Course unit title:	Antennas and Radars		
Course unit code:	AEEE425		
Type of course unit:	Technical Elective		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	4		
Semester when the unit is delivered:	7th (Fall)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Symeon Nikolaou		
Learning outcomes of the course unit:	1. Manage fundamental antenna parameters problems. 2. Combine the radiation pattern of an individual radiator into a linear array, and plot such radiation patterns in Cartesian and polar diagrams 3. Assemble linear arrays considering the calculated mutual and self impedances for antenna arrays. 4. Assess the primary conditions that dictate the selection of a specific antenna type depending on the application. 5. Appraise the basic radar characteristics and recommend the appropriate type depending on the implementation requirements.		
Mode of delivery:	Face-to-face		
Prerequisites:	AEEE312	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	• **Fundamentals of antennas:** Understand the principal antenna parameters and make simple calculations. Model an antenna in simple transmitter and receiver circuits. • **Linear antennas:** Calculate antenna performance with time harmonic excitation. Compute and plot power density and far field radiation patterns. • **Linear antenna arrays:** Use the different types of excitation and phase difference techniques to meet different specifications. Plot power density and radiation patterns of broadside and endfire linear arrays • **Types of antennas for different applications:** Get an idea of Loop antennas. Horn antennas. Helical antennas. Low frequency antennas, High frequency antennas. VHF and UHF Communication antennas. TV and FM transmission antennas. Solve problems related with microstrip patch antenna design. • **Basic radar principles:** Get introduced to basic radar principles. Solve problems related to target detection and range estimation. Active and passive systems. Range, target velocity, incident power density. Range equation. Radar system description. Frequency bands. Radar antennas. Tracking antennas		

Recommended and/or required reading:	
Textbooks:	C. A. Balanis, **Antenna Theory, Analysis and Design**, 3rd ed., J. Wiley, 2007
References:	• W. D. Wirth, Radar Techniques, IEE, 2001 • D. Pozar, Microwave Engineering, 2nd ed. J. Wiley, 1998 • S. Kingsley, S. Quegan, Understanding Radar Systems, McGraw Hill, 1992
Planned learning activities and teaching methods:	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. 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.
Assessment methods and criteria:	• Assignments 20% • Tests: 30% • Final Exam 50%
Language of instruction:	English
Work placement(s):	No