POWER ELECTRONICS LABORATORY

V Semester: EEE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
AEEB21	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	2	1	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 24**				**Total Classes: 24**		

I. COURES OVERVIEW:

This course is intended for practical experience by conducting experiments on rectifiers, inverters, choppers, AC voltage controllers and cycloconverters. It provides hands-on experience by examining the electrical characteristics of various power converters. The power electronic converter applications have been analyzed with simulation tools.

II. OBJECTIVES:

The course should enable the students to:

I   The engineering skills by way of electrical circuit design with power electronicdevices and components.

II   Simulation and testing the different power converter circuits using simulation tools.

III   The demonstration of basic power electronic circuits for developing complex powerconverter modules.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1 **Experiment** the operation of SCR, MOSFET and IGBT forobtaining static voltage - current characteristics. .   Apply

CO 2 **Utilize** the forced commutation circuits and gate firing circuitsfor turning off and on of the SCR.   Apply

CO 3 **Analyze** the input and output waveforms of controlled rectifier circuits for determining the output voltages.   Analyze

CO 4 **Construct** the various inverter circuits for direct current toAlternating current conversion.   Apply

CO 5 **Determine** the performance characteristics of ac to ac converters for getting variable output voltage using hard ware and modern tools.   Evaluate

CO 6 **Develop** the chopper circuits for measuring output voltage andcurrent .   Apply

LIST OF EXPERIMENTS

Expt. 1	**SCR, MOSFET AND IGBT**
Study the characteristics of SCR, MOSFET and IGBT.	

Expt. 2	**GATE FIRING CIRCUITS**
Study the operation of gate firing circuits of SCR.	

Expt. 3	**HALF CONTROLLED CONVERTER**
Study the performance characteristics of single phase half controlled converter with R and RL loads.	

Expt. 4	**FORCED COMMUTATION CIRCUITS**

Plot the characteristics of forced commutation circuits (Class A, Class B, Class C, Class D and Class E).	
Expt. 5	**FULLY CONTROLLED BRIDGE CONVERTER**
Study the characteristics of single phase fully controlled bridge converter with R and RL loads.	
Expt. 6	**SERIES INVERTER**
Study the characteristics of single phase series inverter with different loads.	
Expt. 7	**PARALLEL INVERTER**
Study the characteristics of single phase parallel inverter with different loads.	
Expt. 8	**VOLTAGE CONTROLLER**
Plot the characteristics of single phase AC voltage controller with R and RL loads.	
Expt. 9	**DUAL CONVERTER**
Study the characteristics of single phase dual converter with R and RL loads.	
Expt. 10	**CYCLOCONVERTER**
Study the characteristics of single phase cycloconverter with R and RL loads.	
Expt. 11	**THREE PHASE SEMI CONVERTER**
Plot the characteristics of three phase half converter with R and RL loads.	
Expt. 12	**MOSFET BASED CHOPPERS**
Study the principle of operation of step down chopper using MOSFET.	
Expt. 13	**SIMULATION OF THREE PHASE FULL CONVERTER AND PWM INVERTER**
Simulation of three phase full converter and PWM inverter with R and RL loads by using MATLAB.	
Expt. 14	**SIMULATION OF DC CONVERTERS**
Simulation of boost, buck, buck - boost converter with R and RL loads by using MATLAB.	

Reference Books:

1. M H Rashid, "Power Electronics, Circuits, Devices and Applications", Pearson, 3rd Edition, 2001.
2. M D Singh, K B Kanchandhani, "Power Electronics", Tata McGraw-Hill Publishing Company, 7th Edition, 2007.
3. P S Bimbhra, "Power Electronics", Khanna Publishers, 5th Edition, 2012.

Web References:

1. https://www.ee.iitkgp.ac.in
2. https://www.citchennai.edu.in
3. https://www.iare.ac.in .

Course Home Page:

<p align="center">**SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS:**</p>

SOFTWARE: MATLAB R2015a

HARDWARE: Desktop Computers (04 No.s)