

BIOLOGY WITH ECOLOGY EMPHASIS (BS)

The growing significance of environmental issues to the overall health of our world in the new century requires more individuals who are scientifically trained to contribute to solving environmental problems.

The BS in Biology with Ecology emphasis is designed to provide in-depth training for students planning to do research in various areas of environmental sciences as either graduate students or employees of environmental agencies and companies. The curriculum includes the same foundational lecture and laboratory courses in the areas of cell biology, genetics, and ecology taken by general biology majors. Additional coursework focuses specifically on topics related to ecology and evolution.

Curriculum

This specialized Biology major requires 37 credit hours, including 9 required Biology courses (21 credit hours) and Biology elective courses (16 credit hours) plus cognate courses in Calculus, Chemistry and Physics. This track allows students to receive the strong background in fundamental biology required of all Biology majors, while also specializing in the areas of ecology and evolution. Students will follow the program outlined below:

Code	Title	Hours
Biology Courses: Required		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
BIOL 102	General Biology II	3
BIOL 112	General Biology II Lab	1
BIOL 251	Cell Biology	3
BIOL 265	Ecology	3
BIOL 266	Ecology Laboratory	1
BIOL 282	Genetics	3
BIOL 319	Evolution	3
Biology Courses: Electives (p. 1)		16
At least six (6) credits must be at 300-level and at least two (2) elective courses must include a laboratory component (p. 2)		
At least two (2) Electives (p. 3) must be designated as Ecology Electives		
Chemistry		
CHEM 160	Chemical Structure and Properties	3
or CHEM 101	General Chemistry A Lecture/Discussion	
or CHEM 105	Chemical Principles	
CHEM 161	Chemical Structure and Properties Laboratory	1
or CHEM 105	Chemical Principles	
or CHEM 111	General Chemistry Lab A	
CHEM 180	Chemical Reactivity I	3
or CHEM 221	Organic Chemistry I Lec/Disc	
or CHEM 223	Organic Chemistry A Lec/Disc	
CHEM 181	Chemical Reactivity I Lab	1
or CHEM 221	Organic Chemistry I Lec/Disc	
or CHEM 225	Organic Chemistry Lab A	
CHEM 240	Chemical Reactivity II	3

or CHEM 222	Organic Chemistry II Lec/Disc	
or CHEM 224	Organic Chemistry B Lec/Disc	
CHEM 241	Chemical Reactivity II Laboratory	1
or CHEM 222	Organic Chemistry II Lec/Disc	
or CHEM 226	Organic Chemistry Lab B	
CHEM 260	Quantitative Methods in Chemistry	3
or CHEM 102	General Chemistry B Lecture/Discussion	
or CHEM 106	Basic Inorganic Chemistry	
CHEM 261	Quantitative Methods in Chemistry Laboratory	1
or CHEM 106	Basic Inorganic Chemistry	
or CHEM 112	General Chemistry Lab B	

Mathematics

MATH 131	Applied Calculus I	3-4
or MATH 161	Calculus I	
MATH 132	Applied Calculus II	3-4
or MATH 162	Calculus II	

Physics

PHYS 111	College Physics I Lec / Dis	3-4
or PHYS 121	College Physics I with Calculus Lecture/Discussion	
or PHYS 125	General Physics I Lec/Dis	
PHYS 111L	College Physics Laboratory I	1
PHYS 112	College Physics II Lec/Disc	3
or PHYS 122	College Physics II with Calculus Lecture/Discussion	
or PHYS 126	General Physics II Lec/Dis	
PHYS 112L	College Physics Lab II	1

Total Hours **67**

Biology Electives

Code	Title	Hours
Biology		
Any BIOL 200-Level Course ¹		
Any BIOL 300-Level Course ¹		
BIOL 2TRN Biology 200-Level Transfer		
BIOL 3TRN Biology 300-Level Transfer		
Anthropology		
ANTH 246 / BIOL 246	Ancient Human-Animal Interactions	3
ANTH 280 / BIOL 280	Evolution of Human Disease	3
ANTH 281 / BIOL 281	Evolution of the Human Diet	3
ANTH 325 / BIOL 325	Primatology-Behavior & Ecology	3
ANTH 326 / BIOL 326	Human Osteology Lec/Lab	4
ANTH 327 / BIOL 378	Dental Anthropology	3
ANTH 346 / BIOL 346	Biology of Women	3
ANTH 359 / BIOL 359	Paleopathology	3
Chemistry		

