



University of Tehran
School of Electrical and Computer Engineering

Course:	Cellular Networks									
Course type:	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Elective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Level:	Undergraduate <input type="checkbox"/> Graduate <input checked="" type="checkbox"/>									
Co-requisite(s):	None									
Prerequisite(s):	None									
Prerequisite by topic:	general knowledge on computer and communication networks									
Textbook(s):	[1] Dimitri Bertsekas and Robert G. Gallager, "Data Networks," Prentice Hall, 2 nd edition, 1992. [2] Leonard Kleinrock, "Queuing Systems," John Wiley and Sons, 1975.									
Coordinator:	Vahid Shah-Mansouri									
Goals:	This course is designed for graduate students in communication systems and communication networking. The goal of this course is to provide students with basic knowledge in data communication with focusing on the medium access layer, queuing models and Markov chains. Markov chain is an analytical tool used widely in data networks for performance evaluation and analysis. Medium access control protocols are also studied mainly using Markov chain techniques.									
Outcome:	After taking this course, the students are expected to 1. become familiar with Markov chain modeling and analysis. 2. acquire basic knowledge of M/M/1, G/M/1, and M/G/1 queues. 3. obtain analytical skills for network of queues. 4. Become familiar with analysis of medium access control protocols.									
Topics:	1. Queuing Models a. Introduction & Little's Theorem b. M/M/1, M/M/m, M/M/m/m queueus c. Networks of Queues d. M/G/1 Queues									

	<ul style="list-style-type: none"> e. M/G/1 Queue Occupancy Distribution f. M/G/1 w/ Vacations, Reservations, Priority Queues g. Stability of Queueing Systems <p>2. MAC Protocol analysis</p> <ul style="list-style-type: none"> a. Aloha protocol b. Slotted aloha protocol c. CSMA protocols
Computer usage:	MATLAB programming assignment
Assignments:	Written homeworks and paper readings
Projects:	term project
Grading:	1 Mid Term (35%), 1 Final (35%), 1 Term project (10%) assignments (20%)
Further readings:	1. A. Kumar, D. Manjunath, J. Kuri, "Communication networking: an analytical approach," Morgan Kaufmann Publishers, 2004.
Prepared by:	Vahid Shah-Mansouri
Date:	Aug 24, 2017

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		