APPLIED QUANTUM SCIENCE AND TECHNOLOGY (MS)

Applied Physics Department (https://engineering.nyu.edu/academics/departments/applied-physics)

NYSED: 08873 **HEGIS:** 1902.00 **CIP:** 14.1201

Program Description

Quantum science looks at how the smallest particles of nature behave, often in ways that seem very different from our everyday world. Quantum technology takes those unusual properties and turns them into tools — like quantum computers that may one day solve problems classical computers can't, or sensors that measure with extraordinary precision.

These technologies are especially promising for challenges that involve enormous complexity: simulating new materials or medicines, optimizing supply chains, or developing secure methods of communication. They also hold potential for advancing artificial intelligence and machine learning, where quantum computers could eventually help train models or analyze data in ways that aren't possible today.

What You Learn

Our program is designed to give students both a solid grounding in the theory and hands-on experience with these technologies. You can learn a range of topics relevant to the field, including:

- Quantum computation and information
- Quantum programming
- The physics of quantum devices
- Quantum optics
- Quantum machine learning and AI

Graduates will be well prepared for careers in industry (such as technology companies, startups, and financial firms) as well as in research labs, government agencies, or further study in graduate programs.

Admissions

To apply for admission to any Tandon graduate program, please contact the Office of Graduate Admissions (https://engineering.nyu.edu/admissions/graduate).

Program Requirements

Course	Title	Credits
Core Requirements		
Courses		
PH-GY 6603	Introduction to Quantum Computing	3
PH-GY 6613	Mathematical Methods for Quantum Computing	3
PH-GY 6623	Quantum Programming	3
PH-GY 6633	Physics of Quantum Devices	3
PH-GY 6643	Quantum Computation and Information	3
PH-GY 6653	Introduction to Quantum Optics	3
Lab		
PH-GY 6713	Quantum Optics Laboratory	3
Electives		
Select 9 credits from the following:		9
PH-GY 5493	Physics of Nanoelectronics	
PH-GY 6673	Quantum Mechanics I	
PH-GY 6683	Quantum Mechanics II	
CS-GY 6903	Applied Cryptography	
CS-GY 6923	Machine Learning	
PHYS-GA 2015	Introduction to Condensed Matter Physics	
PHYS-GA 2033	Special Topics	
PHYS-GA 7001	Introduction to Quantum Communication	
Total Credits		**30**

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
PH-GY 6603	Introduction to Quantum Computing	3
PH-GY 6613	Mathematical Methods for Quantum Computing	3
Elective		3
Elective		3
	Credits	**12**
2nd Semester/Term		
PH-GY 6623	Quantum Programming	3
PH-GY 6633	Physics of Quantum Devices	3
PH-GY 6643	Quantum Computation and Information	3
Elective		3
	Credits	**12**
3rd Semester/Term		
PH-GY 6653	Introduction to Quantum Optics	3
PH-GY 6713	Quantum Optics Laboratory	3
	Credits	**6**
	Total Credits	**30**

Learning Outcomes

Upon successful completion of the program, students will achieve:

Policies

Tandon School of Engineering Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/graduate/engineering/academic-policies/).

NYU Policies

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