FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

Power Electronics 1

Information :

Course Code :	EPR 451	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Electrical Power Engineering

Instructor Information :

Title	Name	Office hours
Professor	Naser Mohammed Bayoumy AbdelRahim	4
Assistant Lecturer	Mohamed Abdallah Mahmoud Shaheen	2
Teaching Assistant	Abeer Tharwat Said Awad	2

Area Of Study :

The Main Goals of this course are:
ÅDevelop studentôs knowledge about the characteristics of power switching devices.
ÅEquip the student with the analytical tools to calculate power computation in power electronic circuits.
ÅProvide the student with knowledge required to analyse single- and three-phase, un- and controlled AC to DC converters with various types of loads.
ÅTrain the student to perform basic experiments on single- and three-phase AC-DC converters.

Description :

Introduction to power electronics, Power diodes, Thyristors: Construction, Characteristics, Application in rectifier circuits (converters), Firing circuits, Diac, Triac and Quadracs.Power transistors as switches, Phase shift controls, Phase controlled rectifiers-static switches.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Identify the four main categories of power converters.
2 -	Explain the operation and sketch the i-v characteristics of the commonly used power electronic switches, e.g. diodes, SCRs, BJTs, and IGBTs.
3 -	Explain the operation of single-phase un- and controlled AC-DC converters.
4 -	Describe the operation of un- and controlled three-phase AC-DC converters.
b.Intellectual Skills: :	
1 -	Select appropriate power electronics switching devices for a certain application and check their appropriate behviour.
2 -	Perform power computations in power electronic circuits.
3 -	Analyze the operation of single-phase half-wave and full-wave un- and controlled AC-DC converters.
4 -	Analyze the operation of three-phase full-wave un- and controlled AC-DC converters
c.Professional and Practical Skills: :	
1 -	Select appropriate power electronic devices for a certain application.

2 -	Perform basic experiments on single- and three-phase AC-DC converters.
3 -	Select appropriate power electronics converter in relevant industry applications.
d.General and Transferable Skills: :	
1 -	Work in stressful environment and within constraints.
2 -	Communicate effectively.
3 -	Effectively manage tasks, time, and resources.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction	3	3	0
Power Electronic Switches	8	6	2
Power computations in power electronic circuits	10	6	4
Single-phase half- and full-wave, un- and controlled rectifiers	15	10	5
Three-phase un- and controlled rectifiers	24	9	15

Teaching And Learning Methodologies :

Interactive lectures
Experiential learning
Self reading
Report writing
Problem Solving

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 In Class Quizzes	10.00		
o Lab	10.00		
o Participations	10.00		

Recommended books :

1. D. W. Hart, Power Electronics, 1st edition, McGraw Hill, 2011, ISBN 978-0-07-338067-4
2. M. H. Rashid, Power Electronics: Devices, Circuits, and Applications, 4th edition, Pearson Higher Education, 2014, ISBN-13: 978-0-13-312590-0
3. Ned Mohan, Power Electronics: A First Course, John Wiley and Sons Ltd, 2011.

3. Ned Mohan, ñPower Electronics: A First Courseò, John Wiley and Sons Ltd, 2011.