**LESSON PLAN**

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| **Discipline:** Elect. Engg. | **Semester:** Sixth(6th) | **Name of the Faculty:** Er P K Sahu |
| **Subject:** Switch Gear & Protective Devices | **No. of days per Week class allotted: S**even (07) | **Semester from Date:16.01.2024** **to Date: 26.04.2024****No. of Weeks:** 15 |
| **WEEK** | **CLASS DAY** | **THEORY TOPICS** |
| 1st | 1st | Ch-01**- INTRODUCTION TO SWITCH GEAR**: Introduction |
| 2nd | Essential Features of switchgear |
| 3rd | Switchgear Equipment.Bus-Bar Arrangement. |
| 4th | Bus-Bar Arrangement. |
| 5th | Switchgear Accommodation. |
| 6th | Short Circuit |
| 7th  | Faults in a power system. |
| 2nd | 1st | **Possible question answer discussion**  |
| 2nd | Ch-02**- FAULT CALCULATION**: Symmetrical faults on 3-phase system.Limitation of fault current. |
| 3rd | Percentage Reactance.Percentage Reactance and Base KVA. |
| 4th | Short – circuit  |
| 5th | Reactor control of short circuit currents |
| 6th | Location of reactors. |
| 7th  | Steps for symmetrical Fault calculations. |
| 3rd | 1st | Solve numerical problems on symmetrical fault. |
| 2nd | Problem 1 |
| 3rd | Problem2 |
| 4th | Problem3 |
| 5th | Problem4 |
| 6th | Problem5 |
| 7th  | **Possible question answer discussion** |
| 4th | 1st | **Monthly test-01** |
| 2nd | Ch-03**- FUSES:** Desirable characteristics of fuse element.Fuse Element materials. |
| 3rd | Types of Fuses and important terms used for fuses |
| 4th | Low voltage fuses. |
| 5th | High voltage fuses  |
| 6th | Current carrying capacity of fuse element. |
| 7th  | Difference Between a Fuse and Circuit Breaker |
| 5th | 1st | **Possible question answer discussion** |
| 2nd | Ch-04**- CIRCUIT BREAKER:** Definition and principle of Circuit Breaker. |
| 3rd | Arc phenomenon and principle of Arc Extinction.Methods of Arc Extinction. |
| 4th | Definitions of Arc voltage, Re-striking voltage and Recovery voltage. |
| 5th | Classification of circuit Breakers.Oil circuit Breaker and its classification. |
| 6th |  Plain brake oil circuit breaker. |
| 7th  | Arc control oil circuit breaker |
| 6th | 1st | Low oil circuit breaker |
| 2nd | Maintenance of oil circuit breaker. |
| 3rd | Air-Blast circuit breaker and its classification. |
| 4th | SulphurHexa-fluoride (SF6) circuit breaker |
| 5th | Vacuum circuit breakers. |
| 6th | Switchgear component.Problems of circuit interruption. |
| 7th | Resistance switching. |
| 7th | 1st | Circuit Breaker Rating. |
| 2nd | **Possible question answer discussion** |
| 3rd | **Monthly test-02** |
| 4th | Ch-05**- PROCTIVE RELAY:** Definition of Protective Relay.Fundamental requirement of protective relay |
| 5th | Basic Relay operationElectromagnetic Attraction Type , Induction Type |
| 6th | Definition of following important termsPick-up current., Current setting |
| 7th | Definition of following important terms.Plug setting Multiplier., Time setting Multiplier |
| 8th | 1st | Classification of functional relaysInduction type over current relay (non-directional) |
| 2nd | Induction type directional power relay. |
| 3rd | Induction type directional over current relay. |
| 4th | Differential relay  |
| 5th | Current differential relayVoltage balance differential relay. |
| 6th | Types of protection |
| 7th | **Possible question answer discussion** |
| 9th | 1st | Ch-06**- PROCTION & ELECTRICAL POWER EQUIPMENT & LINES:**Protection of alternator. |
| 2nd | Differential protection of alternators |
| 3rd | Balanced earth fault protection. |
| 4th | Protection systems for transformer. |
| 5th | **Monthly test-3** |
| 6th | Buchholz relay |
| 7th  | Protection of Bus bar.Protection of Transmission line. |
| 10th | 1st | Different pilot wire protection (Merz-price voltage Balance system) |
| 2nd | Continue. |
| 3rd | Explain protection of feeder by over current  |
| 4th | earth fault relay. |
| 5th | **Possible question answer discussion** |
| 6th | Ch-07**- PROCTION AGAINST OVER VOLTAGE & LIGHTING:**Voltage surge and causes of over voltage.Internal cause of over voltage.External cause of over voltage (lighting) |
| 7th  | Mechanism of lightning discharge.Types of lightning strokes. |
| 11th | 1st | Harmful effect of lightning.Lightning arresters and Type of lightning Arresters. |
| 2nd | Rod-gap lightning arrester |
| 3rd | Horn-gap arrester.Valve type arrester. |
| 4th | Surge Absorber |
| 5th | **Monthly test-04** |
| 6th | **Possible question answer discussion** |
| 7th  | Ch-08**- STATIC RELAY:**Advantage of static relay. |
| 12th | 1st | Cont. |
| 2nd | Instantaneous over current relay. |
| 3rd | Principle of IDMT relay. |
| 4th | **Possible question answer discussion** |
| 5th | Revision |
| 6th | Revision |
| 7th  | Revision |
| 13th | 1st | Revision |
| 2nd | Revision |
| 3rd | Revision |
| 4th | Revision |
| 5th | Revision |
| 6th | Revision |
| 7th  | Revision |
| 14th | 1st | Revision |
| 2nd | Revision |
| 3rd | Revision |
| 4th | Revision |
| 5th | Revision |
| 6th | Revision |
| 7th  | Revision |
| 15th | 1st | Revision |
| 2nd | Revision |
| 3rd | Revision |
| 4th | Revision |
| 5th | Revision |
| 6th | Revision |
| 7th  | Revision |

Syllabus coverage up to Internal assessment:-Chapters-1,2, 3& 4.