CHEM 361 / BIOL 366	Principles of Biochemistry	3	BIOL 111	General Biology I Lab	1
Computer Science			BIOL 112	General Biology II Lab	1
COMP 381 / BIOL 388	Bioinformatics	3	200-Level Labs		
Environmental Science			The following course is required:		
ENVS 215 / BIOL 215	Ornithology	3	BIOL 266	Ecology Laboratory	1
ENVS 267 / BIOL 347	Bird Conservation and Ecology	3	Biology Elective Labs		
ENVS 319 / BIOL 329	Winter Ecology	3	Choose at least two of the following courses:		
ENVS 340 / BIOL 340	Natural History of Belize	3	BIOL 205	Plant Biology Lec/Lab	4
ENVS 345 / BIOL 349	Conservation and Sustainability of Neotropical Ecosystems	3	BIOL 210	Laboratory Techniques	2
ENVS 369 / BIOL 348	Field Ornithology	3	BIOL 242	Human Structure and Function I	4
Neuroscience			BIOL 243	Human Structure and Function II	4
NEUR 101	Introduction to Neuroscience ²	3	BIOL 252	Cell Biology Laboratory	1
NEUR 300 / BIOL 303	Seminar in Neuroscience	1	BIOL 283	Genetics Laboratory	1
NEUR 301 / BIOL 373	Laboratory in Neuroscience I	4	BIOL 302	General Microbiology Lec/Lab	4
NEUR 302	Laboratory in Neuroscience II	3	BIOL 313 / PSYC 311	Lab in Psychobiology	3
Physics			BIOL 315	Introductory Immunology Lec/Lab	4
PHYS 371	Biophysics	3	BIOL 316	Limnology Lec/Lab	4
Psychology			BIOL 323	Comparative Anatomy Lec/Lab	4
PSYC 240 / BIOL 240	Psychology-Biology of Perception ²	3	BIOL 326 / ANTH 326	Human Osteology Lec/Lab	4
PSYC 311 / BIOL 313	Lab in Psychobiology	3	BIOL 327	Wetland Ecology	4
PSYC 382 / BIOL 284	Behavioral and Cognitive Neuroscience	3	BIOL 340 / ENVS 340	Natural History of Belize	3
PSYC 388 / BIOL 373	Laboratory in Neuroscience I	4	BIOL 341	Histology Lec/Lab	4
Statistics			BIOL 342	Human Anatomy	4
STAT 310 / BIOL 310	Categorical Data Analysis	3	BIOL 349 / ENVS 345	Conservation and Sustainability of Neotropical Ecosystems	3
STAT 335 / BIOL 335	Introduction to Biostatistics	3	BIOL 355	Parasitology Lec/Lab	4
STAT 336 / BIOL 336	Advanced Biostatistics	3	BIOL 360	Field Biology	3
STAT 337 / BIOL 337	Quantitative Methods in Bioinformatics	3	BIOL 363	Entomology Lec/Lab	4
			BIOL 366L	Cell Physiology & Biochemistry Lab	3
			BIOL 367	Bioimaging	4
			BIOL 368	Plant Ecology Lec/Lab	4
			BIOL 370	Ichthyology Lec/Lab	4
			BIOL 373 / NEUR 301 / PSYC 388	Laboratory in Neuroscience I	4
			BIOL 375	Aquatic Insects Lecture & Laboratory	4
			BIOL 385	Prin Electron Microscopy Lec/Lab	4
			BIOL 390	Molecular Biology Laboratory	4
			BIOL 395	Special Topics in Biology (if designated as a laboratory course)	3
			BIOL 395L	Special Topics Laboratory ¹	1-4
			BIOL 396	Research ²	3
			BIOL 398	Internship in Biology ²	1-3
			NEUR 302	Laboratory in Neuroscience II	3

¹ If not already taken as a 200-level or 300-level required course.

² Either BIOL 240/PSYC 240 Psychology-Biology of Perception OR NEUR 101 Introduction to Neuroscience (but NOT both) count as Biology Electives.

Lab Requirements

Code	Title	Hours
100-Level Labs		
Both of the following courses are required:		

¹ Students may take this special topics course more than one time for credit, so long as the topic differs.

² Either BIOL 396 Research OR BIOL 398 Internship in Biology (but NOT both) count as Biology Electives.

Ecology Electives

Code	Title	Hours
Biology		
BIOL 205	Plant Biology Lec/Lab	4
BIOL 296	Introduction to Research ¹	1
BIOL 316	Limnology Lec/Lab	4
BIOL 320	Animal Behavior	3
BIOL 327	Wetland Ecology	4
BIOL 328	Conservation Biology	3
BIOL 330	Global Change Biology	3
BIOL 344	Microbial Evolution and Human Well-being	3
BIOL 355	Parasitology Lec/Lab	4
BIOL 360	Field Biology	3
BIOL 363	Entomology Lec/Lab	4
BIOL 368	Plant Ecology Lec/Lab	4
BIOL 369	Invertebrate Biology	3
BIOL 370	Ichthyology Lec/Lab	4
BIOL 375	Aquatic Insects Lecture & Laboratory	4
BIOL 395	Special Topics in Biology ¹	3
BIOL 395L	Special Topics Laboratory ¹	1-4
BIOL 396	Research ^{1,2}	3
BIOL 398	Internship in Biology ^{1,2}	1-3
BIOL 399	Individual Study ¹	1-3
Anthropology		
ANTH 246 / BIOL 246	Ancient Human-Animal Interactions	3
ANTH 281 / BIOL 281	Evolution of the Human Diet	3
ANTH 325 / BIOL 325	Primatology-Behavior & Ecology	3
Environmental Science		
ENVS 215 / BIOL 215	Ornithology	3
ENVS 267 / BIOL 347	Bird Conservation and Ecology	3
ENVS 319 / BIOL 329	Winter Ecology	3
ENVS 340 / BIOL 340	Natural History of Belize	3
ENVS 345 / BIOL 348	Conservation and Sustainability of Neotropical Ecosystems	3
ENVS 369 / BIOL 349	Field Ornithology	3
Statistics		
STAT 335 / BIOL 335	Introduction to Biostatistics	3

¹ Courses must be taken in an Ecology related topic.

