



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060, BALASORE (ODISHA)
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



LESSON PLAN

SUBJECT: SWITCH GEAR & PROTECTIVE DEVICE(Th-2)

Name Of The Faculty :- Er.Biswajit Parida

Branch :- Electrical Engg.


Session :- 2024-25

Semester :- 6th

Examination :- 2025(S)

CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Introduction to switchgear	6	7
2	Fault calculation	10	10
3	Fuses	6	6
4	Circuit breakers	10	11
5	Protective relays	8	9
6	Protection of electrical power equipment and lines	6	7
7	Protection against over voltage and lighting	8	8
8	Static relay	6	6
9	Tutorial	15	15
Total periods		75	79



Sign of Faculty


Sign of H.O.D.

Discipline: EE	Semester: 6th	Name of the Teaching Faculty: Er.Biswajit Parida	
		SESSION : 2024-25	EXAMINATION : 2024 (S)
Week	Class Date	Theory / Practical Topics	
1 st	1 st	1.INTRODUCTION TO SWITCHGEAR 1.1 Essential Features of switchgear.	
	2 nd	1.2 Switchgear Equipment. 1.3 Bus-Bar Arrangement.	
	3 rd	1.4 Switchgear Accommodation.	
	4 th	1.5 Short Circuit.	
	5 th	Tutorial	
2 nd	1 st	1.6 Short circuit.	
	2 nd	1.7 Faults in a power system.	
	3 rd	1.7 Faults in a power system.	
	4 th	2.FAULT CALCULATION 2.1 Symmetrical faults on 3-phase system	
	5 th	Tutorial	
3 rd	1 st	2.2 Limitation of fault current.	
	2 nd	2.3 Percentage Reactance.	
	3 rd	2.4 Percentage Reactance and Base KVA.	
	4 th	2.5 Short – circuit KVA.	
	5 th	Tutorial	
4 th	1 st	2.6 Reactor control of short circuit currents.	
	2 nd	2.6 Reactor control of short circuit currents.	
	3 rd	2.7 Location of reactors	
	4 th	2.8 Steps for symmetrical Fault calculations.	
	5 th	Tutorial	
5 th	1 st	2.9 Solve numerical problems on symmetrical fault.	
	2 nd	3. FUSES 3.1 Desirable characteristics of fuse element.	
	3 rd	3.2 Fuse Element materials.	
	4 th	3.3 Types of Fuses and important terms used for fuses.	
	5 th	Tutorial	
6 th	1 st	3.4 Low and High voltage fuses.	
	2 nd	3.5 Current carrying capacity of fuse element.	
	3 rd	3.6 Difference Between a Fuse and Circuit Breaker.	
	4 th	4. CIRCUIT BREAKERS 4.1 Definition and principle of Circuit Breaker. 4.2 Arc phenomenon and principle of Arc Extinction.	
	5 th	Tutorial	

Week	Class Da	Theory / Practical Topics
7 th	1 st	4.3 Methods of Arc Extinction. 4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage.
	2 nd	4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification.
	3 rd	4.7 Plain brake oil circuit breaker.
	4 th	4.8 Arc control oil circuit breaker.
	5 th	Tutorial
8 th	1 st	4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker.
	2 nd	4.11 Air-Blast circuit breaker and its classification.
	3 rd	4.12 Sulphur Hexa-fluoride (SF ₆) circuit breaker.
	4 th	4.13 Vacuum circuit breakers.
	5 th	Tutorial
9 th	1 st	4.13 Vacuum circuit breakers. 4.14 Switchgear component. 4.15 Problems of circuit interruption
	2 nd	4.16 Resistance switching. 4.17 Circuit Breaker Rating.
	3 rd	5. PROTECTIVE RELAYS 5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay.
	4 th	5.3 Basic Relay operation a) Electromagnetic Attraction type b) Induction type 5.4 Definition of following important terms
	5 th	Tutorial
10 th	1 st	5.5 Definition of following important terms. a) Pick-up current. b) Current setting. c) Plug setting Multiplier. d) Time setting Multiplier.
	2 nd	5.6 Classification of functional relays
	3 rd	5.7 Induction type over current relay (Non-directional)
	4 th	5.8 Induction type directional power relay.
	5 th	Tutorial
11 th	1 st	5.9 Induction type directional over current relay.
	2 nd	5.10 Differential relay a) Current differential relay b) Voltage balance differential relay.
	3 rd	5.11 Types of protection
	4 th	6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES 6.1 Protection of alternator
	5 th	Tutorial

Week	Class Da	Theory / Practical Topics
12 th	1 st	6.2 Differential protection of alternators. 6.3 Balanced earth fault protection.
	2 nd	6.4 Protection systems for transformer. 6.5 Buchholz relay.
	3 rd	6.6 Protection of Bus bar. 6.7 Protection of Transmission line.
	4 th	6.8 Different pilot wire protection (Merz-price voltage Balance system)
	5 th	Tutorial
13 th	1 st	6.9 Explain protection of feeder by over current and earth fault relay.
	2 nd	6.9 Explain protection of feeder by over current and earth fault relay.
	3 rd	7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING 7.1 Voltage surge and causes of over voltage.
	4 th	7.2 Internal cause of over voltage. 7.3 External cause of over voltage (lighting)
	5 th	Tutorial
14 th	1 st	7.4 Mechanism of lightning discharge.
	2 nd	7.5 Types of lightning strokes.
	3 rd	7.6 Harmful effect of lightning.
	4 th	7.7 Lightning arresters.
	5 th	Tutorial
15 th	1 st	7.8 Type of lightning Arresters. a) Rod-gap lightning arrester. b) Horn-gap arrester. c) Valve type arrester.
	2 nd	7.9 Surge Absorber
	3 rd	8. STATIC RELAY 8.1 Advantage of static relay.
	4 th	8.2 Instantaneous over current relay.
	5 th	Tutorial
16	1 st	8.2 Instantaneous over current relay.
	2 nd	8.3 Principle of IDMT relay.
	3 rd	8.3 Principle of IDMT relay.
	4 th	8.3 Principle of IDMT relay.


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