	University of Management & Technology School of Engineering Department of Electrical Engineering

COMMUNICATION SYSTEMS (EE 410)

Lecture Schedule	As per timetable.		Semester	Fall2014
Pre-requisite	Signals and Systems (EE312)		**Credit Hours**	3+1
Instructors	Dr.Muhammad Adnan muhammad.adnan@umt.edu.pk	Muhammad Ilyas Khan Ilyas.khan@umt.edu.pk		
Office Hours				
Teaching Assistant	None		**Contact**	N/A
Office	N/A		**Office Hours**	N/A
Course Objectives	- To provide a comprehensive survey of communication system techniques and technologies with emphasis on analog communication. - To provide a context for undertaking advanced subjects in this area, especially digital communications. - To provide exposure to relevant computing techniques in this area. - The course contributes to HEC Electrical Engineering Curriculum objectives a, d, e and f.			
Learning Outcomes	Refer attached sheet			
Textbook(s)	**Required Text:** Communication Systems by Simon Haykin 5th edition, Wiley& sons **Reference:** Digital and Analog Communication Systems by B. P. Lathi, 4th Edition.			
Grading Policy	**Quizzes & Assignments:** 25% **Mid Term:** 25% **Final :** 50%			

Lectures	Topics	Readings
1-2	**Introduction** • Communication System Block Diagram(Transmitter and Receiver) • Signal to Noise Ratio (SNR), Channel Bandwidth and Data Rate • Randomness, Redundancy and Coding • Performance Metrics for Communication Systems	Lecture Notes
3-4	**Overview of Signals and Systems** ● Fourier Transform and its properties ● Inverse Fourier Transform ● Fourier Transform of periodic Signals	2.1-2.6
5-7	**Transmission of Signals** • Signal Transmission through a Linear System • Filters • Phase and Group Delay	2.7, 2.11
8-11	**Amplitude Modulation** • Standard AM • Double Sideband Suppressed Carrier (DSB-SC) • Quadrature-carrier Multiplexing • SSB and VSB • Frequency Translation • Frequency Division Multiplexing	3.1-3.8
12-15	**Phase and Frequency Modulation** ● Frequency Modulation ● Phase-Locked Loop (PLL) ● Non-Linear effects in FM Systems ● The Superheterodyne Receivers	4.1-3, 4.5-6
Mid-Term		
16-19	**Random Variables and Random (Stochastic) Processes** ● Random Variables and Statistical Averages ● Random Processes and WSS ● Transmission of Random Processes through a Linear Filter ● Power Spectral Density ● Gaussian Processes and Noise	5.3-10
20-21	**Noise in Analog Modulation** ● Noise in AM and FM ● Pre-emphasis and De-emphasis in FM	6.4-6
22-23	**Sampling and Pulse Code Modulation** ● The Sampling and Quantization Process ● Pulse-Code Modulation	7.3, 7.8-9
24-27	**Baseband Transmission of Digital Signals** ● Baseband Pulses and Matched Filter Detection ● Probability of Error Due to Noise ● Intersymbol Interference (ISI) ● Nyquist Criterion for Distortionless Transmission	8.1-6 Lecture Notes
28-30	**Band-pass Transmission** ● Band-pass Transmission Model ● Transmission of Binary PSK and FSK ● Coherent and Non-coherent Detection of PSK/FSK	9.1-5 Lecture Notes