GIET
In Pursuit of Innovation

# GIETPOLYTECHNIC,JAGATPUR,CUTTACK

## LESSONPLAN

| Discipline: Electrical . | Semester:6th | Name of theTeaching Faculty:-Pratik Mohanty |
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| Subject: Switch Gear And Protective Devices (TH-2) | No. Of Days Per Week ClassAllotted: 05P(4P+1T) Lecture:05 | Semester From Date:22.12.2025 ToDate:18.04.2026<br>No.ofweeks:15 |
| **Week** | **ClassDay** | **Theory** |
| 1st | 1st | **iNTRODUCTION TO SWITCHGEAR**<br>1.1 Essential Features of switchgear.<br>1.2 Switchgear Equipment. |
| | 2nd | 1.3 Bus-Bar Arrangement |
| | 3rd | 1.4 Switchgear Accommodation. |
| | 4th | 1.5 Short Circuit. |
| | 5th | 1.6 Short circuit |
| 2nd | 1st | 1.7 Faults in a power system |
| | 2nd | **FAULT CALCULATION**<br>2.1 Symmetrical faults on 3-phase system. |
| | 3rd | 2.2 Limitation of fault current |
| | 4th | 2.3 Percentage Reactance. |
| | 5th | 2.4 Percentage Reactance and Base KVA. |
| 3rd | 1st | 2.5 Short – circuit KVA. |
| | 2nd | 2.6 Reactor control of short circuit currents. |
| | 3rd | 2.7 Location of reactors. |
| | 4th | 2.8 Steps for symmetrical Fault calculations. |
| | 5th | 2.9 Solve numerical problems on symmetrical fault |
| 4th | 1st | 2.9 Solve numerical problems on symmetrical fault |
| | 2nd | **FUSES**<br>3.1 Desirable characteristics of fuse element. |
| | 3rd | 3.2 Fuse Element materials. |
| | 4th | 3.3 Types of Fuses and important terms used for fuses. |
| | 5th | 3.4 Low and High voltage fuses. |
| 5th | 1st | 3.5 Current carrying capacity of fuse element. |
| | 2nd | 3.6 Difference Between a Fuse and Circuit Breaker |
| | 3rd | **CIRCUIT BREAKERS**<br>4.1 Definition and principle of Circuit Breaker. |
| | 4th | 4.2 Arc phenomenon and principle of Arc Extinction.<br>4.3 Methods of Arc Extinction. |
| | 5th | 4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage.<br>4.5 Classification of circuit Breakers. |

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| 6th | 1st | 4.6 Oil circuit Breaker and its classification. |
| | 2nd | 4.7 Plain brake oil circuit breaker |
| | 3rd | 4.8 Arc control oil circuit breaker |
| | 4th | 4.9 Low oil circuit breaker |
| | 5th | 4.10 Maintenance of oil circuit breaker<br>4.11 Air-Blast circuit breaker and its classification |
| 7th | 1st | 4.12 Sulphur Hexa-fluoride (SF6) circuit breaker. |
| | 2nd | 4.13 Vacuum circuit breakers. |
| | 3rd | 4.14 Switchgear component. |
| | 4th | 4.15 Problems of circuit interruption. |
| | 5th | 4.16 Resistance switching. |
| 8th | 1st | 4.17 Circuit Breaker Rating. |
| | 2nd | **PROTECTIVE RELAYS**<br>5.1 Definition of Protective Relay.<br>5.2 Fundamental requirement of protective relay. |
| | 3rd | 5.3 Basic Relay operation<br>5.3.1. Electromagnetic Attraction type<br>5.3.2. Induction type |
| | 4th | 5.4 Definition of following important terms<br>5.5 Definition of following important terms. |
| | 5th | 5.5.1. Pick-up current.<br>5.5.2. Current setting.<br>5.5.3. Plug setting Multiplier. 5.5.4. Time setting Multiplier |
| 9th | 1st | 5.6 Classification of functional relays<br>5.7 Induction type over current relay (Non-directional |
| | 2nd | 5.8 Induction type directional power relay.<br>5.9 Induction type directional over current relay |
| | 3rd | 5.10 Differential relay<br>5.10.1. Current differential relay<br>5.10.2. Voltage balance differential relay. |
| | 4th | 5.11 Types of protection |
| | 5th | **PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES**<br>6.1 Protection of alternator. |
| 10th | 1st | 6.2 Differential protection of alternators. |
| | 2nd | 6.3 Balanced earth fault protection.<br>6.4 Protection systems for transformer. |
| | 3rd | 6.4 Protection systems for transformer. |
| | 4th | 6.5 Buchholz relay. |
| | 5th | 6.6 Protection of Bus bar.<br>6.7 Protection of Transmission line. |
| 11th | 1st | 6.8 Different pilot wire protection (Merz-price voltage Balance system |
| | 2nd | 6.9 Explain protection of feeder by over current and earth fault relay |

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| 3rd | **PROTECTION AGAINST OVER VOLTAGE AND LIGHTING**<br>7.1. Voltage surge and causes of over voltage.<br>7.2. Internal cause of over voltage.<br>7.3. External cause of over voltage (lighting)<br>7.4. Mechanism of lightning discharge. |
| 4th | 7.2. Internal cause of over voltage |
| 5th | 7.3. External cause of over voltage (lighting) |

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| 12th | 1st | 7.4. Mechanism of lightning discharge. |
| | 2nd | 7.5. Types of lightning strokes. |
| | 3rd | 7.6. Harmful effect of lightning. |
| | 4th | 7.7. Lightning arresters and Type of lightning Arresters. |
| | 5th | 7.7.1. Rod-gap lightning arrester. |
| 13th | 1st | 7.7.3. Valve type arrester. |
| | 2nd | 7.7.2. Horn-gap arrester. |
| | 3rd | 7.8. Surge Absorber |
| | 4th | STATIC RELAY:<br>8. 1 Advantage of static relay.<br>8. 3 Principle of IDMT relay |
| | 5th | 8. 1 Advantage of static relay |
| 14th | 1st | 8. 1 Advantage of static relay |
| | 2nd | 8. 2 Instantaneous over current relay. |
| | 3rd | 8. 2 Instantaneous over current relay. |
| | 4th | 8. 3 Principle of IDMT relay |
| | 5th | 8. 3 Principle of IDMT relay |
| 15th | 1st | Revision and discussion |
| | 2nd | Revision and discussion |
| | 3rd | Revision and discussion |
| | 4th | Question paper discussion |
| | 5th | Question paper discussion |

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