Model Template for Scheme of Course Work

to be submitted by the Faculty of B.Tech/M.Tech/MCA I semester on or before 11.10.2013 to bhanucvk@gvpce.ac.in and yadavalliraghu@yahoo.com

SCHEME OF COURSE WORK

Course Details:

Course Title	**: ANALYSIS OF POWER ELCTRONIC CONVERTER-I**		
Course Code	**: 13EE2001**	**L T P C**	**:4 0 0 3**
Program:	**: M.Tech.**		
Specialization:	**: Power Electronics and Drives**		
Semester	**:I Sem**		
Prerequisites	**: POWER ELECTRONICS AND BASIC NETWORK ANALYSIS**		
Courses to which it is a prerequisite	**: ANALYSIS OF POWER ELCTRONIC CONVERTER-I, SOLID STATE CONTROL OF AC AND DC DRIVES**		

Course Outcomes (COs): At the end of the course students will be able to understand

1	Different power semiconductor devices
2	Full and half controlled converters
3	AC voltage controllers and Cycloconverters
4	dc-dc switch mode converters
5	dc-ac switch mode inverters
6	Multilevel inverters

Program Outcomes (POs):

1	Be a part of competent workforce in the area of Static Power Electronics Converters and power electronic converter fed electrical drives and power quality issues .
2	Apply soft computing techniques for Power Electronic Systems and Electric Drives.
3	Understand large scale Power Electronic Converter Systems, Electric Drives and issues involved through modeling, analysis and simulation.
4	Apply present day techniques and tools to solve Power electronic and electric drives problems relevant to india and other countries
5	To gain necessary skills in using state-of-the-art simulation tools such as PLEXIM, SABER, OPAL-RT Lab, dSPACE, MULTISIM , LABVIEW and other Tools for analysis , design and trouble shooting of power electronics converters and various Electric drives .
6	Collaborate with industries on problems of relevance to them while planning/organizing graduate dissertations towards expanding sphere of interaction..
7	Improve soft skills of students through seminars and organization of technology workshops, writing research/project reports as a part of graduate education.
8	Encourage life-long learning through professional bodies (such as IEEE. Institute of Engineers (India) ,etc)
9	Imbibe social responsibilities and ethical practices towards creating a work force for national growth

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Course Outcome Versus **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO-1			M	S					
CO-2			S	M					
CO-3				M			S		
CO-4			M	S					
CO-5			M	M		S			
CO-6		M			S				

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Power Diodes, Power BJTs, Power MOSFETs, Thyristors, Gate Turn Off Thyristors, IGBTs,	CO-1	Static V-I Characteristics of devices	▫ Lecture	Assignment (Week 2 - 4)
2	MOS-Controlled Thyristors, Comparison of Controllable Switches,Drive and Snubber Circuits, Justification for Using Idealized Device Characteristics	CO-2	P and N channel enhancement type MOSFET. Also explain its output characteristics	▫ Lecture	Mid-Test 1 (Week 9)
3	Introduction**,** Principle of phase controlled converter operation, single phase full converters, single phase dual converters	CO-3	Explain the principle of operation of a single phase fully controlled converter	▫ Lecture ▫ Problem solving	
4	Three phase half wave converters, three phase full converters, Three phase dual converters,	CO-2	Explain the principle of operation of a three phase fully controlled converter	▫ Lecture Problem solving	
5	Power factor improvements, Single phase semiconverters, Three phase semiconverters.		Explain Power factor improvements	▫ Lecture Problem solving	
6	Introduction, Principle of ON-OFF Control,, Single phase bidirectional controllers with resistive loads	CO-3	Describe principle of operation of single phase AC-AC converters. Derive output voltage	▫ Lecture Problem solving	
7	Single phase controllers with inductive loads, Three Phase full wave controllers, Single phase transformer connection changers	CO-3	Describe principle of operation of three phase AC-AC converters. Derive output voltage	▫ Lecture Problem solving	
8	Single phase cycloconverters,Three phase cycloconverters.	CO-3	Describe principle of operation of three phase AC-AC Cycloconverters.	▫ Lecture	
				▫	
9	Introduction, Control of dc-dc converters, Step down (Buck) converter-continuous	CO-4	Describe principle of operation of Step down dc-dc	▫ Lecture	

	conduction mode-boundary between continuous and discontinuous conduction-discontinuous conduction mode.		converters. Derive output quantities		
10	Step up (Boost) converter- continuous conduction mode-boundary between continuous and discontinuous conduction-discontinuous conduction mode.	CO-4	Describe principle of operation of Boost dc-dc converters. Derive output quantities	▫ Lecture ▫ Problem solving	Mid-Test 2 (Week 18)
11	Buck-Boost converter- continuous conduction mode-boundary between continuous and discontinuous conduction-discontinuous conduction mode-output voltage ripple	CO-4	Describe principle of operation of Buck-Boost dc-dc converters. Derive output quantities	▫ Lecture Problem solving	Assignment (Week 11-13)
12	Introduction, Basic concepts of switch mode inverters, pulse width modulated switching scheme, single phase inverters-half bridge inverters	CO-5	Explain pulse width modulated switching scheme, single phase inverters-half bridge inverters	▫ Lecture Problem solving	
13	full bridge inverters-PWM with bipolar voltage switching-PWM with unipolar voltage switching, Push-pull inverters,	CO-5	Explain full bridge inverters PWM with bipolar voltage switching-PWM with unipolar voltage switching	▫ Lecture Problem solving	
14	Three phase inverters-PWM in three phase voltage source inverters-square wave operation in three phase inverters	CO-5	Explain Three phase inverters-PWM in three phase voltage source inverters-square wave operation in three phase inverters	▫ Lecture Problem solving	
15	Ripple in the Inverter output, effect of blanking time on voltage in PWM inverters	CO-6	What are effect of blanking time on voltage in PWM inverters	▫ Lecture	
16	Introduction, Multilevel Concept, Types of Multilevel Inverters- Diode-Clamped Multilevel Inverter, Principle of Operation	CO-6	Describe the principle of operation of diode clamped MLI	▫ Lecture	
17	Features of Diode-Clamped Inverter, Improved Diode-Clamped Inverter, Feature of Multilevel Converters, Comparisons of Multilevel Converters	CO-6	Describe the principle of operation of diode clamped MLI	▫ Lecture	
18	**Mid-Test 2**				
19/20	**END EXAM**				