PHYSICS WITH COMPUTER SCIENCE (BS)

Physics is understood in terms of many mathematical relationships that are much easier to state than solve, and computer science has become a major part of many physicists' work to solve enormous problems. This major is preparation for graduate study in physics, applied physics, computer science, and especially in the burgeoning research field of computational physics, as well as in many branches of engineering. Employment opportunities are in the industries of R&D and manufacturing, research and teaching in academic institutions, and research in government and private laboratories.

Curriculum

This program is similar to the theoretical physics/applied mathematics option, except that some of the mathematics courses are replaced by computer science courses. A minimum grade of C- must be earned to satisfy a course requirement and a 2.0 minimum overall GPA is required for each major or minor. Final confirmation of degree requirements is subject to department, school, and university approval.

Code	Title	Hours
Required Courses		
Physics		
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 303	Electronics I	3
PHYS 303L	Electronics Laboratory	1
PHYS 310	Optics	3
PHYS 310L	Optics Lab	1
PHYS 314	Theoretical Mechanics I	3
PHYS 351	Electricity and Magnetism I	3
PHYS 361	Quantum Mechanics I	3
Mathematics		
MATH 161	Calculus I	4
MATH 162	Calculus II	4
MATH 263	Multivariable Calculus	4
MATH 264	Ordinary Differential Equations	3
Computer Science		
COMP 141	Introduction to Computing Tools and Techniques	3
COMP 170	Introduction to Object-Oriented Programming	3
COMP 264	Introduction to Computer Systems	3
COMP 271	Data Structures I	3
COMP 272	Data Structures II	3
Discrete Mathematics Choice		
COMP 163	Discrete Structures	3
or MATH 201	Introduction to Discrete Mathematics & Number Theory	
Computer Science Choice		
COMP 313	Object-Oriented Design	3
or COMP 363	Design and Analysis Computer Algorithms	
300-Level Comp Electives or Equivalent		
Select two of the following:		6
BIOL 388	Bioinformatics	
BIOL 392	Metagenomics	
COMP 300-Level Course		
MATH 309	Numerical Methods	
MATH 328	Algebraic Coding Theory	
MATH 331	Cryptography	
PHYS 328	Thermal Physical & Statistical Mechanics	
PHYS 338	Advanced Physics Laboratory	
STAT 321	Computational Aspects of Modeling and Simulation	
Total Hours		**75**

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
COMP 141	Introduction to Computing Tools and Techniques	3
UCWR 110	Writing Responsibly	3
	Hours	**14**
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
COMP 170	Introduction to Object-Oriented Programming	3
Core		3
	Hours	**15**
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
COMP 163	Discrete Structures	3

Core		3
	Hours	**17**
Spring		
PHYS 301	Mathematical Methods in Physics	3
PHYS 314	Theoretical Mechanics I	3
COMP 163	Discrete Structures	3
COMP 271	Data Structures I	3
Core		3
	Hours	**15**
Third Year		
Fall		
PHYS 351	Electricity and Magnetism I	3
PHYS 303	Electronics I [2]	3
PHYS 303L	Electronics Laboratory [2]	1
COMP 272	Data Structures II	3
Core		3
Core		3
	Hours	**16**
Spring		
PHYS 310	Optics [3]	3
PHYS 310L	Optics Lab [3]	1
PHYS 361	Quantum Mechanics I	3
COMP 264	Introduction to Computer Systems	3
Core		3
Core		3
	Hours	**16**
Fourth Year		
Fall		
COMP 363	Design and Analysis Computer Algorithms	3
PCSC 300-Level Elective		3
Core		3
Core		3
Core		3
	Hours	**15**
Spring		
PCSC 300-Level Elective		3
Core		3
Core		3
Core		3
General Elective		1
	Hours	**13**
	Total Hours	**121**

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

2 Students can take PHYS 303 Electronics I & PHYS 303L Electronics Laboratory in the fall semester of their fourth year.

3 Students can take PHYS 310 Optics & PHYS 310L Optics Lab in the spring semester of their 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

Interdisciplinary fields involving science and technology continuously change and present exciting challenges. If you are a student interested in these fields, then a degree in Physics with Computer Science may be just right for you.

By completing the Physics with Computer Science degree, students will:

1. Demonstrate foundational knowledge in the physical sciences and the acquisition of new knowledge via the scientific method.
2. Use mathematical techniques to model physical systems and extract both quantitative and qualitative descriptions of their behavior.
3. Acquire specific knowledge in the computational sciences.
4. Gain an understanding and appreciation of interdisciplinary approach in the physical and computational sciences.
5. Learn effective and ethical methods for collaborating with others on scientific and technical projects.