SCHEME OF COURSE WORK

Course Details:

Course Title	**: ANALYSIS OF POWER ELCTRONIC CONVERTER-II**		
Course Code	**: 15EE2210**	**L T P C**	**:3 0 0 3**
Program:	**: M.Tech.**		
Specialization:	**: Power Electronics and Drives**		
Semester	**:I Sem**		
Prerequisites	**: POWER ELECTRONICS**		
Courses to which it is a prerequisite	**: ANALYSIS OF POWER ELECTRONIC CONVERTER-iI, SOLID STATE CONTROL OF AC AND DC DRIVES**		

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

1	Analyze resonant converters –Zero voltage and zero current switching converters.
2	Analyze DC power supplies with high frequency link.
3	Explain Power conditioners and Uninterruptible power supplies.
4	Describe Principles of Operation & Features of Multilevel Inverters.
5	Explain the Concept of current harmonics and their adverse effects.

Program Outcomes (POs):

1	Develop in depth knowledge in the areas of "Static Power Electronics Converters", "Power Electronic Converter fed Electrical Drives" and "Power Quality".
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	Use state-of-the-art simulation tools such as PLEXIM, SABER, OPAL-RT Lab, DSPACE, MULTISIM, LABVIEW and other Tools.
6	Contribute positively to collaborative and multidisciplinary research to achieve common goals.
7	Demonstrate knowledge and understanding of power engineering and management principles and apply the same for efficiently carrying out projects with due consideration to economical and financial factors.
8	Communicate confidently, make effective presentations and write good reports to engineering community and society.
9	Recognize the need for life-long learning and have the ability to do it independently.
10.	Acquire knowledge on social issues and shall contribute to the community for sustainable development.
11.	Predict and examine critically the outcomes of actions, apply corrective measures subsequently and move forward positively through a self corrective approach.

Course Outcome Versus **Program Outcomes:**

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO-1	S	M	M	S	S	S					
CO-2	S	M	S	M	S	S					
CO-3	S	M	S	M	S	S	S				
CO-4	S	M	M	S	S	S					
CO-5	S	M	M	M	S	S	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**	**Sample questions**	**TEACHING-**	**Assessment**

Template for Scheme of Course Work

		Outcomes		**LEARNING STRATEGY**	**Method & Schedule**
1	Introduction, Switch mode inductive current switching, zero voltage and zero current switching, Classification of resonant converters-load resonant converters-resonant switch converters-resonant dc link converters. Basic resonant circuit concepts-series resonant circuits-parallel resonant circuits.	CO-1	Explain the basic resonant series and parallel circuits.	▫ Lecture	Assignment (Week 2 - 4)
2	Load resonant converters-series loaded resonant dc-dc converters- parallel loaded resonant dc-dc converters.	CO-1	Explain the operation of a series loaded resonant DC-DC converter with the help of a neat sketch.	▫ Lecture	Mid-Test 1 (Week 9)
3	Resonant switch converters-ZCS resonant switch converters-ZVS resonant converters, Comparison of ZCS and ZVS topology.	CO-1	Compare ZVS and ZCS topologies.	▫ Lecture ▫ Problem solving	
4	Introduction, Linear power supplies, overview of switching power supplies, Flyback converters (derived from buck-boost converters).	CO-2	Draw the block diagram of a switching power supply.	▫ Lecture Problem solving	
5.	forward converter (derived from step-down converter), push-pull converter (derived from step-down converter).	CO-2	Explain the operation of a forward converter and derive the voltage reatio.	▫ Lecture ▫ Problem solving	
6	Half bridge converter (derived from step down converter),full bridge converter (derived from step down converter).	CO-2	Derive the expression for the output voltage response for a half ridge converter.	▫ Lecture Problem solving	
7	Introduction, Power line disturbances-types of disturbances-sources of disturbances-effect of sensitive equipment.	CO-3	Explain the various power line disturbances.	▫ Lecture Problem solving	
8	UPSs-rectifiers-batteries-Inverters-static transfer switch.	CO-3	Draw and explain about an UPS.	▫ Lecture Problem solving	
9.	Power conditioners	CO-3	Draw and explain about Power Conditioners.	▫ Lecture ▫ Problem solving	
10	Introduction, Multilevel Concept, Types of Multilevel Inverters	CO-4	Explain the important features of a multilevel Inverter.	▫ Lecture	
11	Diode-Clamped Multilevel Inverter, Principle of Operation, Features of Diode-Clamped Inverter.	CO-4	Draw the schematic of a five level Diode clamped MLI and explain its operation using the switching states.	▫ Lecture	
12	Improved Diode-Clamped Inverter.	CO-4	Draw the schematic of an improved form of Diode clamped MLI and mention its advantages.	▫ Lecture ▫ Problem solving	Mid-Test 2 (Week 18)
13	Introduction, generation of current harmonics, current harmonics and power factor, harmonic standards and recommended practices.	CO-5	Describe principle of operation of Buck-Boost dc-dc converters. Derive output quantities	▫ Lecture Problem solving	Assignment (Week 11-13)
14	need for improved utility interface, improved single phase utility interface,	CO-5		▫ Lecture	
15	improved three phase utility interface, electromagnetic interference.	CO-5		▫ Lecture	

16	**Mid-Test 2**				
17/18	**END EXAM**				