

LESSON PLAN 6TH SEMESTER(2022-23)		
SUBJECT-Th2. SWITCH GEAR AND PROTECTIVE DEVICES		
NAME OF THE FACULTY- SAGARIKA MOHANTY		
MODULE/UNIT	COURSE TO BE COVERED	TOTAL NO. OFCLASS
UNIT-I	1 INTRODUCTION TO SWITCHGEAR	6
	1.1 Essential Features of switchgear.	1
	1.2 Switchgear Equipment.	1
	1.3 Bus-Bar Arrangement.	1
	1.4 Switchgear Accommodation.	1
	1.5 Short Circuit.	1
	1.6 Short circuit.	1
	1.7 Faults in a power system.	
UNIT-II	2. FAULT CALCULATION	10
	1.1 Symmetrical faults on 3-phasesystem.	
	1.2 Limitation of fault current.	1
	2.3 Percentage Reactance.	1
	2.4 Percentage Reactance and Base KVA.	1
	2.5 Short – circuit KVA.	
	2.6 Reactor control of short circuit currents.	2
	2.7 Location of reactors.	1
	2.8 Steps for symmetrical Faultcalculations.	2
	Solve numerical problems on symmetrical fault.	2
UNIT-III	3. FUSES	6
	3.1 Desirable characteristics of fuseelement.	1
	3.2 Fuse Element materials.	1
	3.3 Types of Fuses and important terms used for fuses.	1
	3.4 Low and High voltage fuses.	1
	3.5 Current carrying capacity of fuse element.	1
	3.6 Difference Between a Fuse and Circuit Breaker.	1
UNIT-IV	4. CIRCUIT BREAKERS	10
	4.1 Definition and principle ofCircuit Breaker.	
	4.2 Arc phenomenon and principle ofArc Extinction.	1

	4.3 Methods of Arc Extinction.	1
	4.4 Definitions of Arc voltage, Re- striking voltage and Recovery voltage.	1
	4.5 Classification of circuit Breakers.	1
	4.6 Oil circuit Breaker and itsclassification.	
	4.7 Plain brake oil circuit breaker.	
	4.8 Arc control oil circuit breaker.	1
	4.9 Low oil circuit breaker.	
	4.10 Maintenance of oil circuitbreaker.	1
	4.11 Air-Blast circuit breaker and itsclassification.	
	4.12 Sulphur Hexa-fluoride (SF6)circuit breaker.	1
	4.13 Vacuum circuit breakers.	1
	4.14 Switchgear component.	1
	4.15 Problems of circuit interruption.	
	4.16 Resistance switching.	1
	Circuit Breaker Rating.	
UNIT-V	5. PROTECTIVE RELAYS	8
	5.1 Definition of Protective Relay.	1
	5.2 Fundamental requirement ofprotective relay.	
	5.3 Basic Relay operation	
	5.3.1. Electromagnetic Attraction type	1
	5.3.2. Induction type	
	5.4 Definition of following importantterms	1
	5.5 Definition of following importantterms.	1
	5.5.1. Pick-up current.	

	5.5.2. Current setting.	1
	5.5.3. Plug setting Multiplier.	
	5.5.4. Time setting Multiplier.	
	5.6 Classification of functional relays	1
	5.7 Induction type over current relay(Non-directional)	
	5.8 Induction type directional powerrelay.	1
	5.9 Induction type directional overcurrent relay.	
	5.10 Differential relay	
	5.10.1. Current differential relay	1
	5.10.2. Voltage balance differentialrelay.	
	5.11Types of protection	
UNIT-VI	6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES	8
	6.1 Protection of alternator.	1
	6.2 Differential protection of alternators.	
	6.3 Balanced earth fault protection.	1
	6.4 Protection systems for transformer.	1
	6.5 Buchholz relay.	
	6.6 Protection of Bus bar.	1
	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.	
UNIT-VII	7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING	8
	7.1. Voltage surge and causes of overvoltage.	1

	7.2. Internal cause of over voltage.	1
	7.3. External cause of over voltage(lightning)	1
	7.4. Mechanism of lightningdischarge.	1
	7.5. Types of lightning strokes.	1
	7.6. Harmful effect of lightning.	1
	7.7. Lightning arresters and Type oflightning Arresters.	1
	7.7.1. Rod-gap lightning arrester.	1
	7.7.2. Horn-gap arrester.	
	7.7.3. Valve type arrester.	
	7.8. Surge Absorber	
UNIT-VIII	8. STATIC RELAY:	6
	8. 1 Advantage of static relay.	2
	8. 2 Instantaneous over currentrelay.	2
	8. 3 Principle of IDMT relay.	2