

Course unit title:	Wireless Communications		
Course unit code:	AEEE444		
Type of course unit:	Technical Elective		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	4		
Semester when the unit is delivered:	7 <sup>th</sup> (Fall)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Symeon Nikolaou		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> <li>1. Argue for the conditions under which a transmitter should operate to provide adequate coverage for a given sensitivity receiver.</li> <li>2. Determine the conditions for frequency selective and flat fading wireless channel.</li> <li>3. Determine the conditions for a slow or fast fading wireless channel.</li> <li>4. Compare the available digital communication schemes considering the bandwidth limitations, and the regulations applied to wireless communications.</li> <li>5. Break down the wireless coverage area into cells.</li> <li>6. Appraise the GSM system and compare it with 3G and 4G cellular communication systems.</li> </ol>		
Mode of delivery:	Face-to-face		
Prerequisites:	AEEE321	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> <li>• <b>Introduction to wireless communications:</b> Review of fundamental concepts of wireless communication systems. Definition of the wave propagation and noise for wireless communications systems.</li> <li>• <b>Wireless Channel</b> Large scale propagation fading. Free space model, Okumoura model, Hata model Small scale fading. Power delay profile. Flat and frequency selective fading. Slow and fast fading.</li> <li>• <b>Wireless techniques:</b> Examination of modulation and frequency concepts in wireless communication systems. Examination of coding and time-division multiple access techniques. Evaluation of digital and adaptive modulation techniques. Analysis of diversity, capacity and space-division multiple access.</li> </ul>		

	<ul style="list-style-type: none"> <li>• <b>Wireless Networks</b></li> </ul> <p>Estimation of the entropy and capacity of wireless channels. Evaluation of spread spectrum, CDMA and multi-user wireless systems.</p> <ul style="list-style-type: none"> <li>• <b>Propagation and Noise.</b></li> </ul> <p>Effect of noise for multiple access schemes:</p> <p>Modulation and Frequency-Division Multiple Access.</p> <p>Coding and Time-Division Multiple Access.</p> <p>Spread Spectrum and Code-Division Multiple Access.</p>
Recommended and/or required reading:	
Textbooks:	T. Rappaport, " <b>Wireless Communications: Principles and Practice</b> ", 2 <sup>nd</sup> ed. Pearson, 2037
References:	<ul style="list-style-type: none"> <li>• Simon Haykin, Michael Moher, "Modern Wireless Communications", Prentice Hall, 2003.</li> <li>• Andy Dorman, "The Essential Guide to Wireless Communications Applications", Prentice Hall, 2002.</li> <li>• Jon W. Mark, Weihua Zhuang, "Wireless Communications And Networking", Prentice Hall, 2003.</li> </ul>
Planned learning activities and teaching methods:	<p>The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks. The structure of the course teaching is based on lectures (3 hours per week) in a classroom.</p> <p>During the lectures several related exercises are solved on the board with participation of the students. Several problems are left unfinished for the students to complete at home. Other problems are used as assignments. Topic notes are compiled by students, during the lecture which serve to cover the main issues under consideration. Students are also urged to use the textbook assigned to the course. Related homework problems are also assigned from the textbook as a turn in assignment or for homework practice. Also, students are advised to use the reference books for further reading and practice in solving related exercises.</p>
Assessment methods and criteria:	<ul style="list-style-type: none"> <li>• Assignments                    20%</li> <li>• Tests:                                30%</li> <li>• Final Exam                        50%</li> </ul>
Language of instruction:	English
Work placement(s):	No