

# GOPAL KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY JEYPORE

GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764005

## LESSON PLAN

**Discipline:** ELECTRICAL ENGINEERING

**Semester:** 4TH Semester

**Name of the Teaching Faculty:** DEBASHIS SAHU

**Subject:** POWER ELECTRONICS

**No. of Classes per Week:** 03

**Semester From:** Feb to April

**No. of Weeks:** 15 Weeks

Week	Class Day	Theory / Practical Topics
1st	1st	Introduction to Power Electronics and its Applications
	2nd	Power Semiconductor Devices: Diodes, BJTs and SCRs
	3rd	Characteristics, Rating and Triggering of SCR
2nd	1st	Protection of SCR: $dv/dt$ and $di/dt$
	2nd	Commutation Techniques of SCR
	3rd	Construction and Working of MOSFET and IGBT
3rd	1st	Comparison of Switching Devices
	2nd	Single Phase Half Wave Uncontrolled Rectifier
	3rd	Full Wave and Bridge Uncontrolled Rectifier
4th	1st	Three Phase Uncontrolled Rectifier
	2nd	Numerical on Uncontrolled Rectifiers
	3rd	Single Phase Half Wave Controlled Rectifier
5th	1st	Full Wave Controlled Rectifier
	2nd	Effect of Freewheeling Diode
	3rd	Three Phase Controlled Rectifier
6th	1st	Dual Converters and Comparison
	2nd	Numerical Problems on Controlled Rectifiers
	3rd	Introduction to Choppers and Classification
7th	1st	Step-up, Step-down and Step-up/down Choppers
	2nd	Time Ratio and Current Limit Control
	3rd	Chopper Configurations (Class A to E)
8th	1st	Applications of Choppers
	2nd	Problems on Choppers
	3rd	Inverters – Introduction and Classification
9th	1st	Voltage Source and Current Source Inverters
	2nd	Single Phase Inverter (Half and Full Bridge)
	3rd	Three Phase Inverters
10th	1st	PWM Techniques in Inverters
	2nd	Harmonics and their Minimization
	3rd	Applications and Problems on Inverters
11th	1st	AC Voltage Controllers – Introduction
	2nd	Single Phase AC Voltage Controller with R and RL Load
	3rd	Phase Control and Integral Cycle Control
12th	1st	Triac Based AC Voltage Controller
	2nd	Cycloconverters – Introduction and Working
	3rd	Single and Three Phase Cycloconverters
13th	1st	Applications and Problems on Cycloconverters
	2nd	UPS: Types, Circuit Diagram and Working
	3rd	SMPS – Block Diagram and Operation

14th	1st	Comparison of Linear and Switching Regulators
	2nd	Applications of Power Electronics in Fan Regulators
	3rd	Power Supply Systems, HVDC, AC and DC Drives
15th	1st	Mock Test, Viva and Doubt Clearing
	2nd	Formula Sheet and Problem Practice
	3rd	Final Class Test / Feedback / Course Closure

### **Learning Resources:**

1. P. S. Bimbhra, *Power Electronics*, Khanna Publishers.
2. Muhammad H. Rashid, *Power Electronics: Circuits, Devices and Applications*, Pearson.
3. Ned Mohan, Undeland, Robbins, *Power Electronics: Converters, Applications and Design*, Wiley.
4. Daniel W. Hart, *Power Electronics*, McGraw Hill.