

ELECTROMECHANICAL ENERGY CONVERSION

1	Course Title:	ELECTROMECHANICAL ENERGY CONVERSION	
2	Course Code:	EEM3504	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	3	
6	Semester:	6	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. MURAT UYAR	
15	Course Lecturers:	Öğr.Gör.Dr. Sevim KURTULDU	
16	Contact information of the Course Coordinator:	muratuyar@uludag.edu.tr Tel: (224) 294 0769 Adres: Elektrik-Elektronik Mühendisliği Bölümü 3. Kat, No: 322	
17	Website:	http://ee.uludag.edu.tr/?page_id=7	
18	Objective of the Course:	To gain knowledge and skills about basic magnetic principles, principles of energy conversion, structure of transformers and direct current machines and steady-state operation.	
19	Contribution of the Course to Professional Development:	To be able to follow innovations and apply them in the field by using the competence of collecting information, researching and analyzing them.	
20	Learning Outcomes:		
		1	To be able to apply the theoretical and practical knowledge included in the basic electromagnetic and circuit theory courses in the solution of engineering problems in the field of electromechanical energy conversion.
		2	To know the structure, types of transformers and direct current machines and the basic properties of the materials used.
		3	To be able to create electrical equivalent circuit models of transformers and direct current machines.
		4	To be able to design and set up experiments related to transformers and direct current machines, analyze and interpret the results.
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	

1	Basic magnetic relations, properties of magnetic materials, iron losses.	
2	Inductance. Sinusoidal excitation and magnetizing current	
3	Magnetic circuits.	
4	Transformers, structure of single phase transformer.	
5	Equivalent circuit of transformer, drawing phasor diagrams	
6	Efficiency and voltage regulation in transformers. Auto transformers.	
7	Design principles of transformers.	
8	Midterm and general review	
9	Three phase transformers. Connection types and groups.	
10	General principles and definitions of energy conversion	
11	Structure and form of excitation of direct current (DC) machines	
12	Electrical equivalent circuits and armature reaction of DC machines	
13	Losses and efficiency in DA machines	
14	Overview of speed control methods in DC machines	

22	Textbooks, References and/or Other Materials:	[1] Mergen, A. Faik; Zorlu, Sibel, 'Elektrik Makineleri 1 - Transformatörler', Birsen Yayınevi, 2005, İstanbul. [2] Chapman, S., Electric Machinery Fundamentals, , 3rd Ed., McGraw-Hill. [3] Sen, P.C., 'Principles of Electric Machines and Power Electronics', 3rd Edition, Wiley, 2014. [4] Fitzgerald, A. E., Kingsley, Jr. C., Umans, Jr. S., Umans, S., 'Electric Machinery', 6th Edition, Mc Graw - Hill, 2003.
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23	Assesment	
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TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00

Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the principles of Bursa uludag University Associate and Undergraduate Education Regulation.
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24	ECTS / WORK LOAD TABLE
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Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	4.00	56.00
Homeworks	2	9.00	18.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	2.00	2.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			120.00
Total work load/ 30 hr			4.00
ECTS Credit of the Course			4.00

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			