

M.S. in Telecommunications

Degree Requirements

The curriculum requires a basic knowledge of computer and communications fundamentals such as programming, data structures, computer architecture, signals and systems, and basic communication systems. Bridge courses do not count toward the degree. The bridge courses are selected from the following list depending on individual background in consultation with the graduate advisor. See the undergraduate catalog (<http://catalog.njit.edu/undergraduate/newark-college-engineering/#coursestext>) for descriptions of 200- to 400-level courses.

Candidates must complete a minimum of 30 credits: 12 in core courses and 18 in elective courses in an area of specialization with a minimum overall GPA of 3.0. In addition, a minimum average 3.0 GPA is required in the five core courses. Students with an exceptionally strong telecommunications background may be allowed to replace required courses with advanced electives. Permission of the graduate advisor is required.

M.S. in Telecommunications (courses only)

Code	Title	Credits
Bridge Courses		
ECE 353	Computer Organization and Architecture	3
ECE 252	Microprocessors	3
CS 332	Principles of Operating Systems	3
CS 333	Introduction to UNIX Operating Systems	3
CS 505	Programming, Data Structures, and Algorithms	3
ECE 321	Random Signals and Noise	3
ECE 333	Signals and Systems	3
ECE 481	Digital Communications Systems	3
Core Courses		
ECE 642	Introduction to Communication Systems: Evolution to 5G and Beyond	3
ECE 644	Wireless Communications: Fundamentals to 5G	3
ECE 673	Random Signal Analysis	3
ECE 683	Cloud and IoT Networking and Security	3
Electives		
Select six of the following: ¹		15
CS 631	Data Management System Design	
CS 633	Distributed Systems	
CS 650 or ECE 690	Computer Architecture Computer Systems Architecture	
CS 652	Cognitive Cloud Networking - Architectures and Applications	3
CS 656 or ECE 637	Internet and Higher-Layer Protocols Internet and Higher-Layer Protocols	
CS 665	Algorithmic Graph Theory	
CS 668	Parallel Algorithms	
CS 696 or ECE 638	Network Management and Security Network Management and Security	
ECE 673	Random Signal Analysis	
ECE 742	Communication Systems II	
ECE 755	Advanced Topics in Digital Communications	
ECE 783	Computer Communication Networks	
Total Credits		30

¹ These courses are to be used in an area of specialization.

M.S. in Telecommunications (Master's project)

Code	Title	Credits
Bridge Courses		
ECE 353	Computer Organization and Architecture	3
ECE 252	Microprocessors	3
CS 332	Principles of Operating Systems	3
CS 333	Introduction to UNIX Operating Systems	3
CS 505	Programming, Data Structures, and Algorithms	3
ECE 321	Random Signals and Noise	3
ECE 333	Signals and Systems	3
ECE 481	Digital Communications Systems	3

¹ ECE 321 Random Signals and Noise and ECE 333 Signals and Systems may be substituted for .

Code	Title	Credits
Core Courses		
ECE 642	Introduction to Communication Systems: Evolution to 5G and Beyond	3
ECE 644	Wireless Communications: Fundamentals to 5G	3
ECE 673	Random Signal Analysis	3
ECE 683	Cloud and IoT Networking and Security	3
Project		
ECE 700B or CS 700B	Master's Project Master's Project	3
Electives		
Select five of the following: ¹		15
CS 631	Data Management System Design	
CS 633	Distributed Systems	
CS 650 or ECE 690	Computer Architecture Computer Systems Architecture	
CS 652	Cognitive Cloud Networking - Architectures and Applications	3
CS 656 or ECE 637	Internet and Higher-Layer Protocols Internet and Higher-Layer Protocols	
CS 668	Parallel Algorithms	
CS 696 or ECE 638	Network Management and Security Network Management and Security	
ECE 673	Random Signal Analysis	
ECE 742	Communication Systems II	
ECE 755	Advanced Topics in Digital Communications	
ECE 783	Computer Communication Networks	
Total Credits		33

¹ These courses are to be used in an area of specialization.

M.S. in Telecommunications (Master's thesis)

Code	Title	Credits
Bridge Courses		
ECE 353	Computer Organization and Architecture	3
ECE 252	Microprocessors	3
CS 332	Principles of Operating Systems	3
CS 333	Introduction to UNIX Operating Systems	3
CS 505	Programming, Data Structures, and Algorithms	3
ECE 321	Random Signals and Noise	3

ECE 333	Signals and Systems	3
ECE 481	Digital Communications Systems	3

Code	Title	Credits
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Core Courses

ECE 642	Introduction to Communication Systems: Evolution to 5G and Beyond	3
ECE 644	Wireless Communications: Fundamentals to 5G	3
ECE 673	Random Signal Analysis	3
ECE 683	Cloud and IoT Networking and Security	3

Thesis

ECE 701C	Master's Thesis	6
or CS 701B	Master's Thesis	

Electives

Select four of the following: ¹ 12

CS 631	Data Management System Design	
CS 633	Distributed Systems	
CS 650	Computer Architecture	
or ECE 690	Computer Systems Architecture	
CS 652	Cognitive Cloud Networking - Architectures and Applications	3
CS 656	Internet and Higher-Layer Protocols	
or ECE 637	Internet and Higher-Layer Protocols	
CS 668	Parallel Algorithms	
CS 696	Network Management and Security	
or ECE 638	Network Management and Security	
ECE 673	Random Signal Analysis	
ECE 742	Communication Systems II	
ECE 755	Advanced Topics in Digital Communications	
ECE 783	Computer Communication Networks	

Total Credits		33
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¹ These courses are to be used in an area of specialization.

Area of Specialization

The following are suggested areas of specialization and sample elective courses for each. Students may develop an individual area of specialization in consultation with a graduate advisor.

Management and Administration

Code	Title	Credits
CS 696	Network Management and Security	3
or ECE 638	Network Management and Security	

Communication Systems

Code	Title	Credits
ECE 673	Random Signal Analysis	3
ECE 742	Communication Systems II	3
ECE 755	Advanced Topics in Digital Communications	3

Networking

Code	Title	Credits
CS 633	Distributed Systems	3
CS 650	Computer Architecture	3
or ECE 690	Computer Systems Architecture	
CS 652	Cognitive Cloud Networking - Architectures and Applications	3

CS 656 or ECE 637	Internet and Higher-Layer Protocols Internet and Higher-Layer Protocols	3
CS 668	Parallel Algorithms	3
CS 696 or ECE 638	Network Management and Security Network Management and Security	3
ECE 639	Principles of Broadband Networks	3
ECE 673	Random Signal Analysis	3
ECE 783	Computer Communication Networks	3

Information Technologies

Code	Title	Credits
CS 631	Data Management System Design	3
CS 696 or ECE 638	Network Management and Security Network Management and Security	3

Other CS and ECE courses related to telecommunications may be selected as elective courses with the written approval of the corresponding graduate advisor.

Additional Thesis Option:

With permission of their research advisor, MS Telecom students intending to do an MS thesis may first register in the 700B MS Project course; They must receive a satisfactory (S) grade in 700B before 701B MS Thesis registration in the immediate following semester with the same advisor. The MS thesis topic should be continuation of the work done in 700B.