GANDHI SCHOOL OF ENGINEERING

BHABANDHA, BERHAMPUR

BRANCH:- ELECTRICAL ENGINEERING

SEMESTER:- 6TH

SUBJECT:- SWITCH GEAR AND PROTECTIVE DEVICES

GROUP- 1&2

Name of the Faculty- ER.GIRIDHAREE PRADHAN & ER. DEEPAK KUMAR MAHARANA

			Topic to be taken		Actual topic taken			
Sl. No	**Topic/Module**	**No. of period**	**Details of the topics**	**Date**	**Topic No.**	**Topic Name**	**Date**	**Remark**
1.	INTRODUCTION TO SWITCH GEAR	06	1.1 Essential Features of switchgear. 1.2 Switchgear Equipment. 1.3 Bus-Bar Arrangement. 1.4 Switchgear Accommodation. 1.5 Short Circuit. 1.6 Short circuit. 1.7 Faults in a power system	18.01.2024 TO 25.01.2024	1.1 1.2 1.3 1.4 1.5 1.6 1.7	1.1 Essential Features of switchgear. 1.2 Switchgear Equipment. 1.3 Bus-Bar Arrangement. 1.4 Switchgear Accommodation. 1.5 Short Circuit. 1.6 Short circuit. 1.7 Faults in a power system	18.01.2024 19.01.2024 20.01.2024 22.01.2024 24.01.2024 25.01.2024	
2.	FAULT CALCULATION	10	2.1 Symmetrical faults on 3-phase system. 2.2 Limitation of fault current. 2.3 Percentage Reactance. 2.4 Percentage Reactance and Base KVA. 2.5 Short – circuit KVA 2.6 Reactor control of short circuit currents. 2.7 Location of reactors. 2.8 Steps for symmetrical Fault calculations. 2.9 Solve numerical problems on	31.01.2024 TO 10.02.2024	2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9	2.1 Symmetrical faults on 3-phase system. 2.2 Limitation of fault current. 2.3 Percentage Reactance. 2.4 Percentage Reactance and Base KVA. 2.5 Short – circuit KVA 2.6 Reactor control of short circuit currents. 2.7 Location of reactors. 2.8 Steps for symmetrical	31.01.2024 01.02.2024 02.02.2024 03.02.2024 05.02.2024 06.02.2024 07.02.2024 08.02.2024 09.02.2024 10.02.2024	

			symmetrical fault.			Fault calculations. 2.9 Solve numerical problems on symmetrical fault.		
3	FUSES	06	3.1 Desirable characteristics of fuse element. 3.2 Fuse Element materials. 3.3 Types of Fuses and important terms used for fuses. 3.4 Low and High voltage fuses. 3.5 Current carrying capacity of fuse element. 3.6 Difference Between a Fuse and Circuit Breaker.	12.02.2024 TO 19.02.2024	3.1 3.2 3.3 3.4 3.5 3.6	3.1 Desirable characteristics of fuse element. 3.2 Fuse Element materials. 3.3 Types of Fuses and important terms used for fuses. 3.4 Low and High voltage fuses. 3.5 Current carrying capacity of fuse element. 3.6 Difference Between a Fuse and Circuit Breaker.	12.02.2024 13.02.2024 15.022024 16.02.2024 17.02.2024 19.02.2024	
4	CIRCUIT BREAKERS	10	4.1 Definition and principle of Circuit Breaker. 4.2 Arc phenomenon and principle of Arc Extinction. 4.3 Methods of Arc Extinction. 4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage. 4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification. 4.7 Plain brake oil circuit breaker 4.8 Arc control oil circuit breaker. 4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker. 4.11 Air-Blast circuit breaker and its classification. 4.12 Sulphur Hexa-fluoride (SF6) circuit breaker. 4.13 Vacuum circuit breakers. 4.14 Switchgear component. 4.15 Problems of circuit interruption. 4.16 Resistance switching. 4.17 Circuit Breaker Rating.	20.02.2024 TO 01.03.2024	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 4.10 4.11 4.12 4.13 4.14 4.15 4.16 4.17	4.1 Definition and principle of Circuit Breaker. 4.2 Arc phenomenon and principle of Arc Extinction. 4.3 Methods of Arc Extinction. 4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage. 4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification. 4.7 Plain brake oil circuit breaker 4.8 Arc control oil circuit breaker. 4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker. 4.11 Air-Blast circuit	20.02.2024 21.02.2024 22.02.2024 23.02.2024 24.02.2024 26.02.2024 27.02.2024 28.02.2024 29.02.2024 01.03.2024	

