



ESOGÜ Electrical-Electronics Engineering Department

COURSE CODE:151227455-151247455 COURSE TITLE:Intro. to Power Electronics

Semester	Weekly Hours		COURSE			
	Theoretical	Practical	Credits	ECTS	Type	Language
7	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
		()				
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		Background information about power electronics technology, organizing and analyzing semiconductor switches, uncontrolled diode rectifiers, phase controlled rectifiers, ac controllers, dc/dc converters, inverters, and discontinuous operating modes.				
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 power 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		7) Learn about the basics of the power semiconductor devices 8) Learn about the topology and the operating principles of various ac/dc rectifier circuits 9) Learn about the topology and the operating principles of various dc/dc converters. 10) Learn about the topology and the operating principles of various dc/ac converters.				
Textbook of the course		Mohan, N., T. Undeland, ve W. Robbins, "Power Electronics: Converters, Applications, and Design," John Wiley, ISBN: 0471584088.				
Other reference books		1) Krein, P. T., "Elements of Power Electronics," Oxford University Press, 1998, ISBN: 0195117018. 2) Erickson, R. W., "Fundamentals of Power Electronics," Chapman & Hall, 1997, ISBN: 0412085410. 3) Rashid, M. H., "SPICE for Power Electronics and Electric Power. Upper Saddle River," Prentice-Hall, 1993, ISBN: 0130304204. 4) 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	Introduction to power electronics technology
2	Power semiconductors: diodes and thyristors
3	Power semiconductors: BJT, MOSFET, GTO and IGBT
4	Uncontrolled diode rectifiers
5	Thyristor controlled rectifiers
6	Buck converter
7	Boost converter
8,9	Midterm
10	Buck-boost converter
11	Cuk and Sepic converters
12	Half-bridge and full-bridge dc/dc converters
13	Half-bridge and full-bridge inverters
14	Discontinues current mode of operation
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