جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Information Networks - CS 337

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	CS 337
Course Title	Information Networks
Academic Semester	Spring
Academic Year	2016/2017
Semester Start Date	01/22/2017
Semester End Date	05/18/2017
Class Schedule (Days & Time)	10:30 AM - 12:00 PM | Sun Tue

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Basem Shihada	basem.shihada@kaust.edu.sa			Monday 10:00-11:AM in Building 1, Room 4210

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description	Network structure of the Internet and the Web, performance modeling, experimental design, performance measurement, model development, analytic modeling, single queue facility, networks of queues, stochastic systems, deterministic systems, birth-death model analysis, closed network model, bottleneck, interactive networks, M/M/m queues, M/G/1 priority queues, Markovian queuing model, random numbers, discrete event simulation, verification and validation of simulation models, workload characterization and benchmarks.
Course Description from Program Guide	Modeling, experimental design, performance measurement, model development, analytic modeling, single queue facility, networks of queues, stochastic systems, deterministic systems, birth-death model analysis, closed network model, bottleneck, interactive networks, M/M/m queues, M/G/1 priority queues, Markovian queuing model, random numbers, discrete event simulation, verification and validation of simulation models, workload characterization and benchmarks. Also, advanced research papers on using queuing theory for networking systems. The course consists of a final modeling and simulation project on a novel idea that leads to publication
Goals and Objectives	Students will obtain a full knowledge of how to conduct a system performance measurements and translate the results to a system performance modeling. Also, obtain a sense of analytic modeling using queueing models. Students will also obtain a knowledge on how to apply queuing models in complex networking problems. Finally, students will understand the concept of event-based simulations through practical coding and also verification methods.
Required Knowledge	Students must have already obtained a strong knowledge in computer networks, excellent skills in programming e.g., C/C++ or Java, understanding of probabilities and stochastic systems, general background on network simulators, Matlab simulation, and working with Linux systems.

Reference Texts	-E. Lazowska, J. Zahorjan, G. Graham, K. Sevcik, Quantitative System Performance, Computer System Analysis using Queueing Network Models, Prentice-Hall, [Available Online] -Leonard Kleinrock, Queueing Systems, vol. 1: Theory, John Wiley, 1975 -Thomas G. Robertazzi, Computer Networks and Systems, Springer, 2002 -Andrew S. Tanenbaum , Computer Networks, Prentice Hall, 2002 -Selected research papers.
Method of evaluation	**50.00**% - Research Project **10.00**% - Oral presentation **40.00**% - Homework /Assignments
Nature of the assignments	Assignments are of a mix of theory and practical coding in nature. The course will also include a major modeling and simulation project component that requires performing several paper reviews and simulations.
Course Policies	Assignments, including contributions to discussion, submitted by students in the course of this class should be work written by themselves specifically for this class. Students must clearly cite and reference each and every source that was used in their development. Where students use the actual words of a source, they must put those words inside quotation marks.
Additional Information	***Student must obtain the passing grade (70%) in the Homework and the final project to pass the course.***

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Sun 01/22/2017 Tue 01/24/2017	Introduction to queueing theory concepts
2	Sun 01/29/2017 Tue 01/31/2017	Introduction to system performance evaluation methods
3	Sun 02/05/2017 Tue 02/07/2017	Introduction to system performance measurement methods
4	Sun 02/12/2017 Tue 02/14/2017	Performance modeling
5	Sun 02/19/2017 Tue 02/21/2017	Analytic modeling and stochastic systems
6	Sun 02/26/2017 Tue 02/28/2017	Birth-Death stochastic model
7	Sun 03/05/2017 Tue 03/07/2017	Markovian queuing model
8	Sun 03/12/2017 Tue 03/14/2017	Queuing network model
9	Sun 03/19/2017 Tue 03/21/2017	Open network model
10	Sun 03/26/2017 Tue 03/28/2017	Closed network model
11	Sun 04/02/2017 Tue 04/04/2017	Spring Break
12	Sun 04/09/2017 Tue 04/11/2017	Application to computer networks
13	Sun 04/16/2017 Tue 04/18/2017	Verification and validation
14	Sun 04/23/2017 Tue 04/25/2017	Paper oral presentations
15	Sun 04/30/2017 Tue 05/02/2017	Paper oral presentations
16	Sun 05/07/2017 Tue 05/09/2017	Demonstration of final project results
17	Sun 05/14/2017 Tue 05/16/2017	
18		

Note

The instructor reserves the right to make changes to this syllabus as necessary.