

GOVT. POLYTECHNIC KANDHAMAL LESSON PLAN

Discipline : ELECTRICAL ENGG.	Semester: 6th Sem	Name of the Teaching Faculty : BIJAYA KUMAR BARIK	
Subject : Th2. SWITCH GEAR AND PROTECTIVE DEVICES	No. of Days / per week class allotted : 05	Semester From date : 16.01.2024 To Date : 23.05.2024 No. of Weeks : 16	
Week	Class Day	Topics	
Week 1 (Feb 4 - Feb 8)	1st	1. INTRODUCTION TO SWITCHGEAR 1.1 Essential Features of switchgear	
	2nd	1.2 Switchgear Equipment	
	3rd	1.3 Bus-Bar Arrangement.	
	4th	1.4 Switchgear Accommodation	
	5th	1.5 Short Circuit.	
Week 2 (Feb 10 - Feb 15)	1st	1.6 Short circuit.1.7 Faults in a power system.	
	2nd	2. FAULT CALCULATION 2.1 Symmetrical faults on 3-phase system.	
	3rd	2.2 Limitation of fault current	
	4th	2.3 Percentage Reactance. 2.4 Percentage Reactance and Base KVA	
	5TH	2.5 Short – circuit KVA.	
Week 3 (Feb 17 - Feb 22)	1st	2.6 Reactor control of short circuit currents	
	2nd	2.7 Location of reactors	
	3rd	2.8 Steps for symmetrical Fault calculations.	
	4th	2.9 Solve numerical problems on symmetrical fault	
	5th	2.9 Solve numerical problems on symmetrical fault	
Week 4 (Feb 24 - Mar 1)	1st	2.9 Solve numerical problems on symmetrical fault	
	2nd	3. FUSES 3.1 Desirable characteristics of fuse element.	
	3rd	3.2 Fuse Element materials	
	4th	3.3 Types of Fuses and important terms used for fuses	
	5th	3.4 Low and High voltage fuses.	
Week 5 (Mar 3 - Mar 8)	1st	3.5 Current carrying capacity of fuse element.	
	2nd	3.6 Difference Between a Fuse and Circuit Breaker	
	3rd	CLASS TEST 1	
	4th	4. CIRCUIT BREAKERS 4.1 Definition and principle of Circuit Breaker. 4.2 Arc phenomenon and principle of Arc Extinction.	
	5th	4.3 Methods of Arc Extinction	
Week 6 (Mar 10 - Mar 15)	1st	4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage. 4.5 Classification of circuit Breakers.	
	2nd	4.6 Oil circuit Breaker and its classification.	
	3rd	4.7 Plain brake oil circuit breaker.	
	4th	4.8 Arc control oil circuit breaker.	
	5th	4.9 Low oil circuit breaker.	
	1st	4.10 Maintenance of oil circuit breaker	

Week 7 (Mar 17 - Mar 22)	2nd	4.11 Air-Blast circuit breaker and its classification.
	3rd	4.12 Sulphur Hexa-fluoride (SF6) circuit breaker
	4th	4.13 Vacuum circuit breakers.
	5th	4.14 Switchgear component.

Week 8 (Mar 24 - Mar 29)	1st	4.15 Problems of circuit interruption
	2nd	4.16 Resistance switching.
	3rd	4.17 Circuit Breaker Rating.
	4th	5. PROTECTIVE RELAYS 5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay.
	5th	INTERNAL ASSESSMENT

Week 9 (Apr 1 - Apr 5)	1st	5.3 Basic Relay operation 5.3.1. Electromagnetic Attraction type5.3.2. Induction type
	2nd	5.4 Definition of following important terms 5.5 Definition of following important terms. 5.5.1. Pick-up current. 5.5.2. Current setting.
	3rd	5.5.3. Plug setting Multiplier. 5.5.4. Time setting Multiplier
	4th	5.6 Classification of functional relays
	5th	5.7 Induction type over current relay (Non-directional)

Week 10 (Apr 7 - Apr 12)	1st	5.8 Induction type directional power relay.
	2nd	5.9 Induction type directional over current relay
	3rd	5.10 Differential relay 5.10.1. Current differential relay
	4th	5.10.2. Voltage balance differential relay
	5th	5.11 Types of protection

Week 11 (Apr 14 - Apr 19)	1st	6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES 6.1 Protection of alternator.
	2nd	6.2 Differential protection of alternators.
	3rd	6.3 Balanced earth fault protection.
	4th	6.4 Protection systems for transformer.
	5th	6.5 Buchholz relay.

Week 12 (Apr 21 - Apr 26)	1st	6.6 Protection of Bus bar
	2nd	6.7 Protection of Transmission line.
	3rd	6.8 Different pilot wire protection (Merz-price voltage Balance system)
	4th	6.9 Explain protection of feeder by over current and earth fault relay.
	5th	7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING 7.1. Voltage surge and causes of over voltage.

Week 13 (Apr 28 - May 3)	1st	7.2. Internal cause of over voltage
	2nd	7.3. External cause of over voltage (lightning)
	3rd	7.4. Mechanism of lightning discharge
	4th	7.5. Types of lightning strokes.
	5th	7.6. Harmful effect of lightning.

Week 14 (May 5 - May 10)	1st	7.7. Lightning arresters and Type of lightning Arresters. 7.7.1. Rod-gap lightning arrester. 7.7.2. Horn-gap arrester.
	2nd	7.7.3. Valve type arrester 7.8. Surge Absorber
	3rd	8. STATIC RELAY: 8. 1 Advantage of static relay.

	4th	8. 2 Instantaneous over current relay.
	5th	8. 3 Principle of IDMT relay

Week 15 (May 12 - May 17)	1st	8. 3 Principle of IDMT relay
	2nd	CLASS TEST 2
	3rd	Solving and discussing previous year queations
	4th	Solving and discussing previous year queations
	5th	Solving and discussing previous year queations