						breaker and its classification. 4.12 Sulphur Hexa-fluoride (SF6) circuit breaker. 4.13 Vacuum circuit breakers. 4.14 Switchgear component. 4.15 Problems of circuit interruption. 4.16 Resistance switching. 4.17 Circuit Breaker Rating.		
5	PROTECTIVE RELAYS	08	5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay. 5.3 Basic Relay operation 5.3.1. Electromagnetic Attraction type 5.3.2. Induction type 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. 5.5.3. Plug setting Multiplier. 5.5.4. Time setting Multiplier. 5.6 Classification of functional relays 5.7 Induction type over current relay (Non-directional) 5.8 Induction type directional power relay. 5.9 Induction type directional over current relay. 5.10 Differential relay 5.10.1. Current differential relay 5.10.2. Voltage balance differential relay. 5.11 Types of protection	02.03.2024 TO 14.03.2024	5.1 5.2 5.3 5.3.1 5.3.2. 5.4 5.5 5.5.1 5.5.2 5.5.3 5.5.4 5.6 5.7 5.8 5.9 5.10 5.10.1 5.10.2 5.11	5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay. 5.3 Basic Relay operation 5.3.1. Electromagnetic Attraction type 5.3.2. Induction type 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. 5.5.3. Plug setting Multiplier. 5.5.4. Time setting Multiplier. 5.6 Classification of functional relays 5.7 Induction type over current relay (Non-directional) 5.8 Induction type directional power relay. 5.9 Induction type directional over current relay.	02.03.2024 04.03.2024 06.03.2024 07.03.2024 11.03.2024 12.03.2024 13.03.2024 14.03.2024	

						5.10 Differential relay 5.10.1. Current differential relay 5.10.2. Voltage balance differential relay. 5.11 Types of protection		
6	PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES	06	6.1 Protection of alternator. 6.2 Differential protection of alternators. 6.3 Balanced earth fault protection. 6.4 Protection systems for transformer. 6.5 Buchholz relay. 6.6 Protection of Bus bar. 6.7 Protection of Transmission line. 6.8 Different pilot wire protection (Merz-price voltage Balance system) 6.9 Explain protection of feeder by over current and earth fault relay.	15.03.2024 TO 21.03.2024	6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9	6.1 Protection of alternator. 6.2 Differential protection of alternators. 6.3 Balanced earth fault protection. 6.4 Protection systems for transformer. 6.5 Buchholz relay. 6.6 Protection of Bus bar. 6.7 Protection of Transmission line. 6.8 Different pilot wire protection (Merz-price voltage Balance system) 6.9 Explain protection of feeder by over current and earth fault relay.	15.03.2024 16.03.2024 18.02.2024 19.03.2024 20.03.2024 21.03.2024	
7	PROTECTION AGAINST OVER VOLTAGE AND LIGHTING	08	7.1. Voltage surge and causes of over voltage. 7.2. Internal cause of over voltage. 7.3. External cause of over voltage (lighting) 7.4. Mechanism of lightning discharge. 7.5. Types of lightning strokes. 7.6. Harmful effect of lightning. 7.7. Lightning arresters and Type of lightning Arresters. 7.7.1. Rod-gap lightning arrester. 7.7.2. Horn-gap arrester. 7.7.3. Valve type arrester. 7.8. Surge Absorber	22.03.2024 TO 04.04.2024	7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.7.1 7.7.2 7.7.3 7.8	7.1. Voltage surge and causes of over voltage. 7.2. Internal cause of over voltage. 7.3. External cause of over voltage (lighting) 7.4. Mechanism of lightning discharge. 7.5. Types of lightning strokes. 7.6. Harmful effect of lightning. 7.7. Lightning arresters and Type of lightning Arresters. 7.7.1. Rod-gap lightning arrester. 7.7.2. Horn-gap arrester. 7.7.3. Valve type arrester. 7.8. Surge Absorber	22.03.2024 23.03.2024 27.03.2024 28.03.2024 30.03.2024 02.04.2024 03.04.2024 04.04.2024	

8	STATIC RELAY:	06	8. 1 Advantage of static relay. 8. 2 Instantaneous over current relay. 8. 3 Principle of IDMT relay.	05.04.2024 TO 16.04.2024	8.1 8.2 8.3	8. 1 Advantage of static relay. 8. 2 Instantaneous over current relay. 8. 3 Principle of IDMT relay.	05.04.2024 06.04.2024 08.04.2024 09.04.2024 10.04.2024 12.04.2024 13.04.2024 15.04.2024 16.04.2024	

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