

Course unit title:	Introduction to Communication Systems
Course unit code:	ECE330
Type of course unit: (Compulsory/optional)	Compulsory
Level of course unit: (First, second or third cycle)	Bachelor (1st cycle)
Year of study:	4
Semester when the unit is delivered:	7
Number of ECTS credits allocated:	6
Name of lecturer(s):	TBA
Learning outcomes of the course unit:	
<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> • Describe the radio frequency spectrum and the bands of different types of radio systems • Define the basic principles of both analog and digital communication systems and explain the behaviour of basic electronic components at radio frequencies • Identify the basic modulation and demodulation schemes used in radio communication systems • Analyze, implement and construct amplitude and frequency modulated radio transmitters and receivers • Specify the performance of different communication systems especially in the presence of noise 	
Mode of delivery:	Face- to-face
Prerequisites and co-requisites:	ECE350
Recommended optional program components:	None
Course Contents:	
<p>Objective: The objective of this course is to describe the basic concepts of analog and digital communication systems and the principles of the operation of radio-frequency amplifiers, oscillators, filters, modulators and demodulators. Students are also presented to a range of applications of communication systems, analog and digital modulation and demodulation techniques, and learn to evaluate the performance of communication systems in the presence</p>	

of noise.

Description:

Noise in radio systems:

Basic concepts of noise generated within a radio receiver. Signal to noise ratio (SNR). Noise factor and measurements. Noise in digital systems.

Amplitude modulation:

Amplitude modulation description, Double-sideband amplitude modulation (DSBAM) and DSBAM non-sinusoidal modulating signal. Distortion of an AM wave. Spectrum. Other forms of AM, DSB-SC-AM, SSB-AM and Vestigial Sideband. Demodulation schemes of AM signals. Introduction to the super-heterodyne receiver and its parameters.

Angle modulation:

Frequency modulation (FM) and Phase modulation (PM) techniques. Representation of FM and PM signals. Spectra. Narrowband and wideband FM. Pre-emphasis and de-emphasis.

Digital communication systems:

Baseband and digital signalling, Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM), sampling, quantization, encoding and companding. Digital signalling. Line codes and spectra. Intersymbol interference.

Digital modulation:

Time and Frequency Division Multiplexing. Binary modulated band-pass signalling. On-Off Keying (OOK), Binary Phase-Shift Keying (BPSK), Differential Phase-Shift Keying (DPSK), Frequency-Shift Keying (FSK).

Performance of communication systems:

Error probability. Information theory. Channel capacity.

**Recommended
or
required reading:**

D.C. Green, Radio Communication, 2nd Edition, Pearson, 2000.

L.W. Couch, Digital and Analog Communication Systems, 8th Edition. Prentice Hall, 2013.

S. Haykin, Communication Systems, 4th Edition, John Wiley and Sons, 2001.

**Planned learning activities
and teaching methods:**

Class Instruction
Consultation

42 Hours
15 Hours

Assessment methods and criteria:	<table border="1"> <tr> <td data-bbox="613 275 1110 310">Examinations</td> <td data-bbox="1110 275 1333 310">75%</td> </tr> <tr> <td data-bbox="613 310 1110 346">Course Work/Assignments</td> <td data-bbox="1110 310 1333 346">25%</td> </tr> <tr> <td data-bbox="613 346 1110 382"></td> <td data-bbox="1110 346 1333 382">100%</td> </tr> </table>	Examinations	75%	Course Work/Assignments	25%		100%
Examinations	75%						
Course Work/Assignments	25%						
	100%						
Language of instruction:	English						
Work placement(s):	No						
Place of Teaching:	Regular Classroom European University Cyprus, Nicosia						