



# ESOGÜ Electrical-Electronics Engineering Department

**COURSE CODE:** 151226375-151246375 **COURSE TITLE:** Principles of Energy Conversion

Semester	Weekly Hours		COURSE			
	Theoretical	Practical	Credits	ECTS	Type	Language
6	3	0	3	5	Compulsory (x) Elective ( )	Turkish ( ) English (x)
Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.).						
<b>Math and Basic Science</b>		<b>Electrical Engineering</b> [mark (√) if there is high design content]		<b>General Education</b>	<b>Humanities</b>	
2		2 ( )		-	-	
<b>Assessment</b>		<b>THEORETICAL-PRACTICAL COURSES</b>			<b>LABORATORY COURSES</b>	
<b>Midterm</b>	<b>Type</b>	<b>Number</b>	<b>%</b>	<b>Activity Type</b>	<b>Number</b>	<b>%</b>
	Midterm	1	40	Quiz		
	Quiz			Lab performance		
	Homework			Report		
	Project			Oral exam		
<b>Final</b>	Other (.....)	1	60	Other (.....)		
<b>Final</b>	Comprehensive					
<b>Makeup exam (Oral/Written)</b>	Oral					
<b>Prerequisites</b>	Electromagnetics II					
<b>Brief content of the course</b>	Electromechanical energy conversion, Transformers, Pu systems, Solutions to three phase symmetrical circuits, Power in three phase system.					
<b>Objectives of the course</b>	Some fundamental knowledge that is used in Electric Machinery, Electric Power System Analysis I, II classes is given to the students.					
<b>Contribution of the course towards professional education</b>	Some fundamental knowledge about electric power system engineering is given to the students in this class					
<b>Outcomes of the course</b>	Student, who takes this course, can learn the subjects about the electric machines and electric power systems that are related with student main interest (for instance electronic, Control) easily.					
<b>Textbook of the course</b>	Energy Conversion, Electric Motors and Generators, Raymond Ramshaw, R. G. Heeswijk, Sounders College Publishing, 1990					
<b>Other reference books</b>	Electric Machinery, E. Fitzgerald, Charles Kingsley Jr., Stephen D. Umans,					
<b>Required material for the course</b>	-					

WEEKLY PLAN OF THE COURSE	
Week	Topics
1	Introduction to electromechanical energy conversion, Faraday's law and emf, Solutions to some related examples.
2	Lorenz's force, Fundamental generator operation, Fundamental motor operation, Solutions to some related examples.
3	Continuous electromechanical energy conversion, Electromechanical energy conversion and dynamic circuits, Solutions to some related examples.
4	Singly-excited rotational systems, Multiply-excited rotating systems, Solutions to some related examples.
5	Translational systems, Solutions to some related examples.
6	Moment and stored magnetic energy, coenergy, Solutions to some related examples.
7	Electrostatic devices, Dynamic circuit analysis, Solutions to some related examples
8	Midterm
9	Midterm
10	Transformers and Equivalent circuit of a two-winding single phase transformer, Solutions to some related examples
11	Pu systems, Solutions to some related examples
12	Solutions to symmetric three-phase circuits including transformers, Solutions to some related examples
13	Power definitions in three-phase power systems, Solutions to some related examples
14	Power-flow analysis, Solutions to some related examples
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		X		
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):** Salih FADIL

**Signature(s):** Prof. Dr. Salih FADIL

**Date:** March 22, 2011