SCHEME OF COURSE WORK

Course Title	POWER ELECTRONICS AND SIMULATION LAB		
Course Code	**13EE1133**	L T P C	0 0 3 2
Program	B.Tech		
Branch	Electrical and Electronics Engineering		
Semester	VII		
Prerequisites	Power Electronics, Electrical Machines – I and Electrical Machines – II		
Course to which it is prerequisite	Engineering		

Course Outcomes (COs):

At the end of the Course, the Student will be able to:

CO-1	Design firing and driver circuits.
CO-2	Design and analyze AC-DC converters
CO-3	Design and analyze DC-DC converters.
CO-4	Design and analyze DC-AC converters.
CO-5	Design and implement power electronic converters using various simulation tools.

Program Outcomes (POs):

The student of Electrical and Electronics Engineering at the end of the program will be able to:

PO-1	Apply the knowledge of basic sciences and electrical and electronics engineering fundamentals to solve the problems of power systems and drives.
PO-2	Analyze power systems that efficiently generate, transmit and distribute electrical power in the context of present Information and Communications Technology.
PO-3	Design and develop electrical machines and associated controls with due considerations to societal and environmental issues.
PO-4	Design and conduct experiments, analyze and interpret experimental data for performance analysis.
PO-5	Apply appropriate simulation tools for modeling and evaluation of electrical systems.
PO-6	Apply the electrical engineering knowledge to assess the health and safety issues and their consequences.
PO-7	Demonstrate electrical engineering principles for creating solutions for sustainable development.
PO-8	Develop a techno ethical personality that help to serve the people in general and Electrical and Electronics Engineering in particular.
PO-9	Develop leadership skills and work effectively in a team to achieve project objectives.
PO-10	Communicate effectively in both verbal and written form.
PO-11	Understand the principles of management and finance to manage project in multi disciplinary environments.
PO-12	Pursue life-long learning as a means of enhancing the knowledge and skills.

Course Outcome versus Program Outcomes:

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO-1	S	M	M	M	S		M	M				M
CO-2	S	M	M	M	S		M	M				M
CO-3	S	M	M	M	S		M	M				M
CO-4	S	M	M	M	S		M	M				M
CO-5	S	M	M	M	S		M	M				M

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.	Manual Write up & Demonstration	CO-1,2	Explain the Working of VI Characteristics of SCR	Demo and Experimentation	Day to Day Analysis
2.	Study of static characteristics of SCR, MOSFET & IGBT	CO-1	Obtain the Characteristics of MOSFET with suitable Experiment and plot it in a graph sheet.	Demo and Experimentation	Day to Day Analysis
3.	SCR firing circuits and driver circuit for MOSFET/IGBT	CO-1	Mention the applications of SCR	Demo and Experimentation	Day to Day Analysis
4.	Single Phase AC Voltage Controller with R and RL Loads	CO-2	List out the applications of AC voltage controllers. Explain the Principle of On-Off Control Technique (Integral Cycle Control)	Demo and Experimentation	Day to Day Analysis
5.	Single Phase fully controlled bridge converter with R and RL loads	CO-2	Is it possible to operate a single phase fully controlled half wave converter in the inverting mode? Explain.	Demo and Experimentation	Day to Day Analysis
6.	Speed Control of D.C. motor using dual AC/DC converter.	CO-2	In order to operate with 4 Quadrant operations which converter is required? What are the advantages and disadvantages of Dual Converter?	Demo and Experimentation	Day to Day Analysis
7.	Single Phase Half controlled converter with R and RL load.	CO-2	What is the difference between Half and Full Converter. For a load RL, what is the difference that can be made with R Load?	Demo and Experimentation	Day to Day Analysis
8.	Three Phase fully controlled bridge converter with RL load.	CO-2	In 3-phase full converter, does the current become discontinuous? Why 3-phase full converter is required?	Demo and Experimentation	Day to Day Analysis
9.	MID-I				
10.	Simulation of a DC-DC chopper fed DC drive	CO-3	What type of commutation is required for this circuit? Why it is necessary?	Demo and Experimentation	Day to Day Analysis
11.	Simulation of DC-AC Inverter fed Induction motor drive	CO-4	Why IM Control is required? What type of switches is used to control the Inverter.	Demo and Experimentation	Day to Day Analysis
12.	Single Phase series inverter with R and RL loads.	CO-4	Why it is called as Series Inverter? What are different elements that are to be used in Series Inverter?	Demo and Experimentation	Day to Day Analysis

13.	Single phase parallel inverter with R & RL loads	CO-4	What are the Advantages of Parallel Inverter?	Demo and Experimentation	Day to Day Analysis
14.	Simulation of single-phase full converter using RL load.	CO-5	Why do we require Turn-on circuits for thyristors?	Demo and Experimentation	Day to Day Analysis
15.	Simulation of three phase AC voltage controller using RL & RLE load.	CO-5	Why Voltage control is required. What are the applications for the control of Voltage	Demo and Experimentation	Day to Day Analysis
16.	Simulation of buck/boost converters	CO-5	Explain the Continuous and Discontinuous Conduction Modes.	Demo and Experimentation	Day to Day Analysis
17.	Simulation of single phase Inverter with PWM control	CO-5	What is PWM Technique? What are the different PWM techniques available?	Demo and Experimentation	Day to Day Analysis
18.	**MID TEST – 2**				
19. /20.	**SEMESTER END EXAM**				