ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline: Electrical Engineerin g		
5		
	No. of days/per	Semester From: 16 th January2024 to 26 th April 2024
Subject:TH -2	week class allotted: 4p/week	No. of weeks:15 weeks
(SWITCH GEAR AND PROTECTI VE	Tutorial:1p/week	
DEVICE)	Class Day	Theory Topics
Week	-	Theory Topics
	1^{st}	1. INTRODUCTION TO SWITCHGEAR
		1.1 Essential Features of switchgear.
1^{st}	- nd	1.2 Switchgear Equipment.
1	2^{nd}	1.3 Bus-Bar Arrangement.
	3 rd	1.4 Switchgear Accommodation.
	4 th	1.5 Short Circuit.
	5 th	Tutorial Period
	1 st	1.6 Short circuit
	2^{nd}	1.7 Faults in a power system
2^{nd}	3^{rd}	2. FAULT CALCULATION
		2.1 Symmetrical faults on 3-phase system.(Contd.)
	4^{th}	2.1 Symmetrical faults on 3-phase system.
	5^{th}	2.2 Limitation of fault current.
	1^{st}	Tutorial Period
hu	2^{na}	2.3 Percentage Reactance.
3^{rd}	ord	2.4 Percentage Reactance and Base KVA.(Contd.)
_	3^{rd}	2.4 Percentage Reactance and Base KVA.
_	4 th	2.5 Short – circuit KVA
	$\frac{5^{\text{th}}}{1^{\text{st}}}$	Tutorial Period
-	2 nd	2.6 Reactor control of short circuit currents.
4 th	$\frac{2}{3^{rd}}$	2.7 Location of reactors.
4 th	3	2.8 Steps for symmetrical Fault calculations.
-	4 th	2.9 Solve numerical problems on symmetrical fault.(Contd.)
-	4 5 th	2.9 Solve numerical problems on symmetrical fault. Tutorial Period
	1 st	
	1	3. FUSES 3.1 Desirable characteristics of fuse element.
		3.2 Fuse Element materials.
5^{th}	2^{na}	3.3 Types of Fuses and important terms used for fuses.
-	3 ^{ra}	3.4 Low and High voltage fuses.(Contd.)
-	4 th	
-	•	3.4 Low and High voltage fuses.
	5^{th}	Tutorial Period
F	2 nd	3.5 Current carrying capacity of fuse element.
6 th	$\frac{2}{3^{rd}}$	3.6 Difference Between a Fuse and Circuit Breaker.
	3	4. CIRCUIT BREAKERS
	4 th	4.1 Definition and principle of Circuit Breaker.
	4	4.2 Arc phenomenon and principle of Arc Extinction.
		4.3 Methods of Arc Extinction.
	5^{th}	4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage. Tutorial Period

