School of Engineering and Natural Sciences / Electrical and Electronics Engineering (English)

2024 - 2025 Academic Year

INTRODUCTION to RF and MICROWAVE ENGINEERING

Syllabus

Course Description						
Name		**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
INTRODUCTION to RF and MICROWAVE ENGINEERING		EEE3249220	Spring Semester	3+0	3	6
Prerequisites Courses	ELEKTROMANYETİK					
Recommended Elective Courses						
Language of Instruction	English					
Course Level	First Cycle (Bachelor's Degree)					
Course Type	Elective					
Course Coordinator	Assoc.Prof. Hüseyin Şerif SAVCI					
Name of Lecturer(s)	Assoc.Prof. Hüseyin Şerif SAVCI					
Assistant(s)						
Aim	This is a third-year undergraduate course on the fundamentals of microwave engineering and RF theory. The main goal is to learn the basics of RF/Microwave Engineering. Some basic experiments will be performed. Students will learn how to use microwave equipment such as spectrum and network analyzers. They will also learn how to use some simple commercial microwave software.					
Course Content	This course contains; Introduction. Transmission line theory I.,Smith chart and Impedance matching techniques ,Transmission lines and waveguides ,Microwave netwrok analysis ,Microwave network analysis (emphasis on S-parameters),Impedance matching and tunnng ,Microwave resonators,Power dividers and directional couplers,Microwave filters,Noise in Microwave Systems,Active RF and microwave devices ,Microwave amplifier design ,Oscillators and mixers,Microwave antennas.					

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
5.Ability to use RF/Microwave circuits, devices, and software in the design of RF/Microwave systems.	17, 2, 21, 9	A, E, F, G
1. Transients and steady state analysis of two conductor transmission lines (such as coaxial line, strip line and microstrip line)	17, 2, 21, 9	A, E, F, G
2. Ability to use Smith Chart in designing RF circuits.	17, 2, 21, 9	A, E, F, G
3. Performing impedance matching.	17, 2, 21, 9	A, E, F
4. Understanding of network parameters of RF circuits.	17, 2, 21, 9	A, E, F, G
Teaching Methods	17: Experimental Technique, 2: Project Based Learning Model, 21: Simulation Technique, 9: Lecture Method	
Assessment Methods	A: Traditional Written Exam, E: Homework, F: Project Task, G: Quiz	

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Introduction. Transmission line theory I.	Notes and Textbook chapters 1 & 2
2	Smith chart and Impedance matching techniques □□□□	Notes and Textbook chapter 2
3	Transmission lines and waveguides □□□	Notes and Textbook chapter 3
4	Microwave netwrok analysis □□□	Notes and Textbook chapter 4
5	Microwave network analysis (emphasis on S-parameters)	Notes and Textbook chapter 4
6	Impedance matching and tunnng □□□	Notes and Textbook chapter 5
7	Microwave resonators	Notes and Textbook chapter 6
8	Power dividers and directional couplers	Notes and Textbook chapter 7
9	Microwave filters	Notes and Textbook chapter 8
10	Noise in Microwave Systems	Notes and Textbook chapter 10
11	Active RF and microwave devices □□□	Notes and Textbook chapter 11
12	Microwave amplifier design □□□	Notes and Textbook chapter 12
13	Oscillators and mixers	Notes and Textbook chapter 13
14	Microwave antennas	Notes and Textbook chapter 14

Evaluation Methods	**Weight(%)**
Midterm Exam	30
General Exam	70

Resources
"Microwave Engineering", By David Pozar, 4th ed., John Wiley, 2011Many books with title “Microwave Engineering”