King Fahd University of Petroleum & Minerals
College of Computer Sciences and Engineering
Computer Engineering Department
CSE 642 Computer Systems Performance (3-0-3)
Fall 2009 (Term 091)
Syllabus

Course Objectives

At the end of the course, the student should be able to create appropriate models of computer systems and computer networks. The student should also be able to utilize analytical techniques for evaluating these models where applicable. Emphasis is placed on modeling and evaluation of computer networks and multiple-access methods.

Catalogue Description

Queueing theory. Stochastic Petri nets and Markov Chains. Separable queueing networks. Priority queueing systems. Evaluation studies: monitoring techniques, modeling methods and model validation. Application of queueing theory to computer time-sharing and multi-access systems, multiprocessor systems, interconnected networks. Computer communication networks. Case studies of several distributed system configurations.

Instructor: Dr. Ashraf S. Hasan Mahmoud.

Office: 22-148-3 **Phone:** 1724 **Email:** ashraf AT kfupm.edu.sa

Class Hours/Place: SM 15:30-16:45 pm – Room 24-106

Office hours: SM 14:00-15:00, 17:00-18:00, and by appointment.

Textbook: Jeremiah F. Hays, and Thimma V. J. Ganesh Babu, Modeling and Analysis of Telecommunications Networks, John Wiley, 2004

References: P. King, Computer and Communication Systems Performance Modelling, Pretice Hall, 1990

Jeremiah F. Hays, Modeling and Analysis of Computer Communications Networks, Plenum Press, New York, 1984

L. Kleinrock, Queueing Systems, Volume I, New York, John Wiley and Sons, 1975

Grading Policy (Tentative):

Class Homework/Quizzes/Participation	25%	
Major Exam	15%	
Project	30%	
Final Exam	30%	Scheduled by the registrar

TENTATIVE Course Plan

1. Introduction to Performance Evaluation in Telecommunications
Introduction to switching technologies, functional organization of network protocols, etc.

2. Overview of Probability Theory and Markov Chains
Overview of probability theory and random variables distributions. Single and multiple random variable characterization. Markov chains and state transition matrix. Random processes.

3. Queueing Models
Little's formula. Poisson counting process. Birth and death processes and applications to queueing theory: M/M/1 queue and its variations

4. Network of Queues
Jackson Networks. Burke's Theorem

5. Analysis to Multiplexing and Access
Analysis of TDM, statistical TDM, asynchronous TDM, and random access techniques.

6. Imbedded Markov Chains
M/G/1 queue and its variations. Priority queues. Busy period analysis. G/M/1 queues. Analysis of polling networks.