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SCHOOL OF ENGINEERING AND TECHNOLOGY		ELECTRICAL AND ELECTRONICS ENGIN DEPARTMENT	NEERING	OPERATIONAL FROM (2013-2014)	FOR STUDENTS ADMITTED STARTING (2012-2013)					
1	Course number	EEE312								
2	Course Title	POWER ELECTRONICS (DC)								
3	Credits	5								
4	Contact Hours (L-T-P)	3-1-2								
5	Course Objective	strengths, a 2. ability to an for specific to rectifiers, Do 3. ability to un output ends	 basic understanding of modern power semiconductor devices, their strengths, and their switching and protection techniques ability to analyze various important topologies of power converter circuits for specific types of applications including controlled and uncontrolled rectifiers, DC-DC converters and inverters ability to understand and analyze the qualities of waveforms at input and output ends of these converters 							
6	Course Outcomes	After completion of course student will be able to: 1. analyze the characteristics of semiconductor devices and also know the protection schemes 2. describe the principles of operation of power electronic converters 3. develop simple power electronic converter topologies to meet certain functional specifications 4. analyze power electronic converter operation to develop design guidelines for choice of switching devices 5. differentiate various converter configurations and compare their merits and demerits 6. apply different chopper control strategies for dc-dc power electronic converters 7. discriminate steady state and dynamic behavior of dc-dc power electronic converters using equivalent circuits 8. identify and synthesize general circuit topologies to realize inverters and rectifiers for single phase and three phase applications 9. examine the operation of SCR based power electronic circuits 10. design the power converters								
7	Outline syllabus:		· · · · · · · · · · · · · · · · · · ·							
7.01	EEE312.A	Unit A	Power S	emiconductor Devices						
7.02	EEE312.A1	Unit A Topic 1		rs: Silicon Controlled Rect , power IGBT, triac and the	, , , ,					
7.03	EEE312.A2	Unit A Topic 2	Static, dynamic and gate characteristics of SCR, turn on and turn off methods.							
7.04	EEE312.A3	Unit A Topic 3	Series ar	nd parallel operation of SCI	Rs, snubber circuit, line					

7.05 EE312.B Unit B Phase Controlled Converters Phase Controlled Converters Phase Controlled Converters Phase Controlled Converters Principle of phase control, circuit, waveform and analysis of single phase half wave and full wave line commutated converters with R, RI RIE load, inversion mode, Effect of Source inductance. Clicuit, waveform and analysis of three pulse and six pulse converters with R and RL load. 7.09 EE8312.C Unit C Topic 1 C Choppers Principle of operation, time ratio control and current limit control strategies. Circuit, operation and analysis of Step down and step up choppers. Circuit, operation and analysis of Step down and step up choppers. Types of choppers: circuit, waveforms and analysis of type—A,B,C,D and E choppers. Types of choppers: circuit, waveforms and analysis of type—A,B,C,D and E choppers. Types of choppers. Types of choppers. Three phase inverter, basic series inverter bridge inverter. Three phase inverter: 120° and 180° mode, circuit, operation and analysis. Voltage control techniques for inverters, pulse width modulation techniques, principle of operation and analysis of VSI & CSI and their comparison. Type EE8312.E1 Unit E Topic 1 AC voltage controllers with R and RL loads. Type EE8312.E2 Unit E Topic 2 Cycloconverters: single phase inverter with resistive and inductive load. To observe the output voltage waveforms and to find the average and rms output voltage waveforms and to find the average and rms output voltage waveforms and to find the average and rms output voltage of a single phase AC voltage controlled bridge converter with R and RL loads. To observe the output voltage waveforms and to find the average and rms output voltages of a single phase AC voltage controlled bridge converter with R load. To observe the output voltage waveforms and to find the average and rms output voltages of a single phase AC voltage controlled bridge converter with R and RL loads. To observe the output voltage waveforms and to find the average and rms output voltag				commutation and forced commutation circuits					
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			To observe the output voltage waveforms and to find the					
7.28	EEE312.L8	Lab expt. 8	output voltage of a single phase series inverter with R and RL					
			loads.					
			To observe the output voltage waveforms and to find the					
7.29	EEE312.L9	Lab expt. 9	output voltage of a single phase parallel inverter with R and RL					
			loads.					
			To observe the output voltage waveforms and to find the					
7.30	EEE312.L10	Lab expt. 10	output voltage of a Single phase cycloconverter with R and RL loads.					
8	Course Evaluati	on						
8.1	Course work: 30) marks						
8.11	Attendance	None						
8.12	Homework	10 assignments, no w	10 assignments, no weight					
8.13	Quizzes	7 best quizzes (based on assignments); 20 marks						
		Evaluation of work done on each lab turn in the lab notebook and feedback from oral						
		quiz about the work done that day. Zero, if the student is absent. 0.75N best marks						
8.14	labs	out of N such evaluations: 10 marks						
8.15	Presentations	None						
8.16	Any other	None						
8.2	MTE	20 marks						
8.3		nination: 50 marks						
9	References							
9.1	Text book	Rashid M.D., " Pow	ver Electronics", Prentice Hall, 1993.					
		1. Bose B.K	"Power Electronics and AC drives", Prentice Hall, 1986					
	Other references	2. Sen P.C., "Power Electronics", TataMc.Graw Hill, 1987.						
9.2			D., Kanchandani K.B., "Power Electronics", Tata McGraw-Hill,					
		2007.						
		4. MATLAB user manuals.						
		5. Simulink user manuals.						
		c. Simbilin u	~					

Mapping of Outcomes vs. Topics

Outcome no. →	1	2	3	4	5	6	7	8	9	10	11
Syllabus topic↓	1	-		•							
EEE312.A1	Х										
EEE312.A2		Х	Χ								
EEE312.A3	Х										
EEE312.B1		Χ	Χ								
EEE312.B2				Х	Х						
EEE312.B3				Х	Х						
EEE312.C1			Х								
EEE312.C2						Χ	Х				
EEE312.C3						Х	Х				
EEE312.D1		Х	Х								
EEE312.D2		Х	Х								
EEE312.D3				Х							
EEE312.E1		Х	Х								
EEE312.E2								Х			
EEE312.E3			Х				Х				
EEE312.E4										Х	Х