LESSON PLAN FOR 6TH SEM ELECTRICAL ENGINEERING .

Discipline **Electrical Engg.**	Semester:- **6th**	Name of the Teaching Faculty:- RUPAK KUMAR SAHOO
Subject:- **SWITCH GEAR AND PROTECTIVE DEVICES**	No of Days/per Week Class Allotted :- **4+ 1{Tutorial)**	Semester From:- **15th Apr, 2021** To:- **30h Jun, 2021** No of Weeks:- **15**
Week	**Class Day**	**Theory/ Practical Topics**
1st	1st	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	Tutorial
2nd	1st	1.5 Short Circuit.
	2nd	1.6 Faults in a power system.
	3rd	FAULT CALCULATION 2.1 Symmetrical faults on 3-phase system.
	4th	2.2 Limitation of fault current.
	5th	Tutorial
3rd	1st	2.3 Percentage Reactance.
	2nd	2.4 Percentage Reactance and Base KVA.
	3rd	2.5 Short – circuit KVA
	4th	2.6 Reactor control of short circuit currents.
	5th	Tutorial
4th	1st	2.7 Location of reactors.
	2nd	2.8 Steps for symmetrical Fault calculations.
	3rd	2.9 Solve numerical problems on symmetrical fault.
	4th	2.9 Solve numerical problems on symmetrical fault.
	5th	Tutorial
5th	1st	FUSES 3.1 Desirable characteristics of fuse element.
	2nd	3.2 Fuse Element materials.
	3rd	3.3 Types of Fuses and important terms used for fuses.
	4th	3.4 Low and High voltage fuses. 3.5 Current carrying capacity of fuse element.
	5th	Tutorial
6th	1st	3.6 Difference Between a Fuse and Circuit Breaker.
	2nd	CIRCUIT BREAKERS 4.1 Definition and principle of Circuit Breaker.
	3rd	4.2 Arc phenomenon and principle of Arc Extinction. 4.3 Methods of Arc Extinction.
	4th	4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage. 4.5 Classification of circuit Breakers.
	5th	Tutorial
7th	1st	4.6 Oil circuit Breaker and its classification. 4.7 Plain brake oil circuit breaker.
	2nd	4.8 Arc control oil circuit breaker.
	3rd	4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker.
	4th	4.11 Air-Blast circuit breaker and its classification. 4.12 Sulphur Hexa-fluoride (SF6) circuit breaker.
	5st	Tutorial
8th	1st	4.13 Vacuum circuit breakers. 4.14 Switchgear component.
	2nd	4.15 Problems of circuit interruption.
	3rd	4.16 Resistance switching. 4.17 Circuit Breaker Rating.
	4th	Tutorial
	5st	PROTECTIVE RELAYS 5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay.
9th	1st	5.3 Basic Relay operation a) Electromagnetic Attraction type b) Induction type
	2nd	5.4 Definition of following important terms
	3rd	5.5 Definition of following important terms.

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		a) Pick-up current. b) Current setting. c) Plug setting Multiplier. d) Time setting Multiplier.
	4th	5.6 Classification of functional relays
	5st	Tutorial
10th	1st	5.7 Induction type over current relay (Non-directional)
	2nd	5.8 Induction type directional power relay..
	3rd	5.9 Induction type directional over current relay
	4th	5.10 Differential relay a) Current differential relay b) Voltage balance differential relay
	5st	Tutorial
11th	1st	5.11 Types of protection
	2nd	6.1 Protection of alternator. 6.2 Differential protection of alternators.
	3rd	6.3 Balanced earth fault protection.
	4th	6.4 Protection systems for transformer
	5st	Tutorial
12th	1st	6.5 Buchholz relay
	2nd	6.6 Protection of Bus bar. 6.7 Protection of Transmission line.
	3rd	6.8 Different pilot wire protection (Merz-price voltage Balance system) 6.9 Explain protection of feeder by over current and earth fault relay.
	4th	Tutorial
	5st	7.1 Voltage surge and causes of over voltage. 7.2 Internal cause of over voltage.
13th	1st	7.3 External cause of over voltage (lighting)
	2nd	7.4 Mechanism of lightning discharge.
	3rd	7.5 Types of lightning strokes. 7.6 Harmful effect of lightning.
	4th	7.7 Lightning arresters.
	5st	Tutorial
14th	1st	7.8 Type of lightning Arresters. a) Rod-gap lightning arrester. b) Horn-gap arrester. c) Valve type arrester.
	2nd	7.9 Surge Absorber
	3rd	STATIC RELAY
	4th	8.1 Advantage of static relay.
	5st	Tutorial
15th	1st	8.2.1 Instantaneous over current relay.
	2nd	8.2.2 Instantaneous over current relay.
	3rd	8.3.1 Principle of IDMT relay.
	4th	8.3.2 Principle of IDMT relay.
	5st	Tutorial

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