

BIOPHYSICS (BS)

The Biophysics major is an interdisciplinary program on the cutting edge of new developments in the biosciences. Offered by the Departments of Physics and Biology, the biophysics major provides rigorous training in biosciences, mathematics, and lab skills. The degree prepares students for research careers in biophysics, biochemistry, biomedical engineering, and physics. Biophysics is an ideal major for students considering careers in medicine, optometry, dentistry, and other applied health sciences.

Related Programs

Major

- Biology (BS) (<https://catalog.luc.edu/undergraduate/arts-sciences/biology/biology-bs/>)
- Physics (BS) (<https://catalog.luc.edu/undergraduate/arts-sciences/physics/physics-bs/>)

Minor

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

Curriculum

This course of study prepares one for careers in medicine, medical research, nano-sciences, biophysics, medical physics, biomedical engineering, and biotechnology. A strong physics and mathematics background is fortified with biology and chemistry classes. A minimum grade of C- must be earned to satisfy a course requirement and a 2.0 minimum overall GPA is required for each

Code	Title	Hours
Required Courses		
<i>Physics</i>		
PHYS 121	College Physics I with Calculus Lecture/Discussion	3
PHYS 111L	College Physics Laboratory I	1
PHYS 122	College Physics II with Calculus Lecture/Discussion	3
PHYS 126F	Freshman Projects	1
PHYS 112L	College Physics Lab II	1
PHYS 235	Modern Physics	3
PHYS 235L	Modern Physics Laboratory	1
PHYS 301	Mathematical Methods in Physics	3
PHYS 314	Theoretical Mechanics I	3
PHYS 351	Electricity and Magnetism I	3
<i>Physics Elective</i>		
Select one of the following:		3
PHYS 310	Optics	
PHYS 328	Thermal Physical & Statistical Mechanics	
PHYS 361	Quantum Mechanics I	
<i>Biology</i>		
Select one of the following:		1-3
BIOL 101	General Biology I	
BIOL 111	General Biology I Lab	
BIOL 251	Cell Biology	

BIOL 282 Genetics

Biophysics Elective Options

Students must complete 10 credit hours to fulfill this requirement from the following: 10

BIOL 102	General Biology II ¹ or COMP 18(Computing and Data Analysis for the Sciences
BIOL 112	General Biology II Lab
BIOL 252	Cell Biology Laboratory
BIOL 283	Genetics Laboratory
BIOL 317	Models of Human Disease
BIOL 335 / STAT 335	Intro to Biostatistics
BIOL 366	Cell Physiology & Biochemistry
BIOL 366L	Cell Physiology & Biochemistry Lab
BIOL 387	Genomics
BIOL 388	Bioinformatics
BIOL 390	Molecular Biology Laboratory
BIOL 382	Molecular Genetics
COMP 180	Computing and Data Analysis for the Sciences ¹
PHYS 130	Introduction to Computational Physics ¹
PHYS 310L	Optics Lab
PHYS 338	Advanced Physics Laboratory
PHYS 371	Biophysics
PHYS 391	Research ²

General Chemistry A: Lecture, Discussion & Lab

CHEM 101 & CHEM 111	General Chemistry A Lecture/Discussion and General Chemistry Lab A	4
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General Chemistry B: Lecture, Discussion & Lab

CHEM 102 & CHEM 112	General Chemistry B Lecture/Discussion and General Chemistry Lab B ³	4
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Organic Chemistry A: Lecture, Discussion & Lab

CHEM 223 & CHEM 225	Organic Chemistry A Lec/Disc and Organic Chemistry Lab A ⁴	4
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Organic Chemistry B: Lecture, Discussion & Lab

CHEM 224 & CHEM 226	Organic Chemistry B Lec/Disc and Organic Chemistry Lab B ⁵	4
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Mathematics

MATH 161	Calculus I	4
MATH 162	Calculus II	4
MATH 263	Multivariable Calculus	4
MATH 264	Ordinary Differential Equations	3

Total Hours 67-69

¹ Students may receive degree credit for only one of the following: BIOL 102, COMP 180, or PHYS 130.

² Students may only count 1 credit hour of PHYS 391 Research toward the degree.

³ CHEM 106 Basic Inorganic Chemistry may be substituted

⁴ CHEM 221 Organic Chemistry I Lec/Disc may be substituted

⁵ CHEM 222 Organic Chemistry II Lec/Disc may be substituted

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 Year		
Fall		
PHYS 121	College Physics I with Calculus Lecture/ Discussion	3
PHYS 111L	College Physics Laboratory I	1
MATH 161	Calculus I	4
CHEM 160	Chemical Structure and Properties	3
CHEM 161	Chemical Structure and Properties Laboratory	1
UCWR 110	Writing Responsibly	3
Hours		15
Spring		
PHYS 122	College Physics II with Calculus Lecture/ Discussion	3
PHYS 112L	College Physics Lab II	1
PHYS 126F	Freshman Projects	1
MATH 162	Calculus II	4
CHEM 180	Chemical Reactivity I	3
CHEM 181	Chemical Reactivity I Lab	1
Core		3
Hours		16
Second Year		
Fall		
PHYS 235	Modern Physics	3
PHYS 235L	Modern Physics Laboratory	1
MATH 263	Multivariable Calculus	4
MATH 264	Ordinary Differential Equations ¹	3
CHEM 240	Chemical Reactivity II	3
CHEM 241	Chemical Reactivity II Laboratory	1
Hours		15
Spring		
PHYS 301	Mathematical Methods in Physics	3
CHEM 260	Quantitative Methods in Chemistry	3
CHEM 261	Quantitative Methods in Chemistry Laboratory	1
BIOL 101	General Biology I	3
BIOL 102	General Biology II	3
Core		3
Hours		16
Third Year		
Fall		
PHYS 351	Electricity and Magnetism I	3
BIOL 251	Cell Biology	3
BIOL 282	Genetics	3
Core		3
Core		3
Hours		15

Spring

PHYS 314	Theoretical Mechanics I	3
BPHY 300-Level Elective		3
PHYS 310	Optics ²	3
PHYS 310L	Optics Lab ²	1
Core		3
Core		3
Hours		16

Fourth Year

Fall		
BPHY 300-Level Elective		3
Core		3
Core		3
Core		3
Core		3
Hours		15

Spring

BPHY 300-Level Elective		3
Core		3
Core		3
Core		3
General Elective		2
Hours		14
Total Hours		122

¹ Students can take MATH 264 in the spring semester of their second year, but it would be best taken before PHYS 301.

² PHYS 310 Optics/PHYS 310L Optics Lab can be taken in the spring of the fourth year

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

- Demonstrate foundational knowledge in physics and biology, and the acquisition of new knowledge via the scientific method.
- Develop a deeper understanding of the connection between the biological and the physical sciences.

- Understand and be able to employ laboratory techniques and computer skills used in biological and physical science labs.
- Possess an understanding of the intermediate level mathematics needed to model and solve problems based in the physical and biological sciences.
- Collect and analyze data to develop, refine, or falsify scientific theories.
- Learn effective and ethical methods for collaborating with others on scientific and technical projects.