

# Network Modeling and Simulation

## Saturdays 2:00 - 5:00pm

### Spring 2010

**Instructor** Moustafa Amin Youssef

**Required Textbook**

Mischa Schwartz, "Telecommunication Networks: Protocols, Modeling, and Analysis," Addison Wesley, 1987.

**Pre-requisite** A rigorous probability theory course is required.

**Recommended References**

Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach (4th Ed.), The Morgan Kaufmann Series in Networking.

A. Leon-Garcia and I. Widjaja "Communication Networks, Fundamental Concepts and Key Architectures," McGraw Hill, 2nd Edition.

**Course Description**

This course covers fundamental concepts in the design and modeling of computer networks. In particular, we will focus on an analytical approach to network design, dimensioning, and routing followed by examples implemented in practice. In addition, an introduction to simulation techniques will be introduced.

**Topics Covered (Tentative)**

- Introduction to networking and layered protocol stacks.
- Birth-death processes.

- Poisson Queues.
- Networks of queues.
- Description of error detection, correction, and recovery.
- Analysis of error recovery mechanisms.
- Fundamentals of Routing
- Simulation modeling.

### **Policies**

The course follows the Academic Regulations for VT MENA graduate students.

### **Grading (Tentative)**

Homeworks: 30%

Projects: 15%

Class participation: 5%

Final exam: 50%