

LESSON PLAN

DEPARTMENT OF ELECTRICAL ENGINEERING, ITT, CHOUDWAR

SUBJECT: Switch gear & protective devices

Periods: 4+1 per week

SEMESTER: 6TH

NAME OF FACULTY: MONALISA SWAIN

No. of weeks: 15

Week	Period	Theory / Practical Topics
1st	1 st	INTRODUCTION TO SWITCHGEAR- Essential Features of switchgear
	2 nd	Switchgear Equipment.
	3 rd	Bus-Bar Arrangement
	4 th	Switchgear Accommodation.
	5 th	Tutorial
2 nd	1 st	Short Circuit.
	2 nd	Faults in a power system
	3 rd	FAULT CALCULATION- Symmetrical faults on 3-phase system
	4 th	Limitation of fault current.
	5 th	Tutorial
3 rd	1 st	Percentage Reactance and Base KVA
	2 nd	Short – circuit KVA., Reactor control of short circuit currents.
	3 rd	Location of reactors
	4 th	Steps for symmetrical Fault calculations.
	5 th	Tutorial
4 th	1 st	Solve numerical problems on symmetrical fault.
	2 nd	Solve numerical problems on symmetrical fault.
	3 rd	Solve numerical problems on symmetrical fault.
	4 th	FUSES- Desirable characteristics of fuse element
	5 th	Tutorial
5 th	1 st	Fuse Element materials.
	2 nd	Types of Fuses and important terms used for fuses
	3 rd	Low and High voltage fuses
	4 th	Current carrying capacity of fuse element
	5 th	Tutorial
6 th	1 st	Difference Between a Fuse and Circuit Breaker
	2 nd	CIRCUIT BREAKERS- Definition and principle of Circuit Breaker
	3 rd	Arc phenomenon and principle of Arc Extinction
	4 th	Methods of Arc Extinction.
	5 th	Tutorial
7 th	1 st	Definitions of Arc voltage, Re-striking voltage and Recovery voltage.
	2 nd	Oil circuit Breaker and its classification.
	3 rd	Plain brake oil circuit breaker., Arc control oil circuit breaker
	4 th	Low oil circuit breaker, Maintenance of oil circuit breaker
	5 th	Tutorial
8 th	1 st	Air-Blast circuit breaker and its classification
	2 nd	Sulphur Hexa-fluoride (SF6) circuit breaker
	3 rd	Vacuum circuit breakers
	4 th	Switchgear component
	5 th	Tutorial
9 th	1 st	Problems of circuit interruption

	2 nd	Resistance switching.
	3 rd	Circuit Breaker Rating
	4 th	PROTECTIVE RELAYS- Definition of Protective Relay
	5 th	Tutorial
10 th	1 st	Fundamental requirement of protective relay.
	2 nd	basic Relay operation, Electromagnetic Attraction type, Induction type
	3 rd	Pick-up current, Current setting, Plug setting Multiplier, Time setting Multiplier
	4 th	Classification of functional relays
	5 th	Tutorial
11 th	1 st	Induction type over current relay (Non-directional)
	2 nd	Induction type directional power relay
	3 rd	Induction type directional over current relay
	4 th	Current differential relay, Voltage balance differential relay
	5 th	Tutorial
12 th	1 st	Types of protection
	2 nd	PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES- Protection of alternator.
	3 rd	Differential protection of alternators, Balanced earth fault protection.
	4 th	Protection systems for transformer, Buchholz relay
	5 th	Tutorial
13 th	1 st	Protection of Bus bar. Protection of Transmission line.
	2 nd	Different pilot wire protection (Merz-price voltage Balance system)
	3 rd	Explain protection of feeder by over current and earth fault relay
	4 th	PROTECTION AGAINST OVER VOLTAGE AND LIGHTING- Voltage surge and causes of over voltage
	5 th	Tutorial
14 th	1 st	Internal cause of over voltage, External cause of over voltage (lighting)
	2 nd	Mechanism of lightning discharge.
	3 rd	Types of lightning strokes, Harmful effect of lightning
	4 th	Lightning arresters, Rod-gap lightning arrester.
	5 th	Tutorial
15 th	1 st	Horn-gap arrester, Valve type arrester
	2 nd	Surge Absorber
	3 rd	STATIC RELAY- Advantage of static relay, Instantaneous over current relay
	4 th	Principle of IDMT relay
	5 th	Tutorial