M.S. in Computer Science

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The M.S. in Computer Science (https://cs.njit.edu/ms-computer-science/) offers a well-rounded advanced education in computer science. Students can shape their coursework based on their interests and professional needs, by selecting courses from various areas, including Artificial Intelligence, Cybersecurity, Computer Algorithms, Data Management, Programming Languages and Environments, Systems, Software Engineering and other advanced topics.

Prerequisites

Applicants should have a bachelor's degree from an accredited institution in a discipline related to computing (e.g., Computer Science, Computer Engineering, Information Sciences, or Information Technology). Applicants with a bachelor's degree in STEM or related professional experience can first take an NJIT graduate certificate (https://www5.njit.edu/graduatestudies/degree-programs/graduatecertificates/) and then apply to the M.S. program. Further information can be found in the program's webpage (https://cs.njit.edu/ms-computer-science/).

Degree Requirements

The program requires the completion of 30 credits. The requirement is satisfied by taking 10 courses.

Core Courses (12 credits)

Courses covering fundamental topics in Computer Science.

Code	Title	Credits
Required:		**3**
CS 610	Data Structures and Algorithms	
Select three of the following:		**9**
CS 630	Operating System Design	
CS 631	Data Management System Design	
CS 656	Internet and Higher-Layer Protocols	
CS/DS 675	Machine Learning	
Total Credits		**12**

Elective Courses (18 credits)

The CS department offers courses in various specialized areas. Students are free to elect courses from any area. Additionally, students may take up to two courses from a selected list offered by other departments.

Students who want to pursue research can earn up to 6 of the 30 required credits by taking as elective CS 700B Master's Project, possibly followed by CS 701B Master's Thesis. These have special requirements described in the section 'Master's Project and Thesis' (p. 3).

Code	Title	Credits
Algorithms and CS Theory		
CS 610	Data Structures and Algorithms	
CS 611	Introduction to Computational Complexity	
CS 665	Algorithms on Graphs	
CS 667	Design Techniques for Algorithms	
CS 668	Parallel Algorithms	
CS 703	Computational Optimization	
CS 704	Sequencing and Scheduling	
Artificial Intelligence		
CS 670	Artificial Intelligence	
CS/DS 675	Machine Learning	
DS 669	Reinforcement Learning	
CS/DS 677	Deep Learning	
CS 732	Advanced Machine Learning	
CS 782	Pattern Recognition and Applications	
Cybersecurity and Privacy		

CS 608	Cryptography and Security
CS 645	Security and Privacy in Computer Systems
CS 646	Network Protocols Security
CS 647	Counter Hacking Techniques
CS 648	Cyber Sec Investigations & Law
CS 678	Topics in Smartphone Sec & Rel
CS 696	Network Management and Security
CS 708	Advanced Data Security and Privacy
CS 755	Security and Privacy in Wireless Networks

Data Management

CS 631	Data Management System Design
CS 632	Advanced Database System Design
CS 634	Data Mining
CS/DS 644	Introduction to Big Data
CS 731	Applications of Database Systems
CS 744	Data Mining and Management in Bioinformatics

Programming Languages and Environments

CS 602	Java Programming
CS 635	Computer Programming Languages
CS/DS 636	Data Analytics with R Program
CS 643	Cloud Computing
CS 750	High Performance Computing
CS 756	Mobile Computing and Sensor Networks

Systems

CS 630	Operating System Design
CS 633	Distributed Systems
CS 650	Computer Architecture
CS 652	Cognitive Cloud Networking - Architectures and Applications
CS 656	Internet and Higher-Layer Protocols
CS 680	Linux Kernel Programming

Software Engineering

CS 673	Software Design and Production Methodology
CS 683	Software Project Management
CS 684	Software Testing and Quality Assurance
CS 685	Software Architecture
CS 690	Software Studio
CS 775	Seminar in Software Engineering
CS 777	Seminar in Software Management and Production

Various Topics [0]

CS 657	Principles of Interactive Computer Graphics
CS 659	Image Processing and Analysis
CS 661	Systems Simulation
CS 676	Cognitive Computing
CS 681	Computer Vision
CS 698	Special Emerging Topics:
CS 759	Advanced Image Processing and Analysis
CS 785	Seminar in Computer Science I
CS 786	Seminar in Computer Science II

Entry-level Graduate Courses

CS 506	Foundations of Computer Science

Courses from other departments [1]

DS 650	Data Visualization and Interpretation

DS 680	Natural Language Processing
ECE 645	Design of Wireless Networks: 5G Architecture and Services
ECE 683	Cloud and IoT Networking and Security
ECE 684	Advanced Microprocessor Systems
ECE 689	Computer Arithmetic Algorithms
ECE 690	Computer Systems Architecture
ECE 692	Embedded Computing Systems
IS 601	Web Systems Development
IS 661	User Experience Design
IS 690	Web Services and Middleware
MATH 666	Simulation for Stochastic Systems
ME 625	Introduction to Robotics
MGMT 620	Strategic Management of Technological Innovation
MGMT 735	Deep Learning in Business
YWCC 691	Graduate Capstone Project [&2]
Project and Thesis Courses	
CS 700B	Master's Project
CS 701B	Master's Thesis

&   **0.** All courses from the complete list of graduate CS courses (https://catalog.njit.edu/graduate/computing-sciences/computer-science/#coursestext) are also included.
1. At most two of these courses can count towards degree requirements.
2. YWCC 691 and CS 700B cannot count simultaneously towards degree requirements.

All degree requirements apply to both on-campus and online programs.

Master's Project and Thesis

The contents of this section apply only to students who elect to do a Master's Project (CS 700B) or a Master's Thesis (CS 701B).

Students must first find a research advisor who must be a tenure-track graduate faculty (https://cs.njit.edu/faculty/) of the CS department, including faculty with a joint appointment. Tenure-track faculty are the department members including those who hold joint appointments with the rank of Assistant Professor, Associate Professor, Professor, and Distinguished Professor.

In order to find a research advisor, students are encouraged to attend special presentations offered by the department or to directly contact professors. Professors may not always have availability for conducting an MS project/thesis. Students are therefore encouraged to start looking for an advisor as early as possible, especially if they are considering pursuing a Master's Thesis that takes two semesters.

The students must be in close coordination with their research advisor who will determine the topic of the Project/Thesis and guide them to take specific elective courses that will prepare them for the research.

Registration

- **Master's Project:** With permission of their research advisor students must register in the CS 700B Master's Project course. To register for Master's Project, students must have completed at least 9 credits and must be in good standing.
- **Master's Thesis:** With permission of their research advisor, students must first register in the CS 700B Master's Project course. They must receive a satisfactory (S) grade in CS 700B before CS 701B Master's Thesis registration in the immediately following semester, with the same advisor. The MS thesis topic should be continuation of the work done in CS 700B.

Thesis Requirements

- An MS Thesis Committee must be formed, according to the requirements (https://www5.njit.edu/graduatestudies/composition-master%E2%80%99s-thesis-committee/) set forth by the Office of Graduate Studies.
- A written thesis must be submitted. The thesis must adhere to the style requirements (https://www5.njit.edu/graduatestudies/thesis.php) set forth by the Office of Graduate Studies.
- An oral defense is required. The defense must take place before the last day of the Examination period.