

LESSON PLAN FOR. SWITCH GEAR AND PROTECTIVE DEVICES(Th. 2)

Discipline: Electrical Engineering	Semester: 6th	Name of the Teaching Faculty: Pradosh Kumar Panda (Lect.)	
Subject: SWITCH GEAR AND PROTECTIVE DEVICES	No. of days per week class allotted: 5	Semester From Date : 04/02/2025	to Date: 17/05/2025
		No. of Weeks: 15	
Week	Class Day	Theory	
1st		1. INTRODUCTION TO SWITCHGEAR	
	1st	1.1 Essential Features of switchgear	
	2nd	1.2 Switchgear Equipment.	
	3rd	1.3 Bus-Bar Arrangement	
	4th	1.4 Switchgear Accommodation	
	5th	Tutorial class	
2nd	1st	1.5 Short Circuit.	
	2nd	1.7 Faults in a power system.	
		2. FAULT CALCULATION	
	3rd	2.1 Symmetrical faults on 3-phase system.	
	4th	2.2 Limitation of fault current.	
	5th	Tutorial class	
3rd	1st	2.3 Percentage Reactance	
	2nd	2.4 Percentage Reactance and Base KVA	
	3rd	2.5 Short – circuit KVA.	
	4th	2.6 Reactor control of short circuit currents.	
	5th	Tutorial class	
4th	1st	2.7 Location of reactors	
	2nd	2.8 Steps for symmetrical Fault calculations	
	3rd	2.9 Numerical problems solving	
	4th	2.10 Numerical problems solving	
	5th	Tutorial class	
		3. FUSES	
5th	1st	3.1 Desirable characteristics of fuse element.	
	2nd	3.2 Fuse Element materials.	
	3rd	3.3 Types of Fuses and important terms used for fuses.	
	4th	3.4 Low and High voltage fuses.	
	5th	Tutorial class	
6th	1st	3.5 Current carrying capacity of fuse element.	
	2nd	3.6 Difference Between a Fuse and Circuit Breaker.	
		4. CIRCUIT BREAKERS	

	3rd	4.1 Definition and principle of Circuit Breaker Arc phenomenon and principle of Arc Extinction
	4th	4.2 Methods of Arc Extinction.
	5th	Tutorial class
7th	1st	4.3 Definitions of Arc voltage, Re-striking voltage and Recovery voltage. Classification of circuit Breakers.
	2nd	4.4 Oil circuit Breaker and its classification. Plain brake oil circuit breaker.
	3rd	4.5 Arc control oil circuit breaker. Low oil circuit breaker
	4th	4.6 Maintenance of oil circuit breaker. Air-Blast circuit breaker and its classification.
	5th	Tutorial class
8th	1st	4.7 Sulphur Hexa-fluoride (SF6) circuit breaker. Vacuum circuit breakers.
	2nd	4.8 Switchgear component, Problems of circuit interruption
	3rd	4.9 Resistance switching.
	4th	4.10 Circuit Breaker Rating.
	5th	Tutorial class
5. PROTECTIVE RELAYS		
9th	1st	5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay.
	2nd	5.3 Basic Relay operation ,Electromagnetic Attraction type, Induction type
	3rd	5.4 Definition of following important terms. 5.4.1. Pick-up current. 5.4.2. Current setting. 5.4.3. Plug setting Multiplier. 5.4.4. Time setting Multiplier
	4th	5.5 Classification of functional relays 5.6 Induction type over current relay (Non-directional)
	5th	Tutorial class
10th	1st	5.7 Induction type directional power relay
	2nd	5.8 Induction type directional over current relay.
	3rd	5.9 Differential relay 5.9.1. Current differential relay 5.9.2. Voltage balance differential relay
	4th	5.10 Types of protection
	5th	Tutorial class
11th		6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES
	1st	6.1 Protection of alternator. 6.2 Differential protection of alternators.
	2nd	6.3 Balanced earth fault protection.

	3rd	6.4 Protection systems for transformer. 6.5 Buchholz relay.
	4th	6.6 Protection of Bus bar.
	5th	Tutorial class
12th	1st	6.7 Protection of Transmission line, 6.8 Different pilot wire protection (Merz-price voltage Balance system)
	2nd	6.9 protection of feeder by over current and earth fault relay
		7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING
	3rd	7.1. Voltage surge and causes of over voltage.
	4th	7.2 Internal cause of over voltage. 7.3 External cause of over voltage (lighting)
	5th	Tutorial class
13th	1st	7.4 Mechanism of lightning discharge.
	2nd	7.5 Types of lightning strokes. 7.6 Harmful effect of lightning.
	3rd	7.7 Lightning arresters.
	4th	7.8 Type of lightning Arresters. a) Rod-gap lightning arrester. b) Horn-gap arrester. c) Valve type arrester.
	5th	Tutorial class
14th	1st	7.9 Surge Absorber
	2nd	7.9 Surge Absorber
		8. STATIC RELAY
	3rd	8.1 Advantage of static relay.
	4th	8.2 Instantaneous over current relay.
	5th	Tutorial class
15th	1st	8.3 Principle of IDMT relay
	2nd	8.4 revision class
	3rd	8.5 revision class
	4th	8.6 doubt clearing class
	5th	Tutorial class

 03/02/2025
HOD ELECTRICAL ENGG.

 03/02/25
ACADEMIC CO-ORDINATOR

 05/02/2025
SIGNATURE OF FACULTY