

# Course Outline

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**Course Title:** Network Simulation (Summer 2013)

**Pre-requisite:** Comm. Networks, Data Structures, Object Oriented Programming.

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**Introduction:** This is a graduate level course for students with computer networking and programming background. Also, this is a core course for MS Telecomm & Networks program. This course will cover important theoretical concepts related to simulation of computer networks. Also, this course will help students improve their programming and simulation skills. Upon completion of this course, students will be able program and simulate any networking protocol.

## Course Outline: -

Session No.	Topics to be covered
1.	Networking Basics: Network Types, Switches
2.	Networking Protocols: TCP/IP
3.	Object Oriented Programming Concepts
4.	Object Oriented Programming Example: Linked Lists
5.	Simulation Options: ns-2, C#, MATLAB
6.	Ns-2 basics: programming constructs
7.	Ns-2 Simulating existing protocols
8.	NS-2 Simulating non-existing protocols
9.	MATLAB basics
10.	OOP example in MATLAB
11.	Project Proposal Evaluation
12.	Project Proposal Evaluation
13.	Time Slicing and event scheduling
14.	States and Events
15.	Array Index & Pointers
16.	Data Structure Implementation in Ns-2 & MATLAB
17.	Probability & Random Variables
18.	Uniform Probability Distribution
19.	Pseudo random number generation (PRNG)
20.	Coding PRNG in simulators
21.	Exponential Probability Distribution
22.	Poisson Probability Distribution
23.	Random Variates
24.	Random Variate Generation (RVG) Methods
25.	Random Variate Generation (RVG) Methods
26.	Random Variate Generation in NS-2 & MATLAB
27.	Queuing Basics

28.	Queuing Basics
29.	Single Server Queues
30.	Single Server Queues
31.	Project Evaluation
32.	Project Evaluation

**Text Books:** No specific course textbook. Materials in this course are collected from various books, tutorials and other online sources.

**Grading:** All students will be required to try and understand the topics before coming to the class. Also, students will be given programming / simulation assignments. Class participation of students and their performance in quizzes / assignment along with the project evaluation will contribute towards their grades. In projects, students will be expected to read, understand, simulate and compare three existing research papers. Students are expected to take initiative in choosing the research papers they want to simulate and get them approved by the instructor before project proposal evaluation.