AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Introduction to Mımo Communication						
Course Code	EEE536		Couse Level	Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The aim of this course is to give the basics of Multiple input multiple output (MIMO) antenna systems which is now an essential part of the modern wireless communication systems, such as 3G, 4G, 5G, WLAN / Wifi, LTE, WiMax, etc.						
Course Content	MIMO Capacity, MIMO Channel Models, Alamouti coding, Space-Time Codes, Spatial Multiplexing, MIMO-OFDMA, Practical MIMO Applications						
Work Placement	N/A						
Planned Learning Activities and Teaching Methods		Explanation (Presentation), Discussion, Project Based Study, Individual Study, Problem Solving					
Name of Lecturer(s)							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	30
Assignment	6	20
Project	1	30

Recommended or Required Reading

1	Introduction to MIMO Communications, Jerry R. Hampton, Cambridge University Press, 2013

Week	Weekly Detailed Course Contents	
1	Theoretical	Overview of MIMO communications
2	Theoretical	The MIMO capacity formula
3	Theoretical	Applications of the MIMO capacity formula
4	Theoretical	Applications of the MIMO capacity formula
5	Theoretical	RF propagation
6	Theoretical	RF propagation
7	Theoretical	MIMO channel models
8	Intermediate Exam	Midterm Exam
9	Theoretical	Alamouti coding
10	Theoretical	Space-time coding
11	Theoretical	Space-time coding
12	Theoretical	Spatial multiplexing
13	Theoretical	Spatial multiplexing
14	Theoretical	Broadband MIMO
15	Theoretical	Practical MIMO examples
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	6	3	3	36
Project	1	14	0	14
Individual Work	14	3	0	42
Midterm Examination	1	9	3	12

Final Examination	1	9	3	12
		Total Workload (Hours)		200
		[Total Workload (Hours) / 25*] = **ECTS**		8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Be familiar with the architecture and protocols of typical MIMO wireless communications networks
2	To understand the differences of the MIMO and conventional SISO systems
3	To understand and analyse the Alamouti coding, Space-Time Codes and Spatial Multiplexing
4	To gain experience on the practical MIMO communication systems.
5	To be able to discuss the practical MIMO communication systems.

Programme Outcomes *(Electrical and Electronics Engineering Master)*

1	Developing and intensifying knowledge that requires expertise in the area of Electrical-Electronics Engineering, and gaining the skills necessary to analyze and solve problems using this knowledge
2	Grasping the inter-disciplinary interaction related to Electrical-Electronics Engineering, interpreting and forming new types of knowledge by combining the knowledge from Electrical-Electronics Engineering and the knowledge from various other disciplines
3	Developing new approaches to solve the complex problems arising in Electrical-Electronics Engineering, coming up with solutions while taking responsibility and carrying out a specific study independently
4	Assessing the knowledge and skill gained in the area of Electrical-Electronics Engineering with a critical view
5	Transferring the current developments and one's own work in Electrical-Electronics Engineering, to other groups in written, oral and visual forms
6	The ability to control the collecting, interpreting, practicing and announcing processes of the Electrical-Electronics Engineering related to data taking into consideration scientific, cultural and ethical values and the ability to teach these values to others
7	Developing application plans concerning the subjects related to Electrical-Electronics Engineering and the ability to evaluate the end results of these plans within the frame of quality processes

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	4	4	4	4	4
P2	4	4	4	4	4
P3	4	4	4	4	4
P4	4	4	4	4	4
P5	4	4	4	4	4
P6	4	4	4	4	4
P7	4	4	4	4	4