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Department of Electrical Engineering	
Power Elctronics (63411)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Electronic Circuits II (63363) OR Electronics (63293) OR Electronic Circuits II (63313) OR Electronics (67222)

Course Contents

Introduction to power electronics, thyristor, triac, diac, GTO,IGBT, thermal considerations for thyristor, single phase and three phase rectifiers, harmonics analysis of rectifier types, inverters, dual converter, voltage regulators, commutations techniques .

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	Learning the function and characteristics of the different power electronics elements as thyristor, diac, triac and IGBT. Learning triggering, protection and thermal model of thyristor	B	15 %
2	Understanding the function of power electronics circuits and gain ability in analyzing their performance and calculation of their characteristic parameters	A	60 %
3	Gain ability in performing harmonic analysis for different power electronics converters.	C	15 %
4	Ability in designing of power electronic converters for different applications.	K	10 %

Textbook and/ or Refrences

1- Muhammad Rashid , Power Electronics, 2004,Printice Hall . 2-Ned Mohan , Power Electronics , 2006,John Wiley&Sons 3- P.C.Sen , Power Electronics,1999, Mc Graw- Hill

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Quizzes	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	Reference books, main goals of the course, applications of power electronics, introduction to power electronics circuits.
2	Turning on the thyristor , I-V characteristics of the thyristor, two transistor model of the thyristor, protection circuits of the thyristor.
3	Thermal equivalent circuit of the thyristor ,triggering circuits of thyristor, triac, diac, GTO, IGBT, series and parallel connection of thyristors .
4	Diode circuits with R,RC,RL and RLC elements . Diode circuits with RL- load and free wheeling diode.
5	Single phase half-wave rectifier, single phase full wave rectifier with centre tapped transformer.
6	Harmonics analysis of single phase rectifiers. Midterm Exam 1
7	Single phase bridge rectifier (B2-Rectifier) ,controlled rectifiers, single phase semi converter .

8	Single phase controlled bridge rectifier with R, RL and DC motors , harmonics analysis.
9	Single phase controlled dual converter , three phase half wave controlled rectifier .
10	Three phase full wave controlled six phase rectifier with R, and RL loads, Midterm Exam 2
11	Three phase controlled bridge rectifier with R load
12	Three phase controlled bridge rectifier(B6 Rectifier)with R L load. Harmonics analysis.
13	Voltage regulators with R and RL loads . Quiz
14	Voltage regulators with RL and L loads.
15	Review and solving examples on different subjects
16	Review of some specific topics and Final Exam