GIET
In Pursuit of Innovation

GIETPOLYTECHNIC,JAGATPUR,CUTTACK

LESSONPLAN

Discipline: **Electrical.**	**Semester:4TH**	**Name of the Teaching Faculty:-Rupak Kumar Sahoo**
Subject: fundamental of power electronics.- EEPC202 (TH-1)	**No. Of Days Per Week ClassAllotted: 03P Lecture:03**	**Semester From Date:** 22.12.2025 **To Date:** 15.04.2026 No.ofweeks:15
Week	**ClassDay**	**Theory**
1st	1st	**I : Power Electronic Devices** 1.1:Power electronic devices
	2nd	1.2 : Power transistor 1.2.1. Construction and working principle 1.2.2.V-I characteristics and uses
	3rd	1.3:IGBT 1.3.1. Construction and working principle 1.3.2. V-I characteristics and uses
2nd	1st	1.4.Concept of single electron transistor(SET)
	2nd	1.5.Aspects of Nano-technology(concept only)
	3rd	1.5.Aspects of Nano-technology(concept only)
3rd	1st	**II :Thyristor Family Devices** 2.1.SCR 2.1.1.Construction of SCR
	2nd	2.1.2.Two transistor analogy of SCR
	3rd	2.1.3. Types,working and characteristics 2.1.4. SCR mounting and cooling
4th	1st	2.2.Types of Thyristors:SCR,LASER,.,
	2nd	2.2.,SCS,PUT,GTO
	3rd	2.2.DIAC,TRIAC,UJT
5th	1st	2.3.Thyristor family devices 2.3.1.Symbol and construction 2.3.2.Operating principle
	2nd	2.3.3.V-Icharacteristics
	3rd	2.4.Protection circuits 2.4.1.Over-voltage 2.4.2.Over-current 2.4.3.Snubber 2.4.4.Crowbar

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6th	1st	**III :Turn-on andTurn-off Methods of Thyristors** 3.1. SCR Turn-On methods 3.1.1. High Voltage thermal triggering
	2nd	3.1.2.Illumination triggering
	3rd	3.1.3. dv/dt triggering 3.1.4. Gate triggering
		3.1.4.Gate triggering
9th	1st	3.2. Gate trigger circuits 3.2.1. Resistance and Resistance-Capacitance circuits
	2nd	3.3.SCR triggering using UJT 3.4.PUT:Relaxation Oscillator and Synchronized UJT circuit
	3rd	3.5.Pulse transformer and opto-coupler based triggering 3.6. SCR Turn-Off methods: 3.6.1ClassA-Series resonant commutationcircuit
10th	1st	3.6.2.ClassB-Shunt Resonant commutation circuit
	2nd	3.6.3.ClassC-Complimentary Symmetry commutation circuit
	3rd	3.6.4.ClassD-Auxiliary commutation
11th	1st	3.6.5.ClassE-External pulse commutation
	2nd	3.6.6.ClassF-Line or natural commutation
	3rd	3.6.6.ClassF-Line or natural commutation

12th	1st	**IV :Phase Controlled Rectifiers** 4.1.Phase control:firing angle,conduction angle
	2nd	4.2.Single phase half controlled rectifier with R load
	3rd	4.2.Single phase half controlled rectifier with RL load
13th	1st	4.2.Single phase,full controlled rectifier with R load
	2nd	4.2.Singlephase full controlled rectifier with RL load
	3rd	4.2.Single phase mid point controlled rectifier with R,RL load
14th	1st	4.2.1.Circuit diagram, working ,input-output waveforms
	2nd	4.2.1.Equation for DC output and effect of freewheeling diode
	3rd	4.3.Different configurations of bridge controlled rectifiers
15th	1st	**V : Industrial Control Circuits** 5.1.Applications:Burglar's alarm system 5.1.Applicatiion:Battery charger using SCR Emergency light system, Temperature controller using SCR Illumination control/fan speed control TRIAC
	2nd	5.2.SMPS 5.3.UPS:Offline and Online
	3rd	5.4.SCR based AC and DC circuit breakers

23.12.25
Sign. of faculty

23.12.25
Sign. of sr. lecturer

Head of Dept. (HOD)
...ical & ETC E...

23.12.25
Sign. of principal