# Orissa School of Mining EngineeringKeonjhar

## Department of Electrical Engineering

## Lesson Plan

| Subject : SWITCH GEAR AND PROTECTION DEVICES | | | |
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| Discipline: Electrical Engineering | | Name of the Faculty: DEBENDU PUHAN | |
| Course Code: | TH-2 | Semester:6TH | |
| Total Periods: | 75 | Examination: | 2024 SUMMER |
| Theory Periods: | 5P/W | Class Test: | 20 |
| Maximum Marks: | 100 | End Semester Examination: | 80 |

| WEEK | CALSS DAY | THEORY TOPICS |
|---|---|---|
| 1ST | 1ST 16/01/24 | 1.1 Essential Features of switchgear |
| | | 1.2 Switchgear Equipment |
| | 2ND 17/01/24 | 1.3 Bus-Bar Arrangement |
| | | 1.4 Switchgear Accommodation |
| | 3RD 18/01/24 | 1.5 Short Circuit. |
| | | 1.6 Faults in a power system |
| | 4TH 20/01/24 | 2.1 Symmetrical faults on 3-phase system |
| 2ND | 1ST 22/01/24 | 2.2 Limitation of fault current |
| | | 2.3 Percentage Reactance |
| | 2ND 24/01/24 | 2.4 Percentage Reactance and Base KVA |
| | 3RD 25/01/24 | 2.5 Short – circuit KVA |
| | | 2.6 Reactor control of short circuit currents |
| 3RD | 1ST 29/01/24 | 2.7 Location of reactors. |
| | 2ND 30/01/24 | 2.8 Steps for symmetrical Fault calculations |
| | 3RD 31/01/24 | 2.9 Solve numerical problems on symmetrical fault |
| | 1ST 01/02/24 | Desirable characteristics of fuse element.<br>Fuse Element materials |
| | 2ND 03/02/24 | Types of Fuses and important terms used for fuses.<br>Low and High voltage fuses |
| 4TH | 1ST 05/02/24 | Current carrying capacity of fuse element.<br>Difference Between a Fuse and Circuit Breaker |
| | 2ND 06/02/24 | CUIT BREAKERS 4.1 Definition and principle of Circuit Breaker.<br>Arc phenomenon and principle of Arc Extinction.<br>Methods of Arc Extinction. |
| | 3RD 07/02/24 | Definitions of Arc voltage, Re-striking voltage and Recovery voltage.<br>Classification of circuit Breakers.<br>Oil circuit Breaker and its classification |

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| | 08/02/24 | Arc control oil circuit breaker |
| | 5TH 10/02/24 | Low oil circuit breaker.<br>Maintenance of oil circuit breaker |
| 5TH | 1ST 12/02/24 | 4.11 Air-Blast circuit breaker and its classification |
| | 2ND 13/02/24 | 4.12 Sulphur Hexa-fluoride (SF6) circuit breaker |
| | 3RD 15/02/24 | 4.13 Vacuum circuit breakers. |
| | 4TH 17/02/24 | 4.14 Switchgear component.<br>4.15 Problems of circuit interruption |
| 6TH | 1ST 19/02/24 | 4.16 Resistance switching |
| | 2ND 20/02/24 | 4.17 Circuit Breaker Rating |
| | 3RD 21/02/24 | Definition of Protective Relay.<br>Fundamental requirement of protective relay |
| | 4TH 22/02/24 | Basic Relay operation<br>5.3.1. Electromagnetic Attraction type |
| | 5TH 24/02/24 | 5.3.2. Induction type |
| 7TH | 1ST 26/02/24 | 5.4 Definition of following important terms<br>5.5.1. Pick-up current. |
| | 2ND 27/02/24 | CLASS TEST 01 |
| | 3RD 28/02/24 | 5.5.2. Current setting |
| | | 5.5.3. Plug setting Multiplier |
| | | 5.5.4. Time setting Multiplier |
| | 4TH 29/02/24 | 5.6 Classification of functional relays |
| | | 5.7 Induction type over current relay (Non-directional) |
| | 5TH 02/03/24 | 5.8 Induction type directional power relay |
| 8TH | 1ST 04/03/24 | 5.9 Induction type directional over current relay |
| | | Differential relay<br>Current differential relay |
| | 2ND 06/03/24 | 5.10.2. Voltage balance differential relay |
| | 3RD 07/03/24 | 5.11 Types of protection |
| | 4TH 09/03/24 | PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES 6.1 Protection of alternator. |
| 9TH | 1ST 11/03/24 | 6.2 Differential protection of alternators |
| | | 6.3 Balanced earth fault protection. |
| | 2ND 12/03/24 | 6.4 Protection systems for transformer |
| | | 6.5 Buchholz relay. |
| | 3RD 13/03/24 | 6.6 Protection of Bus bar |
| | | 6.7 Protection of Transmission line |
| | 4TH 14/03/24 | 6.8 Different pilot wire protection (Merz-price voltage Balance system |
| | 5TH 16/03/24 | 6.9 Explain protection of feeder by over current and earth fault relay |

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| | 18/03/24 | |
| | 2ND 19/03/24 | 7.2. Internal cause of over voltage. |
| | 3RD 20/03/24 | 7.3. External cause of over voltage (lighting) |
| | | 7.4. Mechanism of lightning discharge. |
| | 4TH 21/03/24 | 7.5. Types of lightning strokes |
| | 5TH 23/03/24 | 7.6. Harmful effect of lightning. |
| 11TH | 1ST 27/03/24 | 7.7. Lightning arresters and Type of lightning Arresters. |
| | 2ND 28/03/24 | 7.7.1. Rod-gap lightning arrester |
| | 3RD 30/03/24 | 7.7.2. Horn-gap arrester. |
| | | 7.7.3. Valve type arrester. |
| 12TH | 1ST 02/04/24 | INTERNAL ASSESSMENT |
| | 2ND 03/04/24 | 7.8. Surge Absorber |
| | 3RD 04/04/24 | STATIC RELAY |
| | | 8. 1 Advantage of static relay. |
| | 4TH 06/04/24 | 8. 2 Instantaneous over current relay. |
| 13TH | 1ST 08/04/24 | 8. 3 Principle of IDMT relay. |
| | 2ND 09/04/24 | CLASS TEST 02 |
| | 3RD 10/04/24 | Revision class related numerical problem |
| | 4TH 13/04/24 | Revision class |
| 14TH | 1ST 15/04/24 | Doubt clearing classes |
| | 2ND 16/04/24 | Doubt clearing classes |
| | 3RD 18/04/24 | Doubt clearing classes |
| | 4TH 20/04/24 | Previous year question practice |
| 15TH | 1ST 22/04/24 | Previous year question practice |
| | 2ND 23/04/24 | Previous year question practice |
| | 3RD 24/04/24 | VST |

Debendu Puhan.

DEBENDU PUHAN
PTGF
ELECTRICAL DEPT
OSME KEONJHAR

14/1/24

HOD ELECTRICAL DEPTT
OSME KEONJHAR

HOD (Electrical)
Orissa School of Mining Engg.
Keonjhar

29.1.24

PRINCIPAL OSME
KEONJHAR