DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COURSE SYLLABUS

EE 321: Introduction to Communications

COURSE TITLE	*CODE & NUMBER*	*SUBJECT AREA*	Contact Hours			Credit Units
			Th.	*Pr.*	*Tr.*	
Introduction to Communications	**EE 321**	Engineering and Design	3	3		4
Pre-requisites:	EE 301					
Course Role in Curriculum *(Required/Elective):*	Required Course					
Catalogue Description: Fourier Signal Analysis. Linear Modulation: AM, DSBSC, SSB, Frequency Conversion, generation and detection. FDM, Exponential Modulation: FM, PM, NBFM, WBFM. Pulse Modulation, Sampling Theorem, PAM, PDM, PPM, PCM, TDM, Digital Modulation ASK, PSK and FSK.						

***Textbooks*:** *(Author, Title, Pub., year)*
B. P. Lathi and Z. Ding, *Modern Digital and Analog Communication Systems*. Int. 5th ed., Oxford Univ. Press, 2019.

***Supplemental Materials*:**
1. S. Haykin, *Communication Systems*, 5th ed., Wiley, 2015.
2. A. B. Carlson, P. B. Crilly and J. C. Rutledge, *Communication Systems: An Introduction to Signals and Noise in Electrical Communications*. 5th ed., McGraw Hill, 2012.

***Course Learning Outcomes*:**

By the completion of the course the students should be able to:
1. Analyze signals in time and frequency domains.
2. Analyze linear, time-invariant systems in time and frequency domains.
3. Analyze and design an amplitude modulation system in time and frequency domain.
4. Analyze and design an angle modulation system in time system and frequency domain.
5. Apply the sampling theorem and describe and perform simple analysis of pulse modulation systems.

***Topics to be Covered*:**	***Duration in Weeks***
1. Classifications of signals and systems. Energy and power signals, Linear time invariant systems (LTI), Fourier series representation, Fourier transform, Spectral properties and bandwidth, unit step and unit impulse functions, Impulse response and transfer function of linear systems, Filters (LPF, HPF, and BPF)	5
2. Amplitude modulation (Double side-band - Large carrier (DSB-LC)), Double side-band-Suppressed Carrier (DSB-SC), Single side-band (SSB); Hilbert	4

	Transform, Vestigial side-band (VSB); Spectral analysis, modulators, demodulators, Super heterodyne receiver.	
3.	Frequency modulation, Phase modulation; spectral analysis, bandwidth, generation, detection, discriminators, phase-locked-loop (PLL), Frequency division multiplexing (FDM)	4
4.	Sampling theorem, Pulse amplitude modulation (PAM), Time-division multiplexing (TDM), Pulse width modulation (PWM), Pulse position modulation (PPM), Pulse code modulation (PCM)	1

Key Student Outcomes addressed by the course: (Put a ✓ sign)

(1)	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	✓
(2)	An ability to apply the engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
(3)	An ability to communicate effectively with a range of audiences	
(4)	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
(5)	An ability to function effectively on a team whose members together provide leadership, creates a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
(6)	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	
(7)	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Instructor or course coordinator: Dr. Fuad E. Alsaadi
Last updated: Spring 2020