

**Faculty of Engineering & Technology**

**Electrical Machines**

**Information :**

**Course Code :** EPR 340

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Mechanical Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	MARIAM AHMED SAMEH MOHAMAD AHMED ABBADI	1
Teaching Assistant	Abeer Tharwat Said Awad	

**Area Of Study :**

- Develop the students' knowledge about the definitions and construction of magnetic systems.
- Prepare students to recognize the construction, theory of operation, equivalent circuit, of DC Machines, 1-ph Transformers, 3-ph Induction Motors, and 3-ph Synchronous Machines
- Prepare students to recognize the main characteristics and performance of DC Machines, 1-ph Transformers, 3-ph Induction Motors, and 3-ph Synchronous Machines
- Develop student's practical skills and perform the required experiments to get the equivalent circuit parameters and load characteristics of each of the previous machines.

**Description :**

Magnetic circuits. Construction, theory of operation, equivalent circuit, (voltage, current, power and torque) equations, basic characteristics, performance: efficiency and voltage regulation or speed regulation, and testing (experiments) and of each of the following machines: DC Machines, 1-ph Transformers, 3-ph Induction Motors, and 3-ph Synchronous Machines

**Course outcomes :**

**a. Knowledge and Understanding :**

1 -	a1. Identify the magnetic circuit definitions and concepts.
2 -	a2. Explain the construction, theory of operation, equivalent circuit, and main characteristics of DC Machines.
3 -	a3. Demonstrate the construction, theory of operation, equivalent circuit, and main characteristics of 1-ph Transformers.
4 -	a4. Demonstrate the construction, theory of operation, equivalent circuit, and main characteristics of 3-ph Induction Motors.
5 -	a5. Demonstrate the construction, theory of operation, equivalent circuit, and main characteristics of 3-ph Synchronous Machines.

**b. Intellectual Skills :**

1 -	b1. Solve different types of magnetic systems.
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2 -	b2. Analyze the operating conditions and performance of DC Machines.
3 -	b3. Analyze the operating conditions and performance of 1-ph Transformers.
4 -	b4. Determine the operating conditions and performance of 3-ph Induction Motors.
5 -	b5. Analyze the operating conditions and performance of 3-ph Synchronous Machines.
6 -	b6. Choose among different solution alternatives.
<b>c. Professional and Practical Skills: :</b>	
1 -	c1. Perform the required experiments on the equivalent circuit parameters of DC Machines.
2 -	c2. Perform the required experiments on the load characteristics of 1-ph Transformers.
3 -	c3. Perform the required experiments on the equivalent circuit parameters of 3-ph Induction Motors.
<b>d. General and Transferable Skills: :</b>	
1 -	d1. Work coherently and successfully as a part of a team in the Lab.
2 -	d2. Communicate effectively.
3 -	d3. Manage tasks, time, and resources effectively.
4 -	d4. Refer to relevant literatures.

<b>Course Topic And Contents :</b>			
<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Electric power system components	4	2	2
3 phase systems	4	2	2
Magnetic circuits	8	4	4
1- phase transformer & 3-phase transformer	8	4	4
D. C. Machines	10	6	4
AC Machines	14	6	8
Lab session for DC Machine and Transformer	8	4	4
Lab session for AC Machines	4	2	2

<b>Teaching And Learning Methodologies :</b>
Interactive Lecturing
Problem solving
Experiential learning

<b>Course Assessment :</b>			
<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Assignments, Participation, & Quizzes	30.00		
Final Exam	40.00	16	

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Mid-Term Exam 1	15.00	6	
Mid-Term Exam 2	15.00	11	

**Recommended books :**

“Schaum's Electric Machines and Electromechanics”, by Syed A. Nasar. Nasar