

LESSON PLAN

SUB:- SWITCHGEAR AND PROTECTION

BRANCH:- ELECTRICAL ENGG.

SEMESTER:5th

NAME OF FACULTY: - LAXMIDHAR SAHU



**GOVERNMENT POLYTECHNIC,
BHADRAK**

SESSION:2026-27

HOD Electrical
HOD (ELECT.)
G.P.BHADRAK

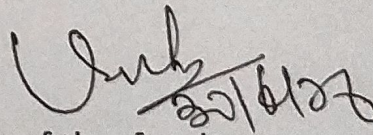
Academic Co-ordinator
Academic Co-ordinator

Principal
Govt. Polytechnic Bhadrak
Govt. Polytechnic
Bhadrak

Discipline: Electrical Engg.	Semester: 5 TH	Name of the Teaching Faculty : LAXMIDHAR SAHU
Subject: SWITCHGEAR AND PROTECTION	No. of Days/per week class allotted: 3	Semester from date: 01.07.2026 To Date: 05.11.2026 No. of Weeks: 15
Week	Class Day	Theory
1 st	1 st	1. Basics of Protection Necessity, functions of protective system.
	2 nd	Normal and abnormal conditions
	3 rd	Types of faults and their causes
2 nd	1 st	Protection zones and backup protection
	2 nd	Short circuit fault calculations in lines fed by generators through transformers
	3 rd	Problem solved of short circuit fault calculation.
3 rd	1 st	Need of current limiting reactors and their arrangements
	2 nd	2. Circuit Interruption Devices Isolators- Vertical break, Horizontal break and Pantograph type
	3 rd	HRC fuses – Construction, working, characteristics and applications.
4 th	1 st	Arc formation process, methods of arc extinction (High resistance and Low resistance)
	2 nd	Arc voltage, Recovery voltage, Re-striking voltage, RRRV
	3 rd	HT circuit breakers (Sulphur-hexa Fluoride (SF ₆) - Working, construction, specifications and applications
5 th	1 st	HT circuit breakers (Vacuum circuit breaker) - Working, construction, specifications and applications.
	2 nd	L.T. circuit breaker (Air circuit breakers (ACB) - Working and applications
	3 rd	Miniature circuit breakers (MCB) - Working and applications
6 th	1 st	Moulded case circuit breakers (MCCB) - Working and

		applications
	2 nd	Earth leakage circuit breaker (ELCB)) - Working and applications.
	3 rd	Selection of LT and HT circuit breakers (ratings), Selection of MCCB for motors.
7 th	1 st	Gas insulated switchgear
	2 nd	3. Protective Relays Fundamental quality requirements: Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy
	3 rd	Basic relay terminology- Protective relay, Relay time, Pick up, Reset current, current setting, Plug setting multiplier, Time setting multiplier
8 th	1 st	Principle of working, construction and operation of Attracted armature type relay
	2 nd	Principle of working, construction and operation of Solenoid type relay
	3 rd	Principle of working, construction and operation of Watt-hour meter type relay
9 th	1 st	Thermal relay. Block diagram and working of Static relay
	2 nd	Overcurrent relay-Time current characteristics
	3 rd	Microprocessor based over current relays: Block diagram, working
10 th	1 st	Distance relaying- Principle, operation of Definite distance relays.
	2 nd	Directional relay: Need and operation , Operation of current and voltage differential relay
	3 rd	4. Protection of Alternator and Transformer Differential protection of Alternator
11 th	1 st	Over current, earth fault protection of Alternator
	2 nd	Overheating and field failure protection of Alternator
	3 rd	Reverse power protection of Alternator.
12 th	1 st	Differential Protection of Transformer,
	2 nd	Over current Protection of Transformer
	3 rd	Earth fault, over heating protection of Transformer.

13 th	1 st	Limitations of differential protection.
	2 nd	Buchholz relay: Construction, operation, merits and demerits
	3 rd	
14 th		5. Protection of Motors
		Bus-bar and Transmission Line, Motor Faults
	1 st	Short circuit protection of Motor
	2 nd	Overload protection of Motor, Single phase preventer of Motor
15 th	3 rd	Faults on Bus bar and Transmission Lines
	1 st	Bus bar protection: Differential and Fault bus protection
	2 nd	Transmission line: Over current, Distance protection
	3 rd	Transmission line: Pilot wire protection


 Signature of the faculty