ECE4604 Course Syllabus

ECE4604

Network Design and Simulation (3-3-4)

Prerequisites
ECE 3076/3600

Corequisites
None

Catalog Description
Introduces the principles of Monte Carlo techniques and network simulation, and applies them to design issues in ATM systems

Textbook(s)
No Textbook Specified.

Topical Outline

Part I: Simulation Methodologies

Pseudo-random numbers, generation of samples of a distribution, the inverse-transformation method.

Estimating expected-valued functions of a random variable by averag outputs of independent random experiments. Special consideration w given to exponential, Poisson, Gaussian and geometric random variab

The memoryless property of the exponential distribution, and its us simulating Poisson processes.

Input analysis: generating a distribution from experimental data.

Output analysis: variance reduction techniques.

Discrete event simulation: the structure of discrete event systems queueing systems, and fork-join networks.

Sensitivity analysis and optimization.

Part II: Networks

The ISO Reference Model and the IEEE-802 LAN architecture.

Asynchronous Transfer Mode: The basic protocol.

Network control: virtual connections, delay control and congestion

LAN emulation.

The lectures will cover the material in Part I and Part II in paral
with emphasis on performance issues in ATM networks. The students
prepare a simulation project for performance evaluation or optimiza
and written reports on some of the main issues concerning ATM netwo
control.