

COURSE RECORD

Code	ECE 505
Name	Antennas
Hour per week	3 (Theory)
Credit	3
ECTS	10
Level/Year	Graduate
Semester	Spring
Type	Elective
Location	
Prerequisites	EE 205
Special Conditions	
Coordinator(s)	Dr. Veli Tayfun Kılıç
Webpage	
Content	The course covers the following topics: introduction to antennas and wave propagation, electromagnetic fundamentals, wave equations and plane waves, electromagnetic power flow and Poynting's vector, Green's function, fundamental parameters of antennas, simple antennas such as linear wire, dipole and loop antennas, array theory, and various types of other antennas used for different applications.
Objectives	<ul style="list-style-type: none"> - Providing fundamental knowledge and skills for antenna engineering - Introducing antenna theory - Analyzing design and testing principles of antennas - Investigating various types of antennas and their applications
Learning Outcomes	L01: To learn basic theory of antennas L02: To learn operation principles of antennas L03: To learn how to analyze, design and test a simple antenna L04: To learn antenna parameters L05: To understand array antenna theory
Requirements	Basic knowledge about fundamentals of electromagnetics
Reading List	<ul style="list-style-type: none"> - Antenna Theory, Analysis and Design, 3rd Edition, Constantine A. Balanis, John Wiley & Sons, Inc., New York, 2005 - Lecture Notes
Ethical Rules and Course Policy	

LEARNING ACTIVITIES *Please, use this one as a reference for your course*

Activities	Number	Weight (%)
Lecture	14	60%
Group Works	1	40%
Presentations	0	0%
Site Visits	0	0%
Total		100 %

ASSESSMENT

Evaluation Criteria	Weight (%)
Midterm Exam/Submission	20%
Group Project Assignments & Presentations	40%
Attendance/Participation	05%
Final Exam/Submission	35%
Total	100%

This is a tentative grading policy. It may change as needed.

COURSE LOAD *Please, use this one as a reference for your course*

Activity	Duration (hour)	Quantity	Work Load (hour)
In class activities	3	14	42
Lab	0	0	0
Group work	2	14	28
Research (web, library)	0	0	0
Required Readings	3	12	36
Pre-work for Presentation	2	1	2
Lab reports	0	0	0
General Sum			108

ECTS: 10 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
L01	5	3	5	1	1	1	1	0	1	1	1	0	0	0
L02	4	4	4	4	1	0	0	0	3	3	3	4	2	2
L03	0	0	0	5	5	0	1	0	5	5	2	1	0	0
L04	0	0	0	4	4	5	5	0	5	5	5	5	0	0
L05	0	0	0	0	0	0	0	0	0	0	0	0	5	5

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

WEEKLY SCHEDULE

W	Topic	Outcomes
1	TX and RX Antennas, EM Fundamentals, Maxwell Equations and Boundary Conditions Lab/Activity:	L01, L02
2	Wave Equations and Solutions, Plane Waves Lab/Activity:	L01, L02
3	Flow of EM Power and Poynting's Vector, Green's Function Activity:	L01, L02
4	Hertzian Dipole, Radiation Field Regions Activity:	L02, L03, L04
5	Radiation Patterns, Radiation from Line Currents Activity:	L03, L04
6	EM Field Approximations in Far-Field Region, Fundamental Definitions of Antennas (Part I) Activity:	L04
7	Fundamental Definitions of Antennas (Part II) Activity:	L04
8	Midterm Exam Activity:	
9	Circuit Models, Antenna Input Impedance and Matching (Part I) Activity:	L02, L03, L04
10	Circuit Models, Antenna Input Impedance and Matching (Part II), Reciprocity Activity:	L02, L03, L04
11	Polarization, Polarization Loss Factor and Efficiency Activity:	L02, L04
12	The Radio Communication Link, Radar Range Equation, Radar Cross Section Activity:	L02, L04
13	Array Theory (Part I) (Uniform One-Dimensional Arrays) Activity:	L05
14	Array Theory (Part II) (Nonuniform Arrays, Uniform Two-Dimensional Planar Arrays)	L05

Activity:

Prepared by Veli Tayfun KILIÇ
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