

## ECE 639 Principles of Broadband Networks

**Description:** This course covers fundamental concepts of broadband networks. Topics include Broadband ISDN, Switching Techniques, ATM, SONET/SDH, Congestion Control, High-Speed Switching Architectures, Traffic Modeling of Broadband Services, Admission Control, Traffic Scheduling, IP/ATM Convergence, QoS Provisioning in IP Networks, and Optical Networks.

**Prerequisites:** B.S. in Electrical Engineering, Computer Engineering, or Computer Science, or instructor's approval

**Learning Outcomes:** Students should be able to understand various concepts of broadband networks and subsequently conduct research in this field.

**Text:** Lecture notes and journal articles plus selected chapters from *Computer Networking: A Top Down Approach Using the Internet* by J. Kurose and K. Ross, Addison-Wesley Computer Science, 6<sup>th</sup> Edition, 2013.

**Instructor:** Dr. Nirwan Ansari, ECE6343  
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**Office Hours:** Vary every semester

**Term project:** Each student is required to work individually or in a group to conduct an in-depth study on a research topic, and submit a project report at the end of the semester.

**Grading:** Mid-term 35%; Final 40%; Assignments/Quizzes & Projects 25%.

**Honor Code:** The NJIT Honor Code will be upheld, and any violation will be brought to the immediate attention of the Dean of Students.

Week	Topics
1	The history of the Internet and its flexible future
2	<b>Introduction:</b> highlights on broadband, existing telecommunication infrastructure, network evolution and architecture, virtual private network, and emerging technologies
3	Switching Techniques, T1, X.25, ISDN, SONET
4/5	ATM Basics
5/6	Congestion Control
7	The Making Over of TCP
8	Mid-term Exam

9	IP/ATM Integration
10	Traffic Modeling of Broadband Services
11	Admission Control
12	Switching Principles and Architectures
13	Traffic Scheduling
14	Recent Advances: Software Defined Networking

**The syllabus is updated every year and may also be modified during the semester. Any updates will be communicated via [moodle.njit.edu](http://moodle.njit.edu). Lecture notes and resources will be posted in [moodle.njit.edu](http://moodle.njit.edu).**