FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

Induction Machines

Information :

Course Code :	EPR 445	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Electrical Power Engineering

Instructor Information :

Title	Name	Office hours
Professor	Hany Mohamed Hasanien Mohamed	2
Assistant Lecturer	Ahmed Moreab Hussien Mohamed	7
Assistant Lecturer	Mohamed Abdallah Mahmoud Shaheen	

Area Of Study :

ÅDevelop the students' knowledge about the construction, theory of operation, equivalent circuit, (voltage, current, power and torque) equations of 3-ph Induction Motors.
ÅPrepare students to establish the main characteristics and performance of 3-ph Induction Motors.
ÅDevelop the students' knowledge about the starting methods and speed control of 3-ph Induction Motors.
ÅDevelop the students' knowledge about the construction, theory of operation, equivalent circuit and the related equations, starting methods, speed control and main characteristics of each of 1-ph Induction Motors.
ÅTrain students to gain practical skills of testing of Induction Motors.

Description :

3-ph Induction Motors: Construction, theory of operation, equivalent circuit, voltage, current, power and torque equations, Load (Torque/Slip) characteristics, Circle diagram, Starting methods, Speed control, Testing and experiments, and Double cage IM. 1-ph Induction Motors: Construction, theory of operation, equivalent circuit, voltage, current, power and torque equations, Load (Torque/Slip) characteristics, Starting methods, Testing and experiments. Induction generator, Induction regulator, Induction type phase shifter

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Explain the construction, theory of operation, and equivalent circuit of 3-ph induction motors.
2 -	Demonstrate the main characteristics and performance of 3-ph induction motors.
3 -	Describe the starting methods of 3-ph induction motors.
4 -	Describe the speed control of 3-ph induction motors.
5 -	Explain the construction, theory of operation, equivalent circuit, main characteristics, and starting methods of 1-ph induction motors.
b.Intellectual Skills: :	
1 -	Solve problems related to theory of operation, and equivalent circuit of 3-ph induction motors.
2 -	Evaluate the performance and operating conditions of 3-ph induction motors.
3 -	Analyze starting methods of 3-ph Induction Motors.

4 -	Analyze speed control of 3-ph Induction Motors.
5 -	Evaluate the performance and starting methods of 1-ph induction motors.
6 -	Choose among different solution alternatives.
c.Professional and Practical Skills: :	
1 -	c1. Perform the required experiments to get the load characteristics of 3-ph induction motors.
2 -	c2. Perform the required experiments to get the load characteristics of 1-ph induction motors.
d.General and Transferable Skills: :	
1 -	Work coherently and successfully as a part of a team in the Lab.
2 -	Work in stressful environment and within constraints.
3 -	Communicate effectively.
4 -	Manage tasks, time, and resources effectively.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Revision of 3-ph circuits, magnetic circuits and 1-ph Transformers.	10	6	4
3-ph Induction Motors: Construction: stator windings of AC machines, Rotor types.	10	6	4
theory of operation, equivalent circuit, (voltage, current, power and torque) equations, and load characteristics.	15	9	6
Analysis using circle diagram.	5	3	2
Experimental determination of IM parameters.	5	3	2
Starting and speed control of Induction Motors.	10	6	4
Double cage IM.	5	3	2
1-ph Induction Motors: Construction, theory of operation, equivalent circuit, (voltage, current, power and torque) equations, and load characteristics.	10	6	4
Testing of induction motors.	5	0	5

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem solving
Report
Experiential learning

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
ÅFinal exam	40.00		
Mid- Exam I	15.00		
Mid- Exam II	15.00		
o Assignment	10.00		

o Lab	10.00		
o Quizzes	10.00		

Recommended books :

1. Chapman, S. J., ñElectric Machinery fundamentalsò, McGraw Hill Co., 5th edition, 2006 (Text Book).
2. M. E. El-Hawary, "Principles of Electric Machines with Power Electronic Applications", Wiley-IEEE Press, 2nd Edition, 2002.
3. Theodore Wildi, "Electric Machines, Drives and Power Systems", Prentice Hall, 6th Edition, 2006.

2. "Principles of Electric Machines with Power Electronic Applications", M. E. El-Hawary, McGraw-Hill, most recent edition.
3. "Electric Machines, Drives and Power Systems", Theodore Wildi, Prentice Hall, most recent edition.