GAU, Faculty of Engineering

Course Unit Title	Electric Machinery
Course Unit Code	EEN475
Type of Course Unit	Technical Elective
Level of Course Unit	Undergraduate Degree
Number of ECTS Credits Allocated	6 ECTS
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	3
Semester when the course unit is delivered	7
Name of Lecturer (s)	Prof. Dr. Adalet Abiyev
Mode of Delivery	Face to Face, Experiments, E-learning activities
Language of Instruction	English
Prerequisities and co-requisities	EEN303, EEN348
Recommended Optional Programme Components	Basic bacground: Circuit Theory
Work Placement(s)	None

Objectives of the Course

1. To introduce the principle of converting electrical energy to mechanical energy and vise versa via electromagnetic field.
2. To introduce different machines, their operating principle and the analysis of key characteristics.
3. To provide the basis for further study of electric machines.

Learning Outcomes

When this course has been completed the student should be able to		Assesment
1	Calculate the electromagnetic energy stored in the static magnetic circuits.	1
2	Analyze the principle of converting electrical energy to mechanical energy and vise versa via electromagnetic field.	1
3	Analyze the operation of the DC motors and generators, and the synchronous motors and generators.	1
4	Analyze the operation of induction motor, and identify advantages and disadvantages of different machines.	1
5	Select and apply the AC and DC machines to the required different type of motion	3.5

Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work

Course's Contribution to Program		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	4
2	Ability to design and conduct experiments as well as to analyze and interpret data	5
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	2
4	Ability to apply systems thinking in problem solving and system design	4
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	4
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	1
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3
11	Strong foundation on the fundamentals of Electrical and Electronics Engineering such as Circuit Theory, Signals, Systems, Control and Communications, which are necessary for successful practice in the field	5
12	Awareness on the contemporary requirements, methods and applications of the Electrical and Electronics Engineering	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)

Course Contents			
Week			Exams
1		Introduction, Basic concepts	
2	Chapter 3	Electromechanical energy conversion principles. Forces and torques.	
3	Chapter 3	Multiple excited magnetic field systems.	
4	Chapter 4	AC machine fundamentals, rotating magnetic field.	
5	Chapter 4	MMF of Distributed Windings	Quiz 1
6	Chapter 4	Rotating Magnetic Fields. Generated Voltage	
7	Chapter 5	Synchronous Machines	
8			Midterm
9	Chapter 5	Synchronous Machines Equivalent Circuits.	
10	Chapter 5	Steady-State Operating Characteristics	
11	Chapter 7	Polyphase-Induction Machines	
12	Chapter 7	Analysis of the Equivalent Circuits.	Quiz 2
13	Chapter 7	Performance calculatin from tests	
14	Chapter 9	DC machines fundamentals. Analysis of steady-state performance.	Lab Exam
15			Final Exam

Recommended Sources

Textbook: A. E. Fitzgerald, C. Kingsley, S. D. Umans, "Electric Machinery", 6th edition, 2003

Supplementary Material (s):

1. B. S. Guru, H. R. Hiziroglu, "Electric Machinery and Transformers", 3rd edition, 2001
2. Lecture Notes in Copy Centre. EEN475. Electric Machinery.

Assessment

Attendance& E-learning	5%
Quiz-1	10%
Midterm Exam	25%
Quiz-2	10%
Laboratory	10%
Final Exam	40%
Total	100%

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	2	30
Labs and Tutorials	8	2	16
Assignments	-	-	-
Project/Presentation/Report Writing	8	2	16
E-learning Activities	12	4	48
Quizzes	2	6	12
Midterm Examination	1	12	12
Final Examination	1	12	12
Self Study	14	2	28
Total Workload			174
ECTS Credit of the Course			6