FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

Actuators and Power Electronics

Information :

Course Code :	EPR 442	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Electronics & Communication

Area Of Study :

Develop the studentsô knowledge about the fundamentals of electric motors
Help the students understand the physics of different power electronic switches.
Enable the students recognize the principle of operation of power electronic converters.

Description :

Single phase induction motors, Two phase machines and applications in control systems, Special AC machines. Power diodes, Power bipolar junction transistors, Thyristors, Rectifiers, Principles of power conditioning, Switching characteristics of power semiconductor devices, Computer simulation of power electronic circuits, Analysis, design, and applications of power converters.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a4.Identify the operation of electric motors under different operating conditions
2 -	a3.Recognize the operation of power electronic converters
3 -	a2.Explain the source of power loss in power electronic devices
4 -	a1.Identify the main characteristics of different power electronic devices.
b.Intellectual Skills: :	
1 -	b3. Analyze the performance of electric motors under different loading conditions
2 -	b2. Analyze the performance of power electronic converters.
3 -	b1. Apply circuits related theories and knowledge of electronic components in power electronic converters
c.Professional and Practical Skills: :	
1 -	c2. Apply safe systems at work and observe the appropriate steps to manage risks
2 -	c1. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyze and interpret results.
3 -	c3. Perform experiments related to power electronic converters under different loading conditions.
4 -	c4. Prepare and present technical reports related to the operation of power electronic converters and AC motors
d.General and Transferable Skills: :	
1 -	d1. Collaborate effectively within multidisciplinary team.

2 -	d2. Work in stressful environment and within constraints.
3 -	d3. Communicate effectively.
4 -	d4. Effectively manage tasks, time, and resources.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction	5	3	2
Power Electronic Switches	15	9	6
Power loss and thermal analysis	10	6	4
Power electronic converters	25	15	10
Induction motors	20	12	8

Teaching And Learning Methodologies :

Interactive lectures
Problem-based learning
Experiential learning
Report writing

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	5.00		
final	40.00		
Lab Exper.	10.00		
midterms	30.00		
Participation	5.00		
Quizzes	10.00		

Recommended books :

1. M. H. Rashid. Power Electronics: Circuits, Devices, and Applications, 4th ed. Pearson Education Inc., 2013 (Text Book).
2. Ned Mohan, ñPower Electronics: A First Courseò, John Wiley and Sons Ltd, 2011.
3. Stephan J. Chapman, ñElectric Machinery Fundamentals, 5th edò, McGraw-Hill Education; 2011.