EE446-2: Control of Power Electronics

Course code and name	EE446-2: Control of Power Electronics
Credits units	2 Credit units
Contact hours	4 Contact hours: 1 lecture, 1 tutorial and 2 practical
Instructor name	Dr. Mohamed Mostafa Ramadan
Textbook	- Power Electronics Converters, Applications, and Design, Ned Mohan, Tore m. Undeland, and William P. Robbins, second edition, John Wiley & sons INC. - Power electronics handbook- Low power components and applications, NihalKularanta, Newnes, 1998.
Other supplemental materials	-
	Specific course information
a. Course description	This course will focus on the control methods of power electronics devices such as controlled rectifier, dc-dc, converter, inverter and vector control of ac machine the student will be able to deal with the tradition & modern control methods using analog and digital controller. Modeling of the speed of torque controlling methods of dc & ac motor will be presented using MATLAB/ Simulink and PSIM
b. Prerequisite	EE444-3 and EE353-3
c. Required / Elective	Elective
	Course Learning Outcomes
<u>CLO of the Lecture Activities:</u> CLO1: Explain the important role of power electronics in power system, applications of power electronics in utility system. Residential, Commercial, and the operation of three phase voltage source inverter, solid state circuit breaker and different dc to dc chopper. CLO2: Determine the parameters of three phases drive system controlling dc motor. CLO3: Evaluate the design premieres of power electronic circuits such Step down (Buck), Step up (Boost) and Step down/ step up (Buck/Boost) Converters.	

CLO4: Calculate the performance of a speed control system of a dc motor using solid state control rectifier Single phase bridge rectifier and dc chopper.

CLO of the Laboratory Activities:

CLO1: Verify theory and to improve knowledge learned in class.

CLO2: Formulate and solve problems related to theory.

CLO3: Design and safety conducts an experimental procedure.

CLO4: Independently perform accurate quantitative measurements, interpret experimental results, perform calculations on these results and draw a reasonable, accurate conclusion.

CLO5: Communicate critical analysis of scientific information through written reports.

CLO6: Be integrated inside a group of work and respect the team working.

Brief list of topics to be covered

- Introduction to Control of Power Electronic
- Characteristics of Power electronics devices
- DC power supply from Single AC source
- DC power supply from Three Phase AC source
- Speed Control of DC Motor Using Controlled Rectifier
- Speed control of DC Motor using DC Choppers
- Solid State Fault Current Limiters
- Speed Control of AC motor using AC Voltage Controller
- Speed Control of I.M Using three phase Inverter

Mapping Course Learning Outcomes to Student Outcomes

	Lecture Activities						
	SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1							
CLO2							
CLO3							
CLO4							
	Laboratory Activities						

	SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1							
CLO2							
CLO3							
CLO4							
CLO5							
CLO6							