AGU Graduate School of Engineering and Science ……
Program

COURSE RECORD	
Code	ECE 505
Name	Antennas
Hour per week	3 (Theory)
Credit	3
ECTS	7,5
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	- 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	LO1: To learn basic theory of antennas LO2: To learn operation principles of antennas LO3: To learn how to analyze, design and test a simple antenna LO4: To learn antenna parameters LO5: To understand array antenna theory
Requirements	Basic knowledge about fundamentals of electromagnetics
Reading List	- 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.

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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
LO1	5	3	5	1	1	1	1	0	1	1	1	0	0	0
LO2	4	4	4	4	1	0	0	0	3	3	3	4	2	2
LO3	0	0	0	5	5	0	1	0	5	5	2	1	0	0
LO4	0	0	0	4	4	5	5	0	5	5	5	5	0	0
LO5	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	LO1, LO2
	Lab/Activity:	
2	Wave Equations and Solutions, Plane Waves	LO1, LO2
	Lab/Activity:	
3	Flow of EM Power and Poynting's Vector, Green's Function	LO1, LO2
	Activity:	
4	Hertzian Dipole, Radiation Field Regions	LO2, LO3, LO4
	Activity:	
5	Radiation Patterns, Radiation from Line Currents	LO3, LO4
	Activity:	
6	EM Field Approximations in Far-Field Region, Fundamental Definitions of Antennas (Part I)	LO4
	Activity:	
7	Fundamental Definitions of Antennas (Part II)	LO4
	Activity:	
8	Midterm Exam	
	Activity:	
9	Circuit Models, Antenna Input Impedance and Matching (Part I)	LO2, LO3, LO4
	Activity:	
10	Circuit Models, Antenna Input Impedance and Matching (Part II), Reciprocity	LO2, LO3, LO4
	Activity:	
11	Polarization, Polarization Loss Factor and Efficiency	LO2, LO4
	Activity:	
12	The Radio Communication Link, Radar Range Equation, Radar Cross Section	LO2, LO4
	Activity:	
13	Array Theory (Part I) (Uniform One-Dimensional Arrays)	LO5
	Activity:	
14	Array Theory (Part II) (Nonuniform Arrays, Uniform Two-Dimensional Planar Arrays)	LO5

Activity:

Prepared by Veli Tayfun KILIÇ
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