CYBERSECURITY (MS)

Computer Science and Engineering Department Website (https://engineering.nyu.edu/academics/departments/computer-science-and-engineering/)

NYSED: 33251 **HEGIS:** 0701.00 **CIP:** 11.1003

Program Description

With the vast amount of sensitive data now stored in the digital universe — everything from social security numbers to financial records and matters of national security — it's critical that we secure and protect it from malicious interests. For vital computer networks and electronic infrastructures, cybersecurity experts stand as the last and most effective line of defense against such attacks.

At the NYU Tandon School of Engineering, our master's in Cybersecurity program curriculum is rooted in the belief that theory and research must translate into real-world solutions. To this end, we have created the NYU Center for Cybersecurity (http://cyber.nyu.edu/), and the Offensive Security, Incident Response, and Internet Security Lab (OSIRIS) (http://osiris.cyber.nyu.edu/) dedicated to training the current and future generations of cybersecurity professionals.

NYU Tandon has a distinguished history of research and education in the field of cybersecurity, and our classes are taught by internationally known experts. We have been designated an NSA (https://www.nsa.gov/Academics/Centers-of-Academic-Excellence/) Center of Academic Excellence in Cybersecurity, a Center of Academic Excellence in Research, a Center of Academic Excellence in Cyber Operations, and a Center of Academic Excellence in Cyber Defense.

The cybersecurity field is expected to generate many new jobs over the next decade as industry and government continue to emphasize safe data and information systems. As a graduate of the program, you'll be ready for a career as a developer of security products, security application programmer, security analyst, and penetration tester. You can also pursue work as a security researcher, vulnerability analyst, or security architect, or continue your studies toward a doctorate.

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

The program requires the completion of 30 credits, comprised of the following:

Course	Title	Credits
Core Courses		
CS-GY 6813	Information, Security and Privacy	3
CS-GY 6823	Network Security	3
CS-GY 6903	Applied Cryptography	3
CS-GY 9163	Application Security	3
Depth Electives		
Select 9 credits of the following: [1]		9
CS-GY 6573	Penetration Testing and Vulnerability Analysis	
CS-GY 6803	Information Systems Security Engineering and Management	
CS-GY 6963	Digital Forensics	
CS-GY 9215	Special Topics in Computer Science (AI Governance)	
CS-GY 9215	Special Topics in Computer Science (Applied Blockchain)	
CS-GY 9215	Special Topics in Computer Science (Cyber Resiliency Management)	
CS-GY 9215	Special Topics in Computer Science (Cyber Risk Management)	
CS-GY 9223	Selected Topics in CS (Cloud Security)	
CS-GY 9223	Selected Topics in CS (Hardware Security) [2]	
CS-GY 9223	Selected Topics in CS (Machine Learning Security) [3]	
CS-GY 9223	Selected Topics in CS (Mobile Security)	
CS-GY 9223	Selected Topics in CS (Offensive Security)	
CS-GY 9223	Selected Topics in CS (Operational Technology Security)	
CS-GY 9223	Selected Topics in CS (Software Supply Chain Security)	
CS-GY 9963	Advanced Project in Computer Science	
Breadth Electives		
Select 9 credits (three courses) of the following: [4]		9
CS-GY 6003	Foundations of Computer Science	
CS-GY 6033	Design and Analysis of Algorithms I	
CS-GY 6083	Principles of Database Systems	
CS-GY 6233	Introduction to Operating Systems	
CS-GY 6843 or ECE-GY 6353	Computer Networking Internet Architecture & Protocols	
CS-GY 6923	Machine Learning	
CS-GY 6953 or ECE-GY 7123	Deep Learning Deep Learning	
ECE-GY 6913	Computing Systems Architecture	
Total Credits		**30**

[1] Other depth electives may be chosen with the Academic Adviser's approval.

[2] Or ECE-GY 9453 ST: Comp Elec Devices & System (Hardware Security)

[3] Or ECE-GY 9163 Sel Topcs in Signal Processing (Machine Learning Security)

[4] Other breadth electives may be chosen with the Academic Adviser's approval.

Capstone Requirement

All Cybersecurity students are required to complete a capstone project that showcases a culmination of skills and knowledge learned throughout the program. There are two options to meet this requirement:

Capstone Option 1: Students may take CS-GY 9963 Advanced Project in Computer Science (depth elective) and complete a project under the direction of faculty.

Capstone Option 2: If students do not complete an Advanced Project, then their capstone project will be either from CS-GY 6803 Information Systems Security Engineering and Management (depth elective) or CS-GY 9163 Application Security (core), whichever course is taken last.[1]

It is recommended that students take their capstone course in their final semester.

[1] Students admitted between Fall 2021 and Spring 2023 have the option of counting CS-GY 6903 Applied Cryptography as the capstone course, since this course was a capstone option prior to Fall 2023.

