

CYBERSECURITY (MS)

Department Website (<https://engineering.nyu.edu/academics/programs/cybersecurity-ms-campus/>)

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've been designated an NSA Center of Excellence in Information Assurance, a Center of Excellence in Research, and a Center of Excellence in Cyber Operations.

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

You need a superior undergraduate record from an accredited institution in order to be considered for entrance into the program. Preferably, you should have an undergraduate degree in computer science, mathematics, science, or engineering. However, applicants with degrees in other fields are considered individually for admission. You must also satisfy the following:

- Knowledge of mathematics through calculus
- At least 1 year of university-level science
- A working knowledge of a high-level, general-purpose programming language (preferably C++) and of data structures
- Demonstrated ability to communicate in written and spoken English. Foreign students and others for whom English is a second language may be required to undertake preparatory work to improve their language skills before admission into the graduate program.
- Statement of Purpose: You should submit a special purpose statement with your application that states your experience in cybersecurity and your motivation for applying to the program.

- A basic understanding of computer fundamentals such as computer organization and operation, data structures, and computer architecture.
- GRE scores

Admission with advanced standing is accepted in accordance with the School of Engineering regulations published in the bulletin. A maximum of 9 credits may be applied to the MS degree from previous graduate work at an acceptable institution.

GRE Requirements

Applicants who satisfy one of the following conditions are not required but encouraged to submit a GRE score:

1. MS Applicants without a Cybersecurity degree or similar background who successfully complete the NYU Tandon Bridge (<http://engineering.nyu.edu/academics/online/programs/bridge/>) program.
2. Applicant completes 9 credits under Visiting Student Registration (<http://engineering.nyu.edu/admissions/graduate/apply/>) from an approved list of CSE courses and maintains an average grade of B+ or better.
3. Applicant has a BA or BS degree in computer science or computer engineering from NYU, with a GPA of 3.0 or higher.

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 three 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 9223	(Cloud Security)	
CS-GY 9223	(Mobile Security)	
CS-GY 9223	(Offensive Security)	
CS-GY 9223	(Operational Technology Security)	
CS-GY 9963	ADVANCED PROJECT IN COMPUTER SCIENCE	
Breadth Electives		
Select three of the following: ²		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	Computer Networking	
CS-GY 6923	Machine Learning	
Total Credits		30

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Other Cybersecurity courses may be chosen with the Academic Advisor's approval.

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Other Computer Science courses may be chosen with the Academic Advisor's approval.

Additional Program Requirements

Capstone

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 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 or CS-GY 9163 Application Security, whichever course is taken last¹.

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

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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.

Concentrations

The Cybersecurity concentrations allow students to focus their degree in specific branches of cybersecurity. By taking certain courses in the normal 30-credit requirements, students may concentrate their degree in Cyber Defense or Cyber Operations.

Cyber Defense

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

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	(Mobile Security)	3
CS-GY 9223	(Offensive Security)	3

Select one of the following: 3

CS-GY 6963 Digital Forensics

CS-GY 9223 (Cloud Security)

CS-GY 9223 (Operational Technology Security)

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 6813	Information, Security and Privacy (core)	3
CS-GY 6843	Computer Networking (breadth elective)	3
CS-GY 6033	Design and Analysis of Algorithms I (breadth elective)	3
Credits		9
2nd Semester/Term		
CS-GY 6823	Network Security (core)	3
CS-GY 6083	Principles of Database Systems (breadth elective)	3
CS-GY 6573	Penetration Testing and Vulnerability Analysis (depth elective)	3
Credits		9
3rd Semester/Term		
CS-GY 9163	Application Security (core)	3
CS-GY 9223	depth elective	3
CS-GY 6903	Applied Cryptography (core)	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 6813	Information, Security and Privacy (core)	3
CS-GY 6843	Computer Networking (breadth elective)	3
CS-GY 6033	Design and Analysis of Algorithms I (breadth elective)	3
Credits		9
2nd Semester/Term		
CS-GY 6823	Network Security (core)	3
CS-GY 6083	Principles of Database Systems (breadth elective)	3
CS-GY 6573	Penetration Testing and Vulnerability Analysis (depth elective)	3
Credits		9
3rd Semester/Term		
CS-GY 9223	depth elective	3
Credits		3
4th Semester/Term		
CS-GY 9163	Application Security (core)	3
CS-GY 6903	Applied Cryptography (core)	3
CS-GY 6803	Information Systems Security Engineering and Management (capstone + depth elective)	3
Credits		9
Total Credits		30

Part-Time Online

Course	Title	Credits
1st Semester/Term		
CS-GY 6813	Information, Security and Privacy (core)	3
CS-GY 6843	Computer Networking (breadth elective)	3
Credits		6
2nd Semester/Term		
CS-GY 6033	Design and Analysis of Algorithms I (breadth elective)	3
Credits		3
3rd Semester/Term		
CS-GY 6823	Network Security (core)	3
Credits		3
4th Semester/Term		
CS-GY 9163	Application Security (core)	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
Credits		3
6th Semester/Term		
CS-GY 9223	depth elective	3
Credits		3
7th Semester/Term		
CS-GY 6803	Information Systems Security Engineering and Management (capstone + depth elective)	3
CS-GY 6903	Applied Cryptography (core)	3
Credits		6
Total Credits		30

Learning Outcomes

Upon successful completion of the program, graduates will:

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

Policies

Grade Policy

All courses must be completed with an overall average of B. In addition, a B average is required across all the required Cybersecurity core courses and 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/>).