AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title		Advanced Power Electronics						
Course Code		EEE554		Couse Level		Second Cycle (Master's Degree)		
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		This course aims to present power electronic devices and their applications in detail						
Course Content		Principal laws of electric and magnetic circuits, solid state devices, gating circuits and thermal design, dc-dc switch mode converters, switch mode dc-ac Inverters						
Work Placement		N/A						
Planned Learning Activities and Teaching Methods			Explanation (Presentation), Demonstration, Discussion, Case Study, 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	20
Assignment	3	20
Project	2	40

Recommended or Required Reading

1	Power Electronics Converters Applications And Design, Mohan, Undeland, Robbins
2	Power Electronics, circuits, Devices and Applications, M.H. Rashid

Week	Weekly Detailed Course Contents	
1	Theoretical	Review of Basic Electrical and Magnetic Circuit Concepts
2	Theoretical	Advanced solid state devices- Power modules, gating circuits
3	Theoretical	Advanced solid state devices- Thermal design, protection
4	Theoretical	dc – dc switch mode converters: Buck, boost, buck-boost
5	Theoretical	dc – dc switch mode converters: Cuk, full-bridge
6	Theoretical	Switch mode dc-ac Inverters : single-phase PWM and square-wave operation
7	Theoretical	Switch mode dc-ac Inverters : three-phase PWM and square-wave operation
8	Intermediate Exam	Midterm Exam
9	Theoretical	Load Resonant Converters
10	Theoretical	Resonant-switch Converters : ZCS and ZVS
11	Theoretical	Power Conditioners and UPS
12	Theoretical	Introduction to Motor Drives
13	Theoretical	DC motor drives
14	Theoretical	AC motor drives
15	Theoretical	Term Project Presentations
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	13	7	3	130
Assignment	3	6	2	24
Project	2	10	3	26
Midterm Examination	1	7	2	9

Final Examination	1	8	3	11
			Total Workload (Hours)	200
			[Total Workload (Hours) / 25*] = **ECTS**	8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Understand the operation and conceptual design principles for current source converter and voltage source converter
2	Explain the underlying principles and assumptions for deriving averaged and linearised small-signal dynamic models of power converters.
3	Derive small-signal models in equivalent circuit and transfer function form for the buck and boost DC-DC converters and for three-phase DC-AC and AC-DC converters.
4	Select appropriate PWM schemes for three-phase DC-AC and AC-DC power converters
5	Explain the basic operation of LCC and VSC HVDC 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