

BIOLOGY (BS)

Loyola's Bachelor of Science (BS) in Biology degree program is designed for students wishing to pursue a career in the biological sciences or a range of healthcare fields. The curriculum includes foundational lecture and laboratory courses in the areas of cell biology, genetics, and ecology. Students can then pursue their individual interests in biology through the diverse electives offered each term. Biology majors also have a myriad of undergraduate student research opportunities on campus. In addition, students have the opportunity to secure internships at hospitals, medical equipment companies, zoos, biotech companies, and other employers.

Many graduates of the biology program pursue advanced degrees in the biological or biomedical fields. For example, Loyola students who work with the Pre-Health Professions Advisory Committee (PHPAC) have a high acceptance rate into health professional schools. This also attests to the caliber of Loyola's Biology program.

Related Programs

Minor

- Biology Minor (<https://catalog.luc.edu/undergraduate/arts-sciences/biology/biology-minor/>)

Combined

- Biology/Bioinformatics (BS/MS) (<https://catalog.luc.edu/undergraduate/accelerated-bachelors-masters-program/biology-bioinformatics-bs-ms/>)
- Biology/Business (BS/MBA) (<https://catalog.luc.edu/undergraduate/accelerated-bachelors-masters-program/biology-business-bs-mba/>)

Curriculum

The Biology major requires 37 credit hours, including 8 required Biology courses (18 credit hours) and Biology elective courses (19 credit hours) plus cognate courses in Calculus, Chemistry and Physics. This allows students to receive a strong background in fundamental biology required of all Biology majors. 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 282	Genetics	3
Select one of the following:		1
BIOL 252	Cell Biology Laboratory	
BIOL 266	Ecology Laboratory	
BIOL 283	Genetics Laboratory	

Biology Courses: Electives (p. 1) ¹ **19**

At least nine (9) credits must be at 300-level and at least two (2) elective courses must include a laboratory component. (p. 2)

NOTE: Special topics courses (BIOL 377, BIOL 394, BIOL 394E, BIOL 394M, BIOL 395, BIOL 395E, BIOL 395M, BIOL 397, BIOL 397E, BIOL 397M) can be taken multiple times for credit as long as the course topic is different.

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
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

¹ Special topics courses (BIOL 377, BIOL 394, BIOL 394E, BIOL 394M, BIOL 395, BIOL 395E, BIOL 395M, BIOL 397, BIOL 397E, BIOL 397M) can be taken multiple times for credit as long as the course topic is different.

Biology Electives

Code	Title	Hours
Biology		
Any BIOL 200-Level Course ^{1,2}		
Any BIOL 300-Level Course ³		
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
Environmental Science		
ENVS 215 / BIOL 215	Ornithology	3
ENVS 267 / BIOL 347	Bird Conservation and Ecology	3
ENVS 340 / BIOL 340	Natural History of Belize	3
ENVS 345 / BIOL 349	Conservation and Sustainability of Neotropical Ecosystems	3
ENVS 367	Mammalogy	3
ENVS 369 / BIOL 348	Field Ornithology	3
Neuroscience		
NEUR 101	Introduction to Neuroscience ⁴	3
NEUR 300 / BIOL 303	Seminar in Neuroscience	1
NEUR 301 / BIOL 373	Laboratory in Neuroscience I	4
NEUR 302	Laboratory in Neuroscience II	3
Physics		
PHYS 371	Biophysics	3
Psychology		
PSYC 240 / BIOL 240	Psychology-Biology of Perception ⁴	3
PSYC 311 / BIOL 313	Lab in Psychobiology	3
PSYC 382 / BIOL 284	Behavioral and Cognitive Neuroscience	3
PSYC 388 / BIOL 373	Laboratory in Neuroscience I	4
Statistics		
STAT 310 / BIOL 310	Categorical Data Analysis	3
STAT 335 / BIOL 335	Introduction to Biostatistics	3

STAT 336 / BIOL 336	Advanced Biostatistics	3
STAT 337 / BIOL 337	Quantitative Methods in Bioinformatics	3

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

² BIOL 296 Introduction to Research can be taken multiple times, but only a maximum of 2 credit hours count as Biology Electives.

³ A maximum of 3 total credits of BIOL 396 Research, BIOL 396E Research (Ecology Emph), BIOL 396M Research (Molecular Emph), BIOL 398 Internship in Biology, BIOL 398E Internship in Biology (Ecology Emph), BIOL 398M Internship in Biology (Molecular Emph) can count as Biology Electives.

