

	<b>Course name:</b> EE329 Electromechanical Energy Conversion I Laboratory		<b>Department:</b> Electrical and Electronics Engineering		Semester
					5
	Methods of Education				Credit (ECTS)
	Lecture	Study Time	Homework	Exam (incl. Preparation)	Total
42	23	20	15	100	
Language	English				
Compulsory/Elective	Compulsory				
Prerequisites	EE319				
Course Contents	Electromagnetic materials and circuits, Properties of ferromagnetic materials, Single-phase and three phase transformers, Per Unit System, Principles of electromechanical energy conversion.				
Course Objective	<ul style="list-style-type: none"> <li>- Students will be able to comprehend the role of electromechanical energy conversion in power systems and operation principles, analysis and design of magnetic circuits in the laboratory.</li> <li>- Students will be able to comprehend electromechanical energy conversion principles and devices in the Laboratory.</li> </ul>				
Learning Outcomes and Competences	<p><b>Students who pass the course will be able to:</b></p> <ul style="list-style-type: none"> <li>- Make experiment study about the principle of energy conversion, electromechanical energy conversion in the overall energy conversion problems.</li> <li>- Make experiment study about magnetic circuits and methods of analysis, flux linkage, inductance, and permanent magnet systems.</li> <li>- Make experiment study about magnetic materials, AC excitation and losses, design of magnetic circuits containing permanent magnets</li> <li>- Make experiment study about ideal transformer, practical transformer and the derivation of its equivalent circuits and induced EMF expressions.</li> <li>- Make experiment study about performance calculations: voltage regulation and efficiency.</li> <li>- Make experiment study about transformers in three-phase circuits, short-circuit and open-circuit tests and parameter calculation.</li> <li>- Make experiment study about Effects of shape of the air gap on torque expression</li> <li>- Make experiment study about induced EMF, electromechanical torque and gross mechanical output power, excitation methods and magnetization characteristics.</li> <li>- Make experiment study about the rotational magnetic field and AC machines</li> </ul>				
Textbook and /or References	1- ELECTRIC MACHINERY FUNDAMENTALS, 5 <sup>th</sup> EDITION, Stephen J. Chapman 2- E. Fitzgerald, Charles Kingsley, Jr., and Stephen D. Umans, Electric Machinery, Sixth Edition, McGraw-Hill, 2003.				
Assessment Criteria			If any, mark as (X)	Percentage (%)	
	Midterm Exams				
	Quizzes		X	30	
	Homework		X	20	
	Projects				
	Term Paper				
Laboratory work		X	50		

	Other		
	Final Exam		
Instructors	Prof. Dr. Ahmet KARAARSLAN		
<b>Weekly Schedule</b>			
<b>Week</b>	<b>Subject</b>		
1	Introduction and Laboratory Equipment		
2	Working principle of Laboratory Experimental Kits		
3	Magnetic fields and Simple dc motor demonstration		
4	Single Phase Transformers: open, short and load tests		
5	Single Phase Transformers: parameter Calculations		
6	Three Phase Transformers: open, short and load tests		
7	Three Phase Transformers: parameter Calculations		
8	Implementation of Per Unit System and Calculation of Efficiency, Load and line regulation		
9	<b>Mid-term Exam</b>		
10	AC Machinery Fundamentals Experiment		
11	AC Machinery Fundamentals Experiment		
12	Three Phase Synchronous Generators Experiment		
13	Synchronization and V-curve of synchronous machine		
14	Power load angle characteristics of a salient pole synchronous machine		
15	Three Phase Synchronous Motors Experiment		