ENVIRONMENTAL SCIENCE (BIOLOGY), B.S.

The interdepartmental major in Environmental Science is designed to prepare students to monitor the quality of the environment, interpret the impact of human actions on terrestrial and aquatic ecosystems, and develop strategies for ecosystem restoration. Career opportunities in this field include conservation biology, environmental analysis, wildlife biology, environmental education, ecological research, environmental planning, resource management, and environmental chemistry.

Program Learning Outcomes

Students who complete the program in Environmental Science will be able to:

1. Demonstrate an understanding of the process of science and of the concepts and theories of biology across a broad range of organizational levels: molecular, cellular, organismal, and ecological.
2. Apply key concepts and principles in analytical chemistry including quantitative and instrumental analysis.
3. Use standard instrumentation and laboratory equipment to conduct scientific experiments and perform chemical characterization and analyses.
4. Participate in the life of the departments of Biology and/or Chemistry by involvement in science clubs and/or in various positions of responsibility such as graders, tutors, and teaching assistants.
5. Develop a rationally defensible integration of science and faith, particularly with regard to environmental stewardship.
6. Be prepared for post-graduate studies or science-related careers.

Code	Title	Units
Lower-Division Requirements		
BIO 1002	Environment and People (GE)	4
BIO 2010 and BIO 2010L	Cell Biology and Biochemistry (GE) and Cell Biology and Biochemistry Lab (GE)	4
BIO 2011 and BIO 2011L	Ecological and Evolutionary Systems (GE) and Ecological and Evolutionary Systems Lab (GE)	4
BIO 2012 and BIO 2012L	Organismal Biology and Organismal Biology Lab	4
CHE 1052 and CHE 1052L	General Chemistry I (GE) and General Chemistry I Lab (GE)	5
CHE 1053 and CHE 1053L	General Chemistry II and General Chemistry II Lab	4
CHE 2013	Analytical Chemistry	3
CHE 2094 and CHE 2094L	Organic Chemistry I and Organic Chemistry I Lab	4
MTH 1044	Calculus with Applications (GE)	4
Choose one (1) course from the following:		3
ECO 1001	Principles of Macroeconomics (GE)	
ECO 1002	Principles of Microeconomics (GE)	
SOC 2001	Cultural Anthropology (GE)	
Upper-Division Requirements		
BIO 3045 and BIO 3045L	Genetics and Genetics Lab	4
BIO 3063 and BIO 3063L	Conservation Ecology and Conservation Ecology Lab	4
BIO 4083	Introduction to Geographic Information Systems (GIS)	3
BIO 4097	Biology Seminar	1
CHE 4070 and CHE 4070L	Environmental Chemistry and Environmental Chemistry Lab	4
MTH 3063	Calculus Based Statistics with R	3
Upper-Division Electives		**12**
Of the 12 required upper-division electives, a minimum of 8 units of upper-division electives are required from approved environmental off-campus programs. Both departmental chairs (Biology and Chemistry) or their designees are responsible for approving all off-campus courses. At least one-half of upper-division units in the major must be taken at PLNU.		
The following courses can be used to transfer in these 8 units:		
EVS 3096	Advanced Biology	
EVS 3097	Advanced Ecology	
EVS 3098	Advanced Ecological Applications	
EVS 3099	Public Policy and Stewardship	
Advanced Science Electives		
Choose a minimum of eight (8) units from the following: [1,2]		8
BIO 3015 and BIO 3015L	Microbiology and Microbiology Lab	
BIO 3023 and BIO 3023L	Introduction to Oceanography and Introduction to Oceanography Lab	
BIO 3033 and BIO 3033L	Marine Biology and Marine Biology Lab	
BIO 3040 and BIO 3040L	Field Biology: Neotropical Ecology and Field Biology: Neotropical Ecology Lab	
BIO 3060	Ethnobotany	
BIO 3070	Sustainable Agriculture	
BIO 4010 and BIO 4010L	Vertebrate Biology and Vertebrate Biology Lab	
BIO 4023 and BIO 4023L	Advanced Human Physiology and Advanced Human Physiology Lab	
BIO 4030 and BIO 4030L	Animal Behavior and Animal Behavior Lab	
BIO 4073 and BIO 4073L	Experimental Marine Ecology and Experimental Marine Ecology Lab	
BIO 4050 and BIO 4050L	Advanced Biochemistry and Advanced Biochemistry Lab [3]	
CHE 2096 and CHE 2096L	Organic Chemistry II and Organic Chemistry II Lab	
CHE 3025 and CHE 3025L	Chemical Thermodynamics and Kinetics and Chemical Thermodynamics and Kinetics Lab	
CHE 3051	Organic Structure Elucidation	
CHE 4066	Bioinorganic Chemistry	
CHE 4068	Advanced Inorganic Chemistry	
Other Related Electives		
Choose a minimum of four (4) units from the following: [1,4]		4
Methodology:		
BIO 3052	Research Methodology	
BIO 4063	Learning and Teaching in Science	
BIO 4090	Internship in Biology	

	BIO 4099	Research in Biology
	CHE 4090	Internship in Chemistry
	CHE 4099	Research in Chemistry
Public Policy and Stewardship:		
	BUS 4075	Sustainability in Action
	PHL 3060	Philosophy and the Sciences
	POL 2090	World Regional Geography
	POL 4035	Global Governance
	POL 4041	Issues in Public Policy
Total Units		**82**

1 One or more approved off-campus environmental course(s) may fulfill part or all of this requirement.

2 Courses and their corresponding lab (if applicable) must be taken concurrently.

3 Or CHE 4050 and CHE 4050L

4 Students can customize their degree by taking one (1) course from each of the two (2) categories.