

PHYSICS AND ASTRONOMY, PHD

The University of Pennsylvania Department of Physics and Astronomy is a world-leading institution that generally is regarded as among the very best places for graduate students to obtain a PhD. Graduate students at Penn combine a short term of coursework with independent, original research that forms the basis of their dissertation and typically their first publications. A rich program of seminars and colloquia by invited speakers from across the world supplements what students learn in classes and during their research activities.

Primary research areas include outstanding theoretical and experimental work in both hard and soft condensed matter physics, often done in conjunction with other schools and departments at Penn, with some laboratories located in Penn's Singh Center for Nanotechnology and the Laboratory for Research into the Structure of Matter. Biophysics at Penn is also divided amongst advanced theoretical work and hands-on laboratory work, and encompasses both complex networking theories and some of the exotic optics of biological systems.

Our Astrophysics and Cosmology groups explore the structure and evolution of the Universe, perform searches for exoplanets, and study galaxy formation. Efforts in cosmology include theoretical models for the acceleration of the Universe and the properties of dark matter, observations of the structure of the Universe and studies of dark matter using gravitational lensing with the Dark Energy Survey and eventually the Large-aperture Synoptic Survey Telescope, and studies of the cosmic microwave background with telescopes in places like the Chilean Andes and the South Pole. Our effort in nuclear and particle physics also spans both fundamental theoretical work such as string theory, as well as experimental work at the Large Hadron Collider at CERN and various neutrino experiments across the world. Collider efforts include studies of the recently-discovered Higgs boson as well as searches for supersymmetry, and our neutrino work includes searches for Majorana neutrinos and CP violation in neutrino oscillations.

Our experimental nuclear and particle physics effort makes extensive use of Penn's world-class instrumentation group, giving students the ability to explore creative new ideas in both hardware and in their data analysis work.

For more information: <http://www.physics.upenn.edu/graduate/>

University PhD Benchmarks

In addition to Program requirements, the following milestones must be completed:

Code	Title	Course Units
	Qualifying Evaluation	
	Candidacy Examination	
	Dissertation Defense/Oral Exam	
	Dissertation Deposit	

For more information view the University's Academic Rules for PhD Programs (<http://catalog.upenn.edu/pennbook/academic-rules-phd/>).

Required Courses

Code	Title	Course Units
Core Requirements		
PHYS 5500	Mathematical Methods of Physics	1
PHYS 5516	Electromagnetic Phenomena	1
PHYS 5531	Quantum Mechanics I	1
PHYS 5532	Quantum Mechanics II	1
PHYS 6611	Statistical Mechanics	1
Electives		
Select an additional 15 course units ¹		15
Total Course Units		20

¹ One course must be outside the student's field of specialization. Up to 11 course units can come from independent research or reading courses.

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The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2025 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.