken as required)	4
BIOL 405	MOLECULAR ECOLOGY, EVOLUTION AND CONSERVATION (if not taken as required)	4
BIOL 406	LIMNOLOGY	4
BIOL 413	EVOLUTION (if not taken as required)	3
BIOL 432	VASCULAR PLANT TAXONOMY	4
BIOL 435	PLANT ECOLOGY	4
BIOL 444	WILDLIFE MANAGEMENT	3
BIOL 446	TROPICAL ECOLOGY AND CONSERVATION	3

BIOL 447	TROPICAL FIELD ECOLOGY	4
BIOL 452	WETLAND ECOLOGY	4
BIOL 455	FISH BIOLOGY	4
BIOL 456	ORNITHOLOGY	4
BIOL 458	MAMMALOLOGY	4
BIOL 461	ENTOMOLOGY	4
BIOL 467	HERPETOLOGY	4
BIOL 472	ORGANISMAL FORM AND FUNCTION LABORATORY	3
BIOL 473	ECOLOGICAL FIELD METHODS LABORATORY	3
BIOL 474	MOLECULAR TECHNIQUES IN ECOLOGY, EVOLUTION, AND CONSERVATION	3
GEOG 221	INTRODUCTION TO GEOSPATIAL TECHNOLOGY ²	3

¹ Only one of BIOL 325 or BIOL 342 may be counted toward the major.

² Students can select GEOG 221 and two upper-level electives as an alternative.

Four-Year Plan of Study

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 206 & 206L (Core 8)	4
MATH 115 or 119 (Core 3) ¹	3 CHEM 131 & 131L	4
Core 1 (or Core 2)	3 MATH 211, 237, 273, or PSYC 212 (Core 3 if taking MATH 211, MATH 237 or MATH 273)	3-4
Core 4	3 Core 2 (or Core 1)	3
Core 5	3 Core 6	3
	16	17-18

Sophomore

Term 1	Units Term 2	Units
BIOL 204 ²	1 BIOL 205 (or elective if taking BIOL 208)	4
BIOL 207 or 208	4 PHYS 211 or 241 ³	4
BIOL 309	4 Core 10	3
CHEM 132 & 132L	4 Required Elective	4
Core 9	3	
	16	15

Junior

Term 1	Units Term 2	Units
BIOL 325, 342, or 436	4 BIOL 343 (if BIOL 342 selected) or elective	4
BIOL 405 or 413	4 BIOL 484 (recommended) ⁵	1

Required Elective	3-4 CHEM 330 or 331 ⁴	5
Core 11	3 Core 12	3

****Students should meet with their advisers to discuss REU programs, internships, etc., for next summer**

14-15		13
Senior	Units Term 2	Units
Term 1		
BIOL 310 or 402	4 Core 14	3
CHEM 332 (if CHEM 331 taken) (or elective)	5 Required Elective	4
Core 13	3 Elective	4
Elective	4 Elective	4
	16	15

Total Units 122-124

¹ Decisions regarding which class to take should be based on Mathematics placement tests and/or required prerequisites for MATH 211, MATH 237, MATH 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 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 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.

Learning Outcomes

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