LESSION PLAN 6HSEMESTER(2021-22)			
SUBJECT-Th2. SWITCH GEAR AND PROTECTIVE DEVICES			
NAME OF THE FACULTY- HARIHARA PARIDA			
MONTH	MODULE/UNIT	COURSE TO BE COVERED	TOTAL NO. OFCLASS
MARCH	**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.	
MARCH	UNIT-II	**2. FAULT CALCULATION**	10
		1.1 Symmetrical faults on 3-phase system.	
		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 Fault calculations.	2
		Solve numerical problems on symmetrical fault.	2
APRIL	UNIT-III	**3. FUSES**	6
		3.1 Desirable characteristics of fuse element.	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
APRIL	UNIT-IV	**4. CIRCUIT BREAKERS**	10
		4.1 Definition and principle of Circuit Breaker.	
		4.2 Arc phenomenon and principle of Arc 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 its classification.	
		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 circuit breaker.	1
		4.11 Air-Blast circuit breaker and its classification.	
		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.	
MAY	UNIT-V	**5. PROTECTIVE RELAYS**	8
		5.1 Definition of Protective Relay.	1
		5.2 Fundamental requirement of protective relay.	
		5.3 Basic Relay operation	
		5.3.1. Electromagnetic Attraction type	1
		5.3.2. Induction type	
		5.4 Definition of following important terms	1
		5.5 Definition of following important terms.	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 power relay.	1
		5.9 Induction type directional over current relay.	
		5.10 Differential relay	
		5.10.1. Current differential relay	1
		5.10.2. Voltage balance differential relay.	
		5.11Types of protection	
MAY	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.	
JUNE	UNIT-VII	**7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING**	8
		7.1. Voltage surge and causes of over voltage.	1

		7.2. Internal cause of over voltage.	1
		7.3. External cause of over voltage (lighting)	1
		7.4. Mechanism of lightning discharge.	1
		7.5. Types of lightning strokes.	1
		7.6. Harmful effect of lightning.	1
		7.7. Lightning arresters and Type of lightning 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	
JUNE	UNIT-VIII	**8. STATIC RELAY:**	6
		8. 1 Advantage of static relay.	2
		8. 2 Instantaneous over current relay.	2
		8. 3 Principle of IDMT relay.	2