



COURSE / MODULE / BLOCK DETAILS

ACADEMIC YEAR / SEMESTER

Offered by: Faculty of Engineering			
Course Title: PHASE ARRAY RADAR TECHNOLOGIES		Course Org. Title: PHASE ARRAY RADAR TECHNOLOGIES	
Course Level: Bachelor's Degree		Course Code: MTH 3504	
Language of Instruction: English		Form Submitting/Renewal Date 13/02/2023	
Weekly Course Hours: 2		Course Coordinator: PROF.DR. EMİNE YEŞİM ZORAL	
Theory	Application	Laboratory	National Credit: 2
2	0	0	ECTS Credit: 4



DOKUZ EYLUL UNIVERSITY

FACULTY OF ENGINEERING OFFICE OF THE DEAN



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Offered to:	Course Status: Compulsory/Elective
Name of the Department:	
Metallurgical and Materials Engineering	Technical Elective
Electrical and Electronics Engineering	Technical Elective
Computer Engineering	Technical Elective

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Instructor/s:

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## Course Objective:

Electronically Scanned Arrays (ESA) are antennas that provide controllable, agile, high-gain beams for areas such as radar and communications. Unlike antennas that require a reflector or wave-guide to steer the array beam, ESAs can steer the beam electronically in space without physical movement of the array. Within the scope of the course, the basic theory of ESAs will be explained and their applications in radar and communication systems will be introduced.

## Learning Outcomes:

- 1 To teach the fundamentals of ESAs.
- 2 To teach sub-array beam forming techniques.
- 3 To achieve beam optimization.
- 4 To achieve the electronic tracking of arrays in radar applications.
- 5 To achieve the electronic tracking of arrays in communication applications.

## Learning and Teaching Strategies:

## Assessment Methods:

Name	Code	Calculation formula
MIDTERM EXAM	MTE	
PROJECT	PRJ	
FINAL EXAM	FIN	
FINAL COURSE GRADE	FCG	$MTE * 025 + PRJ * 025 + FIN * 050$
RESIT	RST	
FINAL COURSE GRADE (RESIT)	FCGR	$MTE * 025 + PRJ * 025 + RST * 050$

## Further Notes about Assessment Methods:



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Assessment Criteria:

Midterm, homeworks (projects) and final exams.

Textbook(s)/References/Materials:

Engineering Electronically Scanned Arrays MATLAB ® Modeling and Simulation Edited by Arik D. Brown

Course Policies and Rules:

To be announced.

Contact Details for the Instructor:

To be announced.

Office Hours:

to be announced.

Course Outline:

Week	Topics:	Notes:
1	Fundamentals of electronically scanned arrays 1	
2	Fundamentals of electronically scanned arrays 2	
3	Fundamentals of electronically scanned arrays 3	
4	Fundamentals of electronically scanned arrays 4	
5	Fundamentals of electronically scanned arrays 5	
6	Sub-array beam forming 1	
7	Sub-array beam forming 2	
8	Midterm exam	



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9	Beam optimization 1
10	Beam optimization 2
11	Applications of electronically scanned arrays in radar systems 1
12	Applications of electronically scanned arrays in radar systems 2
13	Applications of electronically scanned arrays in communication systems 1
14	Applications of electronically scanned arrays in communication systems 2



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## ECTS Table

Course Activities	Number	Duration (hour)	Total Work Load (hour)
In Class Activities			
Lectures	13	2	26

## Exams

Final	1	2	2
Midterm	1	2	2

## Out of Class activities

Project Preparation	1	20	20
Preparation for final exam	1	20	20
Preparation for midterm exam	1	20	20
Total Work Load (hour)			90
ECTS Credits of the Course= Total Work Load (hour) / 25			4