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:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	2
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.	Making explanations about the experiments to be done during the period, introducing the measuring instruments to be used in the experiments and explaining the connection methods to the circuit.
2	Inductance. Sinusoidal excitation and magnetizing current	Making explanations about the experiments to be done during the period, introducing the measuring instruments to be used in the experiments and explaining the connection methods to the circuit.
3	Magnetic circuits.	Making explanations about the experiments to be done during the period, introducing the measuring instruments to be used in the experiments and explaining the connection methods to the circuit.
4	Transformers, structure of single phase transformer.	Finding the conversion ratio of a single phase transformer, Determining the winding resistance of a single phase transformer
5	Equivalent circuit of transformer, drawing phasor diagrams	Obtaining the approximate equivalent circuit of the transformer with short and open circuit experiments in single phase transformers.
6	Efficiency and voltage regulation in transformers. Auto transformers.	Finding the regulation and efficiency of a single phase transformer
7	Design principles of transformers.	Connecting two single-phase transformers in parallel
8	Midterm and general review	Midterm and general review
10	General principles and definitions of energy conversion	Realization of delta / star connection in a three phase transformer
11	Structure and operation of excitation of direct [illegible]	Calculation of unloaded running characteristic of DA shunt
12	Electrical equivalent circuits and armature	Calculation of the load operating characteristic of DA shunt
13	Losses and efficiency in DA machines	Investigation of load characteristics of DC shunt and series
14	Overview of [illegible]	Calculation of efficiency [illegible] DA for

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	14	2.00	28.00
Self study and preparation	15	6.00	90.00
Homeworks	2	8.00	16.00
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			182.00
Total work load/ 30 hr			6.00
ECTS Credit of the Course			6.00

22	Materials:	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.
23	Assesment	

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	25.00
Quiz	0	0.00
Home work-project	1	15.00

Final Exam	1	60.00
Total	3	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 priciples of Bursa uludag University Associate and Undergraduate Education Regulation.

24 ECTS / WORK LOAD TABLE

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**