



ESOGÜ Electrical-Electronics Engineering Department

COURSE CODE: 151228516 - 151248516 **COURSE TITLE:** Power Electronics Applications

Semester	Weekly Hours		COURSE			
	Theoretical	Practical	Credits	ECTS	Type	Language
8	3	0	3	5	Compulsory () Elective (x)	Turkish () English (x)
Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.).						
Math and Basic Science		Electrical Engineering [mark (√) if there is high design content]		General Education	Humanities	
		3 ()				
Assessment		THEORETICAL-PRACTICAL COURSES			LABORATORY COURSES	
		Type	Number	%	Activity Type	Number %
Midterm		Midterm	1	45	Quiz	
		Quiz			Lab performance	
		Homework			Report	
		Project			Oral exam	
		Other (.....)			Other (.....)	
Final			1	55		
Makeup exam (Oral/Written)		Written				
Prerequisites		None				
Brief content of the course		Switching power supplies, zero-current and zero-voltage switching, resonance converters, gate drive circuits, snubber circuits, heat sink calculations, ac motor drives, uninterruptible power supplies, power system applications.				
Objectives of the course		Having taken this course, students will learn the need for electrical conversion, and learn the goal and methods of electrical conversion. At the end of the course, students become effective designers of useful converters.				
Contribution of the course towards professional education		Work and take part in power electronic design projects. Provide important background for graduate level studies.				
Outcomes of the course		11) Learn the topology, the operating principles and the design of various switching mode power supplies. 12) Learn the gate drive topologies, protection mechanisms of power devices. 13) Learn about the various industrial and commercial applications of the power electronics technology.				
Textbook of the course		Mohan, N., T. Undeland, ve W. Robbins, "Power Electronics: Converters, Applications, and Design," John Wiley, ISBN: 0471584088.				
Other reference books		5) Krein, P. T., "Elements of Power Electronics," Oxford University Press, 1998, ISBN: 0195117018. 6) Erickson, R. W., "Fundamentals of Power Electronics," Chapman & Hall, 1997, ISBN: 0412085410. 7) Rashid, M. H., "SPICE for Power Electronics and Electric Power. Upper Saddle River," Prentice-Hall, 1993, ISBN: 0130304204. 8) J. G. Kassakian, M. F. Schlecht, ve G. C. Verghese, "Principles of Power Electronics. Reading, Addison-Wesley, 1991, ISBN: 0201096897.				
Required material for the course						

WEEKLY PLAN OF THE COURSE	
Week	Topics
1	Review of half-bridge and full-bridge inverters
2	Three-phase inverters
3	Switching power supplies: Forward converter
4	Switching power supplies: Flyback converter
5	Switching power supplies: Half-bridge and full-bridge
6	Resonance converters
7	Zero-voltage and zero-current switching
8,9	Midterm
10	Gate drive circuits, snubbers, and heat sink calculations
11	DC motor drives
12	AC motor drives
13	UPS and photovoltaic applications
14	Energy storage applications
15,16	Final

NO	OUTCOMES OF THE PROGRAMME	4	3	2	1
1	Adequate knowledge of mathematics, science and Electrical and Electronic Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving complex problems of Electrical and Electronic Engineering	X			
2	Ability to identify complex engineering problems in Electrical and Electronic Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods.	X			
3	Having skills to apply modern design methods to design a complex system, process, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronic Engineering.		X		
4	Having skills to develop, select and apply modern techniques and tools needed to analyze and solve complex applications in Electrical and Electronic Engineering, skills to use information technology effectively.				
5	Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of complex problems in Electrical and Electronic Engineering				
6	Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.				
7	Communicating effectively in oral and written form both in Turkish and English. Effective report writing and understanding written reports, preparing design and manufacturing reports, making effective presentations, skills to give and receive clear and concise instructions.				
8	Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing				
9	Understanding of professional and ethical responsibility				
10	Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development.				
11	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.				

Scale for assessing the contribution of the course to the program outcomes:

4: High 3: Medium 2: Low 1: None

Name of Instructor(s): Assoc. Prof. Bünyamin Tamyürek

Signature(s):

Date: 22.03.2016