



University of Tehran
School of Electrical and Computer Engineering

Course:	8101??? – Wireless Communications									
Course type:	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	■	<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"/>	
Level:	Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/>									
Co-requisite(s):										
Prerequisite(s):	Communications II (8101355)									
Prerequisite by topic:	Digital Communications Theory, Signal Processing									
Textbook(s):	[1] Goldsmith, <i>Wireless Communications</i> , Cambridge University Press, 2005. [2] T. S. Rappaport, <i>Wireless Communications Principles and Practice</i> , 2 nd Edition, Pearson Education, 2009.									
Coordinator:	Maryam Sabbaghian									
Goals:	The course is designed for undergraduate level. It provides students with an overview of each generation of cellular systems and modeling of wireless channels. It also introduces practical issues to be dealt with in wireless systems and their solutions. This includes transmission over frequency selective channels and fundamental obstacles in this way. The students also acquire knowledge on the methods exploited to solve these issues such as equalization techniques, space-time codes, MIMO systems.									
Outcome:	Upon successful completion of the course, students will be able to <ol style="list-style-type: none"> 1. understand the evolvement of generations of cellular systems. 2. analyze wireless channels. 3. acquire knowledge regarding multiple access methods in wireless systems. 4. understand the fundamentals of uplink and downlink transmission schemes in 4G.. 5. learn techniques to combat fading in wireless systems. 6. analyze space-time coding and MIMO systems. 									
Topics:	1- Overview of 1G to 4G. 2- Cellular concept 3- Frequency reuse and channel assignment 4- Handoff 5- Propagation characteristics in wireless channels 6- Large scale ad small scale fading									

	7- Coherence time and coherence bandwidth 8- Multiple access schemes 9- TDMA, FDMA 10- CDMA and Spread spectrum 11- Spreading codes and m-sequences 12- Multi-user interference 13- Inter-symbol interference 14- Equalization techniques 15- OFDM 16- Nonlinear power amplifier effects on OFDM systems 17- Frequency domain equalization and SC-FDE 18- Synchronization 19- Diversity techniques 20- Space-time codes 21- Multiple Input multiple Output (MIMO) systems		
Computer usage:	MATLAB		
Assignments:	8 problem sets		
Projects:	Term paper		
Grading:	Assignments	10%	
	Term paper	5%	
	Midterm exam	35%	
	Final exam	50%	
Further readings:	[1] Andreas F. Molisch, <i>Wireless Communications</i> , 2 nd Ed., John Wiley & Sons, 2011. [2] P. M. Shankar, <i>Introduction to Wireless Systems</i> , John Wiley & Sons, 2002. [3] D. Tse and P. Viswanath, <i>Fundamentals of Wireless Communications</i> , Cambridge University Press.		
Prepared by:	Maryam Sabbaghian		
Date:	Dec., 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		