

# GOVERNMENT CO-ED POLYTECHNIC, RAIPUR

## DEPARTMENT OF ELECTRICAL ENGINEERING

### LESSON PLAN

Session:- July - Dec 2024

Semester:- 5<sup>th</sup>

Session start date as per University Calendar:-

Course Name:- **Power Electronics**

Course Code:- 2024571(024)

Name of Subject teacher:- *Abhijeet Yadav*

#### Unit -1 Power Electronic Devices

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
1.1 Silicon Controlled Rectifier (SCR): Construction, Principle of operation, Characteristic Curve, Two Transistor Analogy. Switching Characteristics and Triggering Methods	2	1.1 Test the Performance of a given SCR and Plot the VI characteristics.	2	03/09/24
1.2 Rating and Protection: Over Voltage, Over Current, Snubber circuit	1	1.2 Test the performance of a given MOSFET and plot the output Characteristics.		04/09/24
1.3 Series and parallel Operation of SCRs: String Efficiency	2	1.3 Test the performance of a given IGBT and plot the output Characteristics.	2	09/09/24
1.4 DIAC, TRIAC: Construction, Operation, Characteristic Curves and Applications	1	1.4 Test the performance of TRIAC for the given AC Load Control.		10/09/24
1.5 Power BJT, MOSFET, IGBT: Construction, Operation, Characteristic Curves and Applications	2	1.5 Design the R and RC Triggering Circuit for Triggering SCR.		11/09/24 12/09/24 13/09/24

Number of periods planned (CI + LI) : 12

Number of periods actually taken : 7 (CI)

### Unit - 2 Commutation Technique And DC-DC Converter

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
2.1 Need for commutation in SCR	1	2.1 Test the performance of a buck converter at different duty cycle for a given resistive load.  2.2 Test the performance of a buck converter at different duty cycle for a given resistive inductive load.  2.3 Test the performance of a boost converter at different duty cycle for a given resistive load.  2.4 Test the performance of a forced commutation circuit (A, B, C, D and E)	2	14/09/24
2.2 Principle of Natural and Forced Commutations (class A, class B, class D and class E)	4			17/09/24
2.3 Working principle of Buck, Boost and Buck-Boost Converter	3			18/09/24
2.4 Simple numerical on Converters: duty ratio calculation, output voltage, current, input and output power, efficiency calculation for a buck converter, boost converter	2			19/09/24
				20/09/24
				21/09/24
				23/09/24
				24/09/24
				26/09/24
				27/09/24

Number of periods planned (CI + LI) : 12

Number of periods actually taken : 9 (CI)

### Unit - 3 Phase Controlled Rectifier

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
3.1 Single Phase Half Wave Controlled Rectifier with R, RL and RLE load.	2	3.1 Build and test a triggering circuit for a single phase full wave controlled rectifier using SCR.  3.2 & 3.3 Test the performance of a half wave controlled rectifier comprising of SCR for R and RL load.	2	30/09/24
3.2 Single phase full wave controlled rectifier (M-2 & B-2 connection) with R, RL and RLE load.	4			01/10/24
3.3 Effect of free-wheel diode in single phase full converter.	1	3.4 Test and Analyze the performance of a half wave controlled rectifier comprising of SCR for RL load with free Wheeling Diode  3.5 Test the performance of a Full wave controlled rectifier comprising of SCR for RL load and Calculate The Ripple Factor.	2	3/10/24
3.4 Effect of source inductance on Converter performance.	1			8/10/24
3.5 Three-phase half wave-controlled rectifier with R and RL load	2			9/10/24
				14/10/24
				16/10/24
				17/10/24
				18/10/24
				19/10/24

Number of periods planned (CI + LI) : 14

Number of periods actually taken : 10 (CI)

### Unit - 4 Inverter & Cycloconverter

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
4.1 Inverter: Working principle, types- Voltage Source Inverter, Current Source Inverter.	1	4.1 & 4.2 Test the performance of a single-phase half bridge and full bridge VSI feeding R & RL load.	2	21/10/24
4.2 PWM Inverters: single phase Half bridge and full bridge with R and RL load.	3			22/10/24
4.3 PWM techniques: single pulse, multi-pulse and SPWM (Uni-polar and bipolar switching)	1	4.3 & 4.4 Measure the input to output frequency of a single phase to single phase step up & step down cyclo-converter.	2	23/10/24
4 Concept of three phase VSI	3			05/11/24
4.5 & 4.6 Cyclo-converter	2			24/10/24
				25/10/24
				04/11/24

Number of periods planned ( CI + LI ) : 14

Number of periods actually taken : 8 (CI)

### Unit - 5 AC Voltage Controller, UPS And SMPS

Class Room Instruction (CI)	No. of Periods	Laboratory Instruction (LI)	No. of Periods	Remark
5.1 Single phase AC voltage controller: Working principle and its applications	4	5.1 Measure the output load voltage of a single phase AC voltage controller using On-off control.	1	6/11/24
5.2 Significance of UPS, Block diagram of UPS, function of each block, types: ON-line & Off-line UPS.	4			8/11/24
5.3 SMPS: Block diagram, principle of operation, advantages and disadvantages and applications of SMPS.	4	5.2 Measure the output load voltage of a single phase AC voltage controller using phase angle control for a resistive load.	1	9/11/24
				11/11/24
		5.3 Measure the output load voltage of a single phase AC voltage controller using phase angle control for a resistive inductive load.	2	14/11/24
				16/11/24
				18/11/24
				19/11/24
				20, 21, 22, 25/11/24

Number of periods planned ( CI + LI ) : 16

Number of periods actually taken : 12 (CI)

Number of Total periods planned : 68.  
Number of Total periods actually taken :

Subject Teacher : *Abhijeet Yadav*



**HOD**  
**(Department of Electrical Engineering)**