⁴ 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:		
BIOL 111	General Biology I Lab	1
BIOL 112	General Biology II Lab	1
200-Level Labs		
Choose one of the following courses:		
BIOL 252	Cell Biology Laboratory	1
BIOL 266	Ecology Laboratory	1
BIOL 283	Genetics Laboratory	1
Biology Elective Labs		
Choose at least two of the following courses:		
BIOL 205	Plant Biology Lec/Lab	4
BIOL 210	Laboratory Techniques	2
BIOL 242	Anatomy and Physiology I	4
BIOL 243	Anatomy and Physiology II	4
BIOL 252	Cell Biology Laboratory ¹	1
BIOL 266	Ecology Laboratory ¹	1
BIOL 283	Genetics Laboratory ¹	1
BIOL 302	General Microbiology Lec/Lab	4
BIOL 313 / PSYC 311	Lab in Psychobiology	3
BIOL 315	Introductory Immunology Lec/Lab	4
BIOL 316	Limnology Lec/Lab	4
BIOL 323	Comparative Anatomy Lec/Lab	4
BIOL 326 / ANTH 326	Human Osteology Lec/Lab	4
BIOL 327	Wetland Ecology	4
BIOL 340 / ENVS 340	Natural History of Belize	3
BIOL 341	Histology Lec/Lab	4
BIOL 342	Human Anatomy	4
BIOL 347 / ENVS 267	Bird Conservation and Ecology	3
BIOL 348 / ENVS 369	Field Ornithology	3

BIOL 349 / ENVS 345	Conservation and Sustainability of Neotropical Ecosystems	3
BIOL 353	Natural History of Vertebrates	4
BIOL 355	Parasitology Lec/Lab	4
BIOL 360	Field Biology	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 394	Special Topics in Biology Laboratory	1-4
BIOL 394E	Special Topics in Biology Laboratory (Ecology Emph)	1-4
BIOL 394M	Special Topics in Biology Laboratory (Molecular Emph)	1-4
BIOL 395L	Special Topics Laboratory	1-4
BIOL 396	Research ²	3
BIOL 396E	Research (Ecology Emph) ²	3
BIOL 396M	Research (Molecular Emph) ²	3
BIOL 397	Course-Based Undergraduate Research Experience in Biology	1-4
BIOL 397E	Course-based Undergraduate Research Experience in Biology (Ecology Emph)	1-4
BIOL 397M	Course-based Undergraduate Research Experience in Biology (Molecular Emph)	1-4
BIOL 398	Internship in Biology ²	1-3
BIOL 398E	Internship in Biology (Ecology Emph) ²	1-3
BIOL 398M	Internship in Biology (Molecular Emph) ²	1-3
NEUR 302	Laboratory in Neuroscience II	3

¹ If not already taken as the 200-level required lab.

² A maximum of one course of BIOL 396 Research, BIOL 396E Research (Ecology Emph), BIOL 396M Research (Molecular Emph), BIOL 398 Internship in Biology, BIOL 398E Internship in Biology (Ecology Emph), BIOL 398M Internship in Biology (Molecular Emph) can count toward the 2 minimum courses of Biology Labs.

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.

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 ¹	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 ¹	3
Hours		11

Third Semester

CHEM 240	Chemical Reactivity II	3
CHEM 241	Chemical Reactivity II Laboratory	1
Select one of the following:		3

BIOL 251	Cell Biology	
BIOL 265	Ecology	
BIOL 282	Genetics	

Select one of the following:		1
BIOL 252	Cell Biology Laboratory	
BIOL 266	Ecology Laboratory	
BIOL 283	Genetics Laboratory	

Hours **8**

Fourth Semester

CHEM 260	Quantitative Methods in Chemistry	3
CHEM 261	Quantitative Methods in Chemistry Laboratory	1

Select one of the following:		3
BIOL 251	Cell Biology	
BIOL 265	Ecology	
BIOL 282	Genetics	

Hours **7**

Fifth Semester

Select one of the following:		3
BIOL 251	Cell Biology	
BIOL 265	Ecology	
BIOL 282	Genetics	

PHYS 111	College Physics I Lec / Dis ¹	3
PHYS 111L	College Physics Laboratory I	1

Hours **7**

Sixth Semester

BIOL Elective		4
PHYS 112	College Physics II Lec/Disc ¹	3
PHYS 112L	College Physics Lab II	1

Hours **8**

Seventh Semester

BIOL Elective		4
BIOL Elective		3

Hours **7**

Eighth Semester

BIOL Elective		4
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BIOL Elective	4
Hours	8
Total Hours	67

¹ May be replaced by a more difficult course.

Transferring Credit

Transfer students seeking the BS in Biology 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 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.

Learning Outcomes

At the completion of the Undergraduate Biology Major:

- Students will demonstrate developing mastery of the following Vision and Change core concepts and their related principals: 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).

- Students will be able to retrieve, synthesize, and critically evaluate scientific literature.
- Students will be able to communicate (orally and in writing) results and interpretation of scientific research.
- Students will be able to design and implement experiments that test predictive hypotheses, analyze data, report results, and interpret the significance of these experiments.