

LESSON PLAN

**SUB:-FUNDAMENTAL OF POWER
ELECTRONICS**

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 4TH

**NAME OF FACULTY: SUSHANT KUMAR
MOHANTY**



**GOVERNMENT POLYTECHNIC,
BHADRAK
SESSION:2025-26**

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HOD (ELECT.)
G.P. BHADRAK
19.12.25

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Academic Co-ordinator

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Principal
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19.12.25

LESSON PLAN OF FUNDAMENTALS OF POWER ELECTRONICS

Course Code- EEPC202

TH:1- 4th semester

NAME: SUSHANT KUMAR MOHANTY , LECT: ETC , W.E.F:22.12.2025 TO 18.04.2026
 SUB: FUNDAMENTAL OF POWER ELECTRONICS
 BRANCH: ELECTRICAL ENGG.,

NO OF PERIODS /WEEK: 3	CLASS NO & TOPICS TO BE COVERED	REMARK
WEEK-1	Power Electronic Devices 1.1 Power electronic devices 1.2 Power transistor 1.2.1 construction and working principle 1.2.2 V-I characteristics and uses	
WEEK-2	1.3 IGBT 1.3.1 Construction and working principle 1.3.2 V-I characteristics and uses	
WEEK-3	1.4 Concept of single electron transistor (SET) 1.5 Aspects of Nano- technology(concept only)	
WEEK-4	2.1 SCR 2.1.1 Construction of SCR 2.1.2 Two transistor analogy of SCR 2.1.3 Types, working and characteristics 2.1.4 SCR mounting and cooling	
WEEK-5	2.2 Types of Thyristors: SCR, LASCR, SCS, GTO, UJT, PUT, DIAC and TRIAC 2.3 Thyristor family devices 2.3.1 Symbol and construction 2.3.2 Operating principle 2.3.3 V-I characteristics	
WEEK-6	2.4 Protection circuits 2.4.1 Over-voltage 2.4.2 Over-current 2.4.3 Snubber 2.4.4 Crowbar	
WEEK-7	Turn-on and Turn-off Methods of Thyristors 3.1 SCR Turn-On methods 3.1.1 High Voltage thermal triggering, 3.1.2 Illumination triggering 3.1.3 dv/dt triggering 3.1.4 Gate triggering 3.2 Gate trigger circuits 3.2.1 Resistance and Resistance-Capacitance circuits	
WEEK-8	3.3 SCR triggering using UJT 3.4 PUT: Relaxation Oscillator and Synchronized UJT circuit 3.5 Pulse transformer and opto-coupler based triggering.	
WEEK-9	3.6 SCR Turn-Off methods: 3.6.1 Class A- Seriesresonant commutation circuit 3.6.2 Class B-Shunt Resonant commutation circuit 3.6.3 Class C-Complimentary Symmetry commutation circuit	
WEEK-10	3.6.4 Class D-Auxiliary commutation 3.6.5 Class E-External pulse commutation 3.6.6 Class F-Line or natural commutation	

WEEK-11	Phase Controlled Rectifiers 4.1 Phase control: firing angle, conduction angle. 4.2 Single phase half controlled, full controlled and midpoint controlled rectifier with R, RL load	
WEEK-12	4.2.1 Circuit diagram, working, input- output waveforms, equations for DC output and effect of freewheeling diode	
WEEK-13	4.3 Different configurations of bridge controlled rectifiers: Full bridge, half bridge with common anode, common cathode, SCRs in one arm and diodes in another arm	
WEEK-14	5.1 Applications: Burglar's alarm system, Battery charger using SCR, Emergency light system, Temperature controller using SCR and; Illumination control/fan speed control TRIAC 5.2 SMPS	
WEEK-15	5.3 UPS: Offline and Online 5.4 SCR based AC and DC circuit breakers.	

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18/12/25

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