INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS						
SCHOOL	SCHOOL OF SCIENCE						
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS						
COURSE LEVEL	UNDERGRADUATE						
COURSE TITLE	**Waves, waveguides and antennas**						
COURSE CODE	**ΕΠ05**		**Semester**	**5**	**ECTS**	**6**	
TEACHING HOURS per week	**THEORY**	**3**	**SEMINAR.**		**LABORATORY**	**1**	
COURSE TYPE	Elective (ΠΜ)						

K	**E1**	**E2**	**E3**	**E4**	**E5**	**E6**
B					B	

URL	https://eclass.uoa.gr/courses/D425/
EXPECTED PRIOR KNOWLEDGE/ PREREQUISITES AND PREPARATION:	YES (K12)
TEACHING AND EXAMINATIONS LANGUAGE:	GREEK
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO

COURSE CONTENT

1. Elements of vector analysis
2. Maxwell equations in differential and integral form
3. Wave Equation
4. Poynting Vector and power of waves
5. Complex representation of fields. Harmonic fields. Plane waves
6. Polarization of waves.
7. Reflection and reflection of plane waves
8. Basic antenna parameters
9. Radiation of Hertz dipole
10. Linear antennas.
11. Typical antennae

12. Analysis and synthesis of elements of Array Antennas

STUDENT LEARNING OBJECTIVES
The course is a fundamental applied electromagnetics course for computer and telecom scientists and engineers. By teaching this lesson, the student becomes familiar with the use of basic principles and equations of electromagnetism in telecommunication problems . She/he understands the basic electromagnetic magnitudes and properties used in practice in telecommunications. Based on what has been taught in the course Electromagnetism - Optics, she learns to use the basic Electromagnetic theory from the perspective of the Engineer and leads to solve the problem of Electromagnetic Radiation and Antennas. Upon successful completion of the course, students will be able to: • use the principles of electromagnetic theory to solve problems. Such problems are par excellence those related to the propagation of waves (eg transmission media) and their sources. • use simplistic assumptions in the HM equations that usually apply to telecommunications • connect the electromagnetic field with useful telecommunication sizes • examine simple wave forms by highlighting their basic properties and finally apply practically the above to the antennae • Differentiate the various types of antennae and understand their use

TEACHING AND LEARNING METHODS - ASSESSMENT	
TEACHING METHOD	In Class (Face to Face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Learning process supported by the e-class platform (Discussions, Announcements, Task assignments, Student groups) Email communication Live transmission of lectures Ability to track recorded lectures Utilization of Specialized Software - applets
TEACHING ORGANIZATION *Describe in detail the way and methods of teaching:* *Enhanced Lectures,* *Online Lectures,* *Seminars,* *Tutorial,* *Laboratory,* *Laboratory Exercise,* *Study & analysis of literature,* *Practice (Positioning),* *Interactive teaching,* *Developing a project,* *Individual / group work* *Telework (reference to tools) etc.*	

Activity	***Student Workload*** *(hours)*
Lectures	39
Tutorial	13
Laboratory	13
Bibliography analysis	5
Small individual exercises	20
Independent Study	60
Total Course (25 hours of workload per unit of credit)	***150***

Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS	
ASSESSMENT OF STUDENTS *Description of the assessment process* *Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other* *Fully defined evaluation criteria are mentioned and if and where they are accessible to students.*	The evaluation includes: the final - recapitulative written examination, including closed or open-ended questions and problems . The evaluation is done in the Greek language

Assessment methods	***Number***	***Percentage***
Written examination	1	60%
Progress		
Exercises	3	10%
Laboratory	2	20%
Small project	1	10%

LITERATURE AND STUDY MATERIALS / READING LIST

In Greek

- *Σημειώσεις, Θ. Σφηκόπουλος*
- *Εφαρμοσμένος Ηλεκτρομαγνητισμός, L. C. Shen, J. A. Kong, Εκδόσεις ΙΩΝ, 2003*
- *Κεραίες - Ανάλυση και Σχεδίαση, C.A. Balanis, Εκδόσεις ΙΩΝ, 2005*