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 54-73 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 Biodiversit	ty option from the following:	3-8
BIOL 205 & BIOL 207	GENERAL BOTANY and GENERAL ZOOLOGY	
BIOL 208	BIODIVERSITY	
Select one Physiology	y option from the following:	3-8
BIOL 325	ANIMAL PHYSIOLOGY ²	
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		

Cł	nemistry		
CI &	HEM 131 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CI &	HEM 132 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
CI &	HEM 333 333L or CHEM 334 & CHEM 336 & CHEM 337	ESSENTIALS OF ORGANIC CHEM [LECTURE] and ESSENTIALS OF ORGANIC CHEMISTRY LABORATORY ORGANIC CHEMISTRY I [LECTURE] and INTRODUCTORY ORGANIC CHEMISTRY LABORATORY	5-8
		and ORGANIC CHEMISTRY II [LECTURE]	
M	athematics		
Se	elect one of the follo	owing:	3-4
	MATH 211	CALCULUS FOR APPLICATIONS	
	MATH 237	ELEMENTARY BIOSTATISTICS	
	MATH 273		
	PSYC 212	BEHAVIORAL STATISTICS	
PI			4
Ы	HYS 211	BASED	4
	or PHYS 241	GENERAL PHYSICS I CALCULUS-BASED	
EC	cology, Evolution an	d Conservation Concentration Courses	4
BI	UL 310		4
	or BIOL 402		0.4
BI	OL 405	CONSERVATION	3-4
	or BIOL 413	EVOLUTION	
EI	ectives	(000,400) . I time	0.10
M EC Th ar cc cc	elect minimum three inimum two course cology, Evolution an ne remaining course by course not alread oncentration of the pourses). One elective pourse, a laboratory of	e upper (300-400) elective courses. s must be from the following list of d Conservation Concentration Electives. e may be selected from the list or from ly taken that may be counted toward any major (excluding ancillary and UTeach e course must be a lecture/laboratory course, or BIOL 491.	8-12
Тс	otal Units		54-73
С	ode	Title	Units
Ec	ology, Evolution an	d Conservation Concentration Electives	
BI	OL 310	CONSERVATION BIOLOGY (if not taken as required)	4
BI	OL 334	HUMANS, SCIENCE AND THE CHESAPEAKE BAY	3
BI	OL 347	MARINE BIOLOGY	3
BI	OL 353	INVERTEBRATE ZOOLOGY	4
BI	OL 355	ANIMAL PARASITOLOGY	3
BI	OL 371	ANIMAL BEHAVIOR	4
BI	OL 402	GENERAL ECOLOGY (if not taken as required)	4
BI	01 405		4
	UL 405	CONSERVATION (if not taken as required)	4
BI	OL 405	CONSERVATION (if not taken as required)	4

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BIOL 413	EVOLUTION (if not taken as required)	3
BIOL 419	ENVIRONMENTAL MICROBIOLOGY	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	MAMMALOGY	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 ³	3

¹ Students may substitute BIOL 191/BIOL 191L for BIOL 200/BIOL 200L if an A- or better is earned in each course component.

² Only one of BIOL 325 or BIOL 342 may be counted toward the major.
³ Students can select GEOG 221 and two upper-level electives as an alternative.

Departmental Research Honors Program

The Department of Biological Sciences' Research Honors program allows undergraduates to develop their critical thinking and research skills in a rigorous and collaborative environment. The program is a two-semester sequence of independent study, the culmination of which is the writing and public presentation and defense of a research thesis—a significant scholarly research paper prepared under the close supervision of a faculty member and one additional research thesis committee member.

Students who are interested in pursuing departmental research honors will need to contact a potential research mentor toward the beginning of their junior year. Once accepted by the research mentor, students should consult the Department Chair or the Departmental Honors Thesis Coordinator. Students will register for BIOL 491 under the supervision of their research mentor in one semester, and then BIOL 499 in the next semester. Students must receive a grade of \geq B in BIOL 491 in order to register for BIOL 499.

Departmental Research Honors are designated on a graduate's transcript when a student successfully completes BIOL 499, which requires a written thesis and a public seminar and a thesis defense in front of the student's thesis committee. Students pursuing departmental research honors are not required to be members of the Honors College. Departmental research honors are distinct from Latin honors (*cum laude*, etc.) and from enrollment in the Honors College.

Code	Title	Units
Required Course Wor	k for Departmental Honors in Biology	
BIOL 491	ELECTIVE IN INDEPENDENT RESEARCH	3

BIOL 499	HONORS SENIOR THESIS IN BIOLOGY	3

Total Units

Four-Year Plan of Study Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

Freshman		
Term 1	Units Term 2	Units
BIOL 200	4 BIOL 206	4
& 200L (Core 7)	& 206L (Core 8)	
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	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) ⁴	1
Required Elective	3-4 Core 12	3
Core 11	3 CHEM 333 & 333L	3-5
**Students should meet with their advisers to discuss REU programs, internships, etc., for next summer	OR	
	CHEM 334	
	Elecitve	3
	14-15	14-16

	14-15	14-16
Senior		
Term 1	Units Term 2	Units
BIOL 310 or 402	4 Core 14	3
CHEM 336 & CHEM 337	5 Required Elective	4
Core 13	3 Elective	4

Elective	4 Elective	4
	16	15

Total Units 123-127

- 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 CHEM 334 and CHEM 336 & CHEM 337 may be required for graduate programs. Such choices should always be discussed with your adviser.
- ⁴ 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

- 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.
- 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.