1 1 Construction Breaker and its classification. 4 0 1 Control of Circuit breaker. 3 4 9 Low oil circuit breaker. 4 4 10 Maintenance of al circuit breaker. 4 th 4 11 Air-Blast circuit breaker. 4 th 4 11 Air-Blast circuit breaker. 4 th 4 12 Suphur Hexa-fluorid (SF6) circuit breaker. 2 th 4 13 Vacuum circuit breakers. 4 th 4 15 Problems of circuit interruption 4 th 4 16 Resistance switching. 4 th 17 S. PROFECTIVE RELAYS 5 10 th S. Basic Relay operation 4 th 5.3 Bioteromagnetic Attraction type 5 1 th 5.4 Definition of following important terms 5 5.1 Proceating Multiplier. 5.5 2.5 10 th 3 th 5.5 Curent string Multiplier. 5.7 Mutorin type directional power relay.		. 91	
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$11^{16} \qquad \begin{array}{ c c c } \hline 1^{16} & \hline S. PROTECTIVE RELAYS \\ \hline 5.1 Definition of Protective Relay. \\ \hline 5.2 Fundamental requirement of protective relay. \\ \hline 3^{170} & \hline 5.3 Basic Relay operation \\ \hline 4^{16} & \hline 5.3.1 Electromagnetic Attraction type \\ \hline 5.3.2 Induction type \\ \hline 5^{116} & Tutorial Period \\ \hline 1^{181} & \hline 5.4 Definition of following important terms \\ \hline 5.5 Definition of pole verent. \\ \hline 5.5 Definition of pole verent. \\ \hline 5.5 Definition of pole verent relay (Non-directional) \\ \hline 10^{16} & \hline 10^{16$		5 th	
$9^{th} = \frac{5.1 \text{ Definition of Protective Relay.}}{5.2 \text{ Fundamental requirement of protective relay.}}{5.3 \text{ Basic Relay operation}} \\ \frac{3^{rd}}{4^{tn}} = \frac{5.3 \text{ Basic Relay operation}}{5.3.1 \text{ Electromagnetic Attraction type}} \\ \frac{5^{th}}{5.3.2 \text{ Induction type}} \\ \frac{5^{th}}{5.3.2 \text{ Induction type}} \\ \frac{5^{th}}{5.5.2 \text{ Current Priod}} \\ \frac{2^{rd}}{5.5.2 \text{ Current setting.}} \\ \frac{2^{rd}}{5.5.2 \text{ Current setting.}} \\ \frac{5.5.3 \text{ Plug setting Multiplier.}}{5.5.3 \text{ Plug setting Multiplier.}} \\ \frac{5.5.4 \text{ Time setting Multiplier.}}{5.5.4 \text{ Time setting Multiplier.}} \\ \frac{4^{th}}{5.5.3 \text{ Plug setting fultiplier.}} \\ \frac{4^{th}}{5.7 \text{ Induction type over current relay (Non-directional)} \\ \frac{1^{th}}{5.8 \text{ Induction type over current relay (Non-directional)} \\ \frac{1^{th}}{5.8 \text{ Induction type directional power relay.}} \\ \frac{2^{100}}{5.9 \text{ Induction type directional over current relay.} \\ \frac{2^{100}}{5.9 \text{ Induction type directional over current relay.} \\ \frac{1^{th}}{5.10 \text{ Differential relay}} \\ \frac{1^{th}}{5.10 2 \text{ Voltage balance differential relay}} \\ \frac{4^{th}}{5.10 2 \text{ Voltage balance differential relay}} \\ \frac{1^{th}}{6.4 \text{ Protection of alternator.}} \\ \frac{1^{th}}{6.3 \text{ Balanced earth fault protection.} \\ \frac{1^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{6.7 \text{ Protection of Bus bar.}}{6.7 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.7 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{6.7 \text{ Protection of Bus bar.}}{6.7 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{6.4 \text{ Protection of Bus bar.}} \\ \frac{5^{th}}{7.1 \text{ Voltage surge and causes of over voltage.} \\ \frac{1^{th}}{7.4 \text{ Voltage surge and causes of over voltage.} \\ \frac{1^{th}}{7.4 Mechanism$		1^{st}	
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$10^{ab} = \frac{5.5 \text{ Definition of following important terms}}{5.5 \text{ Definition of following important terms}} = \frac{2^{aa}}{5.5.1 \text{ Pick-up current.}} = \frac{2^{aa}}{5.5.2 \text{ Current setting.}} = \frac{2^{ab}}{5.5.3 \text{ Pigs setting Multiplier.}} = \frac{3^{ab}}{5.5.3 \text{ Pigs setting Multiplier.}} = \frac{5.5.3 \text{ Pigs setting Multiplier.}}{5.5.4 \text{ Time setting Multiplier.}} = \frac{4^{ab}}{5.6 \text{ Classification of functional relays}} = \frac{4^{ab}}{5.7 \text{ Induction type over current relay (Non-directional)}} = \frac{1^{ab}}{5.8 \text{ Induction type over current relay.}} = \frac{1^{ab}}{5.8 \text{ Induction type over current relay.}} = \frac{1^{ab}}{5.9 \text{ Induction type directional over current relay.}} = \frac{2^{aa}}{5.9 \text{ Induction type directional over current relay.}} = \frac{1^{ab}}{5.10 \text{ Differential relay}} = 5.10.2 \text{ Voltage balance differential relay}} = 5.10.2 \text{ Voltage balance differential relay}} = 5.10.2 \text{ Voltage balance differential relay}} = \frac{1^{ab}}{5.10.2 \text{ Voltage balance differential relay}} = \frac{1^{ab}}{5.10 \text{ Differential Protoction}} = \frac{1^{ab}}{5^{ab}} = \frac{5.3 \text{ Balanced earth fault protection a fatemator.}}{5.10 \text{ Differential protection of alternators.}} = \frac{6.3 \text{ Palanced earth fault protection}}{6.4 \text{ Protection of Bus bar.}} = \frac{6.5 \text{ Buchholz relay.}}{6.7 \text{ Protection of Bus bar.}} = \frac{5^{ab}}{6.7 \text{ Protection of Transmission line.}} = \frac{5^{ab}}{7 \text{ Tutorial Period}} = \frac{1^{ab}}{6.8 \text{ Explain protection of Galers by over current and earth fault relay.}} = \frac{1^{ab}}{6.9 \text{ Explain protection of Galers by over current and earth fault relay.}} = \frac{3^{aa}}{6.9 \text{ Explain protection of Galers by over current and earth fault relay.}} = \frac{7^{ab}}{7 \text{ A PROTECTION AGAINST OVER VOLTAGE AND LIGHTING}} = \frac{1^{ab}}{7 \text{ A Mechanism of lightning discharge.} (Contd.)} = \frac{4^{ab}}{7.4 \text{ Mechanism of lightning discharge.} (Contd.)} = \frac{5^{ab}}{7 \text{ Tutorial Period}} = \frac{5^{ab}}{7 A Mechanism$		-	
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2 nd 7.5 Types of lightning strokes.		2^{nd}	7.5 Types of lightning strokes.

	3 ^{ra}	7.6 Harmful effect of lightning.
		7.7 Lightning arresters and Type of lightning Arresters.
	4^{tn}	7.7.1 Rod-gap lightning arrester
		7.7.2 Horn-gap arrester
	5^{th}	Tutorial Period
	1^{st}	7.7.3 Valve type arrester.
	2^{na}	7.8 Surge Absorber
15 th	3 rd	8. STATIC RELAY
(Extra Class)		8.1 Advantage of static relay.(Contd.)
	4^{th}	8.1 Advantage of static relay.
	5^{th}	Tutorial Period
	1^{st}	8.2 Instantaneous over current relay.(Contd.)
16^{th}	2^{nd}	8.2 Instantaneous over current relay.
(Extra	3^{rd}	8.3 Principle of IDMT relay.(Contd.)
Class)	4^{th}	8.3 Principle of IDMT relay.
	5^{th}	Tutorial Period



Signature of Teaching Facult