National Centers of Academic Excellence (NCAE-C) in Cybersecurity Designation Tracks

NYU Tandon School of Engineering is one of the select institutions recognized by the National Centers of Academic Excellence in Cybersecurity (https://www.nsa.gov/resources/students-educators/centers-academic-excellence/) with designations in **Cyber Defense** and **Cyber Operations**.

The Cybersecurity MS degree allows students the opportunity to plan their course selection, within the curriculum requirements, following either the Cyber Defense or Cyber Operations tracks outlined below.

Cyber Defense (CAE-CD)

Course	Title	Credits
CS-GY 6233	Introduction to Operating Systems	3
CS-GY 6573	Penetration Testing and Vulnerability Analysis	3
CS-GY 6843	Computer Networking	3

Cyber Operations (CAE-CO)

Course	Title	Credits
CS-GY 6233	Introduction to Operating Systems	3
CS-GY 6803	Information Systems Security Engineering and Management	3
CS-GY 6813	Information, Security and Privacy	3
CS-GY 6823	Network Security	3
CS-GY 6843	Computer Networking	3
CS-GY 6903	Applied Cryptography	3
CS-GY 9163	Application Security	3
CS-GY 9223	Selected Topics in CS (Mobile Security)	3
CS-GY 9223	Selected Topics in CS (Offensive Security)	3

Sample Plan of Study

The specific courses that a student takes during the program will vary according to the student's interests and background, course offerings and whether the student studies full-time or part-time. The following are examples of courses a typical student might take. These are just samples meant to help in planning the courses for the degree. Individual study plans may differ depending on when courses are offered.

Full-Time On-Campus

Course	Title	Credits
1st Semester/Term		
CS-GY 6033	Design and Analysis of Algorithms I (breadth elective)	3
CS-GY 6813	Information, Security and Privacy (core)	3
CS-GY 6843	Computer Networking (breadth elective)	3
	Credits	**9**
2nd Semester/Term		
CS-GY 6083	Principles of Database Systems (breadth elective)	3
CS-GY 6823	Network Security (core)	3
CS-GY 6963	Digital Forensics (depth elective)	3
	Credits	**9**
3rd Semester/Term		
CS-GY 6903	Applied Cryptography (core)	3
CS-GY 9163	Application Security (core)	3
CS-GY 9223	Selected Topics in CS (Cloud Security, depth elective)	3
	Credits	**9**
4th Semester/Term		
CS-GY 6803	Information Systems Security Engineering and Management (capstone + depth elective)	3
	Credits	**3**
	Total Credits	**30**

Full-Time Online

Course	Title	Credits
1st Semester/Term		
CS-GY 6233	Introduction to Operating Systems (breadth elective)	3
CS-GY 6813	Information, Security and Privacy (core)	3
CS-GY 6843	Computer Networking (breadth elective)	3
	Credits	**9**
2nd Semester/Term		
CS-GY 6083	Principles of Database Systems (breadth elective)	3
CS-GY 6823	Network Security (core)	3
CS-GY 6963	Digital Forensics (depth elective)	3
	Credits	**9**
3rd Semester/Term		
CS-GY 9223	Selected Topics in CS (Cloud Security, depth elective)	3
	Credits	**3**
4th Semester/Term		
CS-GY 6803	Information Systems Security Engineering and Management (capstone + depth elective)	3
CS-GY 6903	Applied Cryptography (core)	3
CS-GY 9163	Application Security (core)	3
	Credits	**9**
	Total Credits	**30**

Part-Time Online

Course	Title	Credits
1st Semester/Term		
CS-GY 6813	Information, Security and Privacy (core)	3
	Credits	**3**
2nd Semester/Term		
CS-GY 6843	Computer Networking (breadth elective)	3
	Credits	**3**
3rd Semester/Term		
CS-GY 6823	Network Security (core)	3
	Credits	**3**
4th Semester/Term		
CS-GY 6233	Introduction to Operating Systems (breadth elective)	3
CS-GY 6573	Penetration Testing and Vulnerability Analysis (depth elective)	3
	Credits	**6**
5th Semester/Term		
CS-GY 6083	Principles of Database Systems (breadth elective)	3

CS-GY 6903	Applied Cryptography (core)	3
	Credits	**6**
6th Semester/Term		
CS-GY 9223	Selected Topics in CS (Cloud Security, depth elective)	3
	Credits	**3**
7th Semester/Term		
CS-GY 9163	Application Security (core)	3
	Credits	**3**
8th Semester/Term		
CS-GY 6803	Information Systems Security Engineering and Management (capstone + depth elective)	3
	Credits	**3**
	Total Credits	**30**

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Obtain a strong background in cybersecurity fundamentals for advanced development or research activity.
2. Master important practical skills in cybersecurity labs.
3. Assess systems with project work.
4. Obtain knowledge in core computer science courses.

Policies

Program Policies

GPA Requirement

All courses must be completed with an overall grade point average (GPA) of 3.0 or higher. In addition, a core GPA of 3.0 or higher is required in the core courses. A grade of B or higher is required in the capstone course.

NYU Policies

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

Tandon Policies

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