

LESSON PLAN

SUB: SWITCH GEAR AND PROTECTIVE DEVICES

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 6th

NAME OF FACULTY:UMESH KUMAR DALAI



**GOVERNMENT POLYTECHNIC,
BHADRAK**

SESSION:2023-24

Hod. Electrical

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

Academic Co-ordinator

Academic Co-ordinator

Principal

Govt. Polytechnic, Bhadrak

**Principal
Govt. Polytechnic
Bhadrak**

Discipline: Electrical Engg.	Semester: 6 th	Name of the Teaching Faculty : U/MESH KUMAR DALAI
Subject: Switch Gear & Protective Devices	No. of Days/per week class allotted:5	Semester from date: 16.01.2024 To Date: 26.04.2024
Week	Class Day	No. of Weeks: 15
	1 st	Theory
1 st	2 nd	Essential Features of switchgear
	3 rd	Switchgear Equipment.
	4 th	Bus-Bar Arrangement
	5 th	Switchgear Accommodation.
		Short Circuit.
	1 st	Short circuit.
	2 nd	Faults in a power system.
	3 rd	FAULT CALCULATION
2 nd	4 th	Symmetrical faults on 3-phase system.
		Limitation of fault current.
		Percentage Reactance.
		Percentage Reactance and Base KVA.
	5 th	Short – circuit KVA.
	1 st	Reactor control of short circuit currents.
	2 nd	Location of reactors.
3 rd	3 rd	Steps for symmetrical Fault calculations.
	4 th	Solve numerical problems on symmetrical fault.
	5 th	FUSES
		Desirable characteristics of fuse element.
	1 st	Fuse Element materials.
	2 nd	Types of Fuses and important terms used for fuses.
4 th	3 rd	Low and High voltage fuses.
		Current carrying capacity of fuse element.
	4 th	Difference Between a Fuse and Circuit Breaker.
		CIRCUIT BREAKERS
	5 th	Definition and principle of Circuit Breaker.
	1 st	Arc phenomenon and principle of Arc Extinction.
	2 nd	Methods of Arc Extinction
5 th	3 rd	Definitions of Arc voltage, Re-striking voltage and Recovery voltage.
	4 th	Classification of circuit Breakers.
		Oil circuit Breaker and its classification.
		Plain brake oil circuit breaker.

6 th	1 st	Arc control oil circuit breaker.
	2 nd	Low oil circuit breaker.
	4 th	Maintenance of oil circuit breaker.
	1 st	Air-Blast circuit breaker and its classification.
7 th	2 nd	Sulphur Hexa-fluoride (SF6) circuit breaker.
	3 rd	Vacuum circuit breakers.
	4 th	Switchgear component.
	1 st	Problems of circuit interruption.
8 th	2 nd	Resistance switching. Circuit Breaker Rating.
	3 rd	PROTECTIVE RELAYS Definition of Protective Relay.
	4 th	Fundamental requirement of protective relay. Basic Relay operation.
	1 st	Electromagnetic Attraction type Induction type
9 th	2 nd	Definition of following important terms Pick-up current, Current setting. Plug setting Multiplier, Time setting Multiplier.
	3 rd	Classification of functional relays.
	4 th	Induction type over current relay (Non-directional).
	1 st	Induction type directional power relay.
10 th	2 nd	Induction type directional over current relay.
	3 rd	Differential relay Current differential relay
	4 th	Voltage balance differential relay.
	1 st	Types of protection
11 th	2 nd	PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES Protection of alternator.
	3 rd	Differential protection of alternators.
	4 th	Balanced earth fault protection.

12 th	1 st	Protection systems for transformer.
	2 nd	Buchholz relay.
	3 rd	Protection of Bus bar.
	4 th	Protection of Transmission line.
13 th	1 st	Different pilot wire protection (Merz-price voltage Balance system)
	2 nd	Explain protection of feeder by over current and earth fault relay.
	3 rd	Voltage surge and causes of over voltage.
	4 th	Internal cause of over voltage.
14 th	1 st	External cause of over voltage (lightning)
	2 nd	Mechanism of lightning discharge.
	3 rd	Types of lightning strokes. Harmful effect of lightning.
	4 th	Lightning arresters and Type of lightning Arresters. Rod-gap lightning arrester. Horn-gap arrester. Valve type arrester.
15 th	1 st	Surge Absorber.
	2 nd	Static relay. Advantage of static relay.
	3 rd	Instantaneous over current relay.
	4 th	Principle of IDMT relay.

LLK
19.01.2024

SIGNATURE OF FACULTY

Lect.in Elect.Engg.
Govt.Poly.Bhadrak