OSTİM TECHNICAL UNIVERSITY
FACULTY OF ENGINEERING
ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE SCHEDULE FORM
2023-2024 FALL/SPRING

EEE 471 Radar Theory

Course Unit Name	Course Unit Code	Semester	Lecture Hr	Practice Hr	Lab Hr	Credit	ECTS
Radar Theory	EEE 471	7	3	---	--	3	4

Course Details	
Language of Instruction	English
Level of Course Unit	Undergraduate
Program	Electrical and Electronics Engineering
Mode of Delivery	Face to Face
Type of Course Unit	Technical Elective
Objectives of the Course	The course aims to provide electrical and electronics engineering students with a technical knowledge of radar systems and to understand how and for what purpose radar systems are used in the field. At the end of the course, students will know what radar technical specifications mean while performing basic radar calculations.
Course Content	- Basic radar principles, - Derivation of the Radar Range equations and jamming equations, - Radar types and structures, - Radar losses, - Matched Filter Radar Receiver, - Pulse compression techniques.
Course Method and Techniques	Lecture, Questions/Answers, Problem-solving, and laboratory work.
Prerequisites and Corequisities	No
Course Coordinator	Assoc.Prof.Dr. Ahmet Güngör Pakfiliz
Name of Lecturer(s)	Assoc.Prof.Dr. Ahmet Güngör Pakfiliz
Assistants	---
Work Placement(s)	No

Recommended or Required Reading
Resources: - Bassem R. Mahafza, Radar Systems Analysis and Design Using MATLAB, Third Edition, deciBel Research Inc. Huntsville, Alabama, USA, 2013 - Merrill I. Skolnik, Introduction to Radar Systems, Second Edition, McGraw-Hill International Edition, 1981.

Course Category			
Mathematics and Basic Sciences	:	Education	:
Engineering	:**X**	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Profession	:

Weekly Detailed Course Contents		
Week No	**Topics**	**Pre-study & Materials**
1	Introduction to Radar Systems	
2	Pulsed Radar Equations	
3	Radar Equation with Jamming	
4	Radar Losses	
5	Noise Factor	
6	Continuous Wave Radars	
7	Radar Signals and Signal Processing	
8	Midterm	
9	Spectral Display of Radar Signals	
10	Discrete-Time Systems and Signals	
11	Matched Filter Radar Receiver	
12	Matched Filter Radar Receiver	
13	Pulse Compression	
14	Pulse Compression	
15	Radar Clutter	
16	Final	

Course Learning Outcomes	
No	**Learning Outcomes**
C1	Will learn the basics of Radar principles.
C2	Will be able to establish and solve radar and jamming equations.
C3	Will learn the basic structures of the radar components and radar losses.
C4	Will be able to select radar type according to the operational requirements.
C5	Will be able to explain radar signal processing techniques.

Program Outcomes	
No	**Outcomes**
P01	Reaches the knowledge broadly and in-depth by doing scientific research in the field, evaluating, interpreting, and applying the knowledge.
P02	Has comprehensive knowledge about current techniques and methods applied in engineering and their constraints.
P03	Complements and applies knowledge with scientific methods, using uncertain, limited, or incomplete data; can use information from different disciplines together.
P04	The student knows his/her profession's new and developing applications and examines and learns them when needed.
P05	Defines and formulates problems related to the field, develops methods to solve, and applies innovative solutions.
P06	Develops new and/or original ideas and methods; designs complex systems or processes and develops innovative/alternative solutions in their designs.
P07	Designs and implements theoretical, experimental, and modeling research; examines and solves complex problems encountered in this process.
P08	Can work effectively in disciplinary and multi-disciplinary teams, lead such teams, and develop solutions in complex situations; can work independently and take responsibility.
P09	Communicates verbally and in writing using a foreign language at least at the B2 General Level of the European Language Portfolio.
P10	The student conveys the results of his/her studies systematically and clearly in written or verbal form in national and international environments in that field or outside the field.
P11	Knows the social, environmental, health, safety, and legal aspects of engineering applications, project management, and business life applications and is aware of the constraints they impose on engineering applications.
P12	Observes social, scientific, and ethical values in the stages of data collection, interpretation, announcement, and in all professional activities.

Assessment Methods and Criteria		
In-term studies	**Quantity**	**Percentage**
Attendance		
Lab		
Practice		
Fieldwork		
Course-specific internship (if any)		
Quiz/Studio/Criticize	2	15%
Homework		
Presentation		
Project	1	15%
Report		
Seminar		
Midterm Exam	1	30%
Final Exam	1	50%
	Total	**Total**
Contribution of Midterm Studies to Success Grade		50%
Contribution of End of Semester Studies to Success Grade		50%
	Total	**% 100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration (Hr)**	**Total Work Load**
Weekly Theoretical Course Hrs (Including the exam week: 16 x total course hours)	14	2	28
Lab			
Practice			
Course-specific internship (if any)			
Fieldwork			
Out-of-class study time	14	3	42
Presentation/Seminar Preperation			
Project			
Report	11	2	22
Homework			
Quiz/Studio/Criticize	2	4	8
Midterm Exam and Preperation for Midterm	1	6	6
Final Exam and Preperation for Final Exam	1	14	14
Total Workload			**120**
ECTS Credit	**(120 /30) =**		**4**

Contribution of Course Learning Outcomes to Programme Outcomes												
Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant												
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**
C1	4	4	4									
C2	4	4	4									
C3	3	4	4	3								
C4	3	4	3	4								
C5	3	4	3	4								