² Either BIOL 396 Research OR BIOL 398 Internship in Biology (but NOT both) count as Biology Electives.

Suggested Sequence of Courses

The below sequence of courses is meant to be used as a suggested path for completing coursework. An individual student's completion of

requirements depends on course offerings in a given term as well as the start term for a major or graduate study. Students should consult their advisor for assistance with course selection.

The biology department recommends that students pursuing the BS in Biology with Ecology Emphasis complete their required classes in the following sequence. Requirements include courses in Biology (BIOL), Chemistry (CHEM), Mathematics (MATH) and Physics (PHYS):

Course	Title	Hours
First Semester		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
CHEM 160	Chemical Structure and Properties	3
CHEM 161	Chemical Structure and Properties Laboratory	1
MATH 131	Applied Calculus I	3
Hours		11
Second Semester		
BIOL 102	General Biology II	3
BIOL 112	General Biology II Lab	1
CHEM 180	Chemical Reactivity I	3
CHEM 181	Chemical Reactivity I Lab	1
MATH 132	Applied Calculus II	3
Hours		11
Third Semester		
BIOL 265	Ecology	3
BIOL 266	Ecology Laboratory	1
CHEM 240	Chemical Reactivity II	3
CHEM 241	Chemical Reactivity II Laboratory	1
Hours		8
Fourth Semester		
BIOL 282 or BIOL 251	Genetics or Cell Biology	3
CHEM 260	Quantitative Methods in Chemistry	3
CHEM 261	Quantitative Methods in Chemistry Laboratory	1
Hours		7
Fifth Semester		
BIOL 251 or BIOL 282	Cell Biology or Genetics	3
PHYS 111	College Physics I Lec / Dis	3
PHYS 111L	College Physics Laboratory I	1
Hours		7
Sixth Semester		
BIOL 319	Evolution	3
PHYS 112	College Physics II Lec/Disc	3
PHYS 112L	College Physics Lab II	1
BIOL Elective (Ecology)		3
Hours		10
Seventh Semester		
BIOL Elective (Ecology)		3
BIOL Electives		5
Hours		8

Eighth Semester

BIOL Electives	5
Hours	5
Total Hours	67

TRANSFERRING CREDIT

Transfer students seeking the BS in Biology with Ecology Emphasis degree must take a minimum of 20 credit hours in Biology courses at Loyola. No more than 18 credit hours from another institution may be applied to the BS in Biology with Ecology Emphasis degree program.

COURSE REPEAT RULE

Effective with the spring 2009 semester, students are allowed only TWO attempts to pass Biology courses with a C- or better grade. The two attempts includes withdrawals (W).

The procedure for securing approval for a repeat: Students must come to the Biology Department, fill out a permission to register form, and obtain signatures of both the faculty instructor, and the Biology Chairperson or Assistant-Chairperson. A copy of this form is then submitted to the student's academic advisor to secure final permission for the repeat. After a second attempt to pass a Biology course, it is at the discretion of the Biology Chairperson or Assistant-Chairperson whether the student may repeat the course.

College of Arts and Sciences Graduation Requirements

All Undergraduate students in the College of Arts and Sciences are required to take two Writing Intensive courses (6 credit hours) as well as complete a foreign language requirement at 102-level or higher (3 credit hours) or a language competency test. More information can be found here (<https://www.luc.edu/cas/college-requirements/>).

Additional Undergraduate Graduation Requirements

All Undergraduate students are required to complete the University Core, at least one Engaged Learning course, and UNIV 101. SCPS students are not required to take UNIV 101. Nursing students in the Accelerated BSN program are not required to take core or UNIV 101. You can find more information in the University Requirements (<https://catalog.luc.edu/undergraduate/university-requirements/>) area.

At the completion of the Undergraduate Biology with Ecology Emphasis Major:

1. Students will demonstrate developing mastery of the following Vision and Change core concepts and their related principals as they relate to population ecology, community ecology, and ecosystem-level concepts: evolution (the diversity of life-forms that have evolved over time through mutations, selection and genetic change; structure and function (the basic units of biological structures that define the functions of all living things); information flow, exchange and storage (the influence of genetics on the control of the growth and behavior of organisms); pathways and transformations of energy and matter (the ways in which chemical transformation pathways and the laws of thermodynamics govern the growth and change of biological systems); and systems (the ways in which living things are interconnected and interact with one another).
2. Students will be able to retrieve, synthesize, and critically evaluate scientific literature.
3. Students will be able to communicate (orally and in writing) results and interpretation of scientific research.
4. Students will be able to design and implement experiments that test predictive hypotheses, analyze data, report results, and interpret the significance of these experiments to enhance their understanding of ecological systems.