PHYSICS (MS)

Department Website (http://as.nyu.edu/physics/)

NYSED: 08329 **HEGIS:** 1902.00 **CIP:** 40.0801

Program Description

Physicists come in many forms. Some love tinkering and may be natural experimentalists, some are drawn to elegant theories, some delight in writing computer codes, some have a special talent for communicating science to others, etc. And physicists do many different things in their lives, from public education, to academic research, to industry and tech, to public service and beyond. The goal of the NYU Graduate Program in Physics is to provide outstanding training to a student body which reflects the diversity of backgrounds, talents and skills of the next generation of aspiring physicists, astrophysicists and biophysicists. We want every member of the Department to flourish and find their own path. Our graduate admissions process aims to bring in a capable and committed group of students who are well-positioned to benefit from the training we can provide. No single metric gives a valid and accurate gauge for every person. To that end, admissions decisions are based on the full scope of information in the application dockets, and any individual component is considered in relation to its relevance for the student's aims.

The Department of Physics offers courses leading to the degrees of Master of Science and Doctor of Philosophy. There are opportunities for study and research in both experimental and theoretical physics. Areas of specialization include astrophysics and cosmology, atomic and molecular physics, condensed matter physics, elementary particle physics, quantum field theory and string theory, quantum optics, and statistical physics. Through ongoing faculty recruitment efforts the department continues to develop existing active research efforts and expand into new areas. The Ph.D. program is aimed at enabling a student to prepare for and carry out research in physics at the frontier of knowledge. The department encourages entry into doctoral research under the supervision of a faculty member as soon as one has attained sufficient mastery of the fundamental principles and techniques of physics. Depth and breadth within the larger context of contemporary physics are promoted by a flexible set of course requirements.

Applications for admission to the Masters and Doctoral programs in Physics should be submitted to the Graduate School of Arts and Science (https://as.nyu.edu/nyu-as/gsas/admissions/gsas-application-resource-center.html). We encourage all applicants to review our Frequently Asked Questions (https://as.nyu.edu/nyu-as/as/departments/physics/programs/graduate/physics-graduate-admissions-faq.html) page for answers to the most commonly asked questions, including how to qualify for an application fee waiver (http://gsas.nyu.edu/admissions/gsas-application-resource-center/nyu-gsas-general-application-policies.html#2).

Admissions

All applicants to the Graduate School of Arts and Science (GSAS) are required to submit the general application requirements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc.html), which include:

- Academic Transcripts (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/academic-transcripts.html)
- Test Scores (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/test-scores.html) (if required)
- Applicant Statements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/statements.html)
- Résumé or Curriculum Vitae
- Letters of Recommendation (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/letters-of-recommendation.html), and
- A non-refundable application fee (https://gsas.nyu.edu/admissions/arc.html#fee).

See Physics (https://gsas.nyu.edu/admissions/arc/programs/physics.html) for admission requirements and instructions specific to this program.

Program Requirements

Course	Title	Credits
Major Requirements		
Students must pass at least five of the following six courses:		20
PHYS-GA 2002	Statistical Physics	
PHYS-GA 2005	Electromagnetism I	
PHYS-GA 2000	Computational Physics	
PHYS-GA 2011	Classical and Quantum Mechanics I	
PHYS-GA 2012	Classical and Quantum Mechanics II	
PHYS-GA 2075	Advanced Experimental Physics	
Degree Options		
Select one of the following degree options: (see degree option details below)		12-16
Option A		
Option B		
Option C		
Total Credits		**32-36**

Note: MS candidates are permitted to take at most two courses outside the department, with permission of the Director of Graduate Studies.

Degree Options

In addition to the above course requirements, MS candidates complete their degree requirements via one of three options:

Option A: Report

This degree option requires the completion of 36 credits. The report is essentially a comprehensive review article based on the literature in a specialized field of physics, prepared under the supervision of a faculty adviser. In addition to submitting the report, students choosing this option must receive credit for nine regular courses (one-semester, 4-credit courses, not including reading and research).

Option B: Thesis

This degree option requires the completion of 32 credits. The thesis is based on physics research (experimental or theoretical) supervised by a faculty adviser, at a level of originality and comprehensiveness less than that of Ph.D. research. In addition to receiving 28 credits in standard courses, the student is expected to enroll in one semester (4 points) of a research course: Experimental Physics Research, PHYS-GA-2091, Theoretical Physics Research, PHYS-GA-2093 or Research Reading, PHYS-GA-2095

Option C: Examination

This degree option requires the completion of 32 credits. In addition to receiving credit for eight regular courses (one-semester, 4-credit courses,

not including reading and research), a student choosing this option must pass the core courses with an average grade of B or better. For each course, the student has the option of:

1. enrolling in the course;
2. taking the midterm and final examination of the course if the student is not enrolled; or
3. taking the relevant preliminary examination given just before the start of the fall or spring terms.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
PHYS-GA 2000	Computational Physics	4
PHYS-GA 2011	Classical and Quantum Mechanics I	4
	Credits	**8**
2nd Semester/Term		
PHYS-GA 2002	Statistical Physics	4
PHYS-GA 2005	Electromagnetism I	4
	Credits	**8**
3rd Semester/Term		
PHYS-GA 2012	Classical and Quantum Mechanics II	4
PHYS-GA 2075	Advanced Experimental Physics	4
	Credits	**8**
4th Semester/Term		
PHYS-GA 2091	Experimental Physics Rsc	1-9
Other Elective Credits		4
	Credits	**8**
	Total Credits	**32**

Learning Outcomes

Upon successful completion of the program, graduates will have:

1. Mastery of fundamental technical and mathematical knowledge of foundational areas of Physics. This includes mastering of Classical Electromagnetism, Statistical Mechanics, Classical and Quantum Mechanics, as well as being fluent in the use of numerical techniques applied to solutions of physical problems.
2. The ability to perform supervised research on an assigned research topic, either in an experimental setting or in a theoretical setting.
3. The ability to conduct autonomous, unsupervised research on original material, either independently or collaboratively.
4. A full grasp of the relevance and position of the student's research within its area of specialization.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Graduate School of Arts and Science Policies

Academic Policies for the Graduate School of Arts and Science can be found on the Academic Policies page (https://bulletins.nyu.edu/graduate/arts-science/academic-policies/).