

## **CSCI 381.3/780**

### **Performance Evaluation of Communication Networks**

**Fall 2006**

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#### **Pre-requisite:**

Students are expected to have a good understanding of probability and random processes. The fundamental concepts such as conditional probabilities, random variables, probability density function (pdf), and expectation will be used intensively in the class. An undergraduate course on Computer Networks is also helpful.

#### **Course Description:**

This course is an advanced upper undergraduate and graduate level course focusing on the analytical techniques for performance evaluation of communication networks. Students will learn how to model network systems, switches, routers, protocols, etc. The underlying principles of computer systems analysis (which are based on queuing theory) will be studied. Analytical methods based on queuing theory will be used to study the behavior of communication networks, for example, the time spent by a packet waiting to be transmitted on a given link or through a whole network.

The course will start with the review of probability, random variables and distributions. Then, the queuing systems and Markov processes are introduced. The behavior of various queuing systems and Markovian queues will be studied, such as the typical M/M/1 queuing model to be used in message-switched networks and the M/M/m/m queue employed to characterize the call loss behavior of local offices in telephone networks. In addition, the analytic techniques will be applied to study the behavior of traffic, switching, and network protocols.