

**"PVC" NSSK Govt. Polytechnic Bilaspur at Kalol (H.P.)**  
**Lesson Planning (Theory)**

Branch : **Electrical Engg.**

Semester: **6th**

Subject: **Electrical Power System-III**

Session: **Jan 2024 - Jun 2024**

Teacher: **Ashwani Kumar**

Class Room: **L-5**

Sr. No	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Rem
1	7	<b>Introduction to Switchgear</b>	<ul style="list-style-type: none"> <li>- Switchgear, Essential features of Switchgear.</li> <li>- Switchgear elements and its operation.</li> <li>- Bus-bar arrangements.</li> <li>- Concept of short-circuit, short circuit current.</li> </ul>	R1,R2,R3	
2	8	<b>Power System Faults</b>	<ul style="list-style-type: none"> <li>- Types of faults: symmetrical faults, unsymmetrical faults.</li> <li>- Unsymmetrical faults: Analysis of L-to-L, L-to-G and L-L-to-G faults.</li> </ul>	- do -	
3	4	<b>Fuses</b>	<ul style="list-style-type: none"> <li>- Advantages and disadvantages of fuse.</li> <li>- Desirable characteristics of fuse element, fuse element materials.</li> <li>- Important terms related to fuse: current rating of fuse element, fusing current, fusing factor, cut-off current, arcing time and breaking capacity.</li> <li>- Types of fuse: LV fuse and HV fuse.</li> <li>- LV fuse: semi-enclosed rewritable fuse and HRC fuse-their construction and working.</li> <li>- HV fuse: cartridge type, liquid type and metal clad type-their construction &amp; working.</li> </ul>	- do -	
4	12	<b>Circuit Breakers</b>	<ul style="list-style-type: none"> <li>- Difference between Switch, Isolator and Circuit Breakers.</li> <li>- Function of Isolator and Circuit breaker.</li> <li>- Difference between Fuse and Circuit Breaker.</li> <li>- Arc phenomenon in circuit breaker: principles and methods of arc extinction.</li> <li>- Terms related to circuit breaker: arc voltage, re-striking voltage and recovery voltage.</li> <li>- Construction, working principles, types and applications of Air-Blast Circuit Breaker, Oil Circuit Breaker, Vacuum Circuit Breaker and SF6 Circuit Breaker, Comparison between various types of Circuit Breakers in terms of their features and application areas.</li> <li>- Circuit breaker rating: breaking capacity, making capacity and short-time rating.</li> </ul>	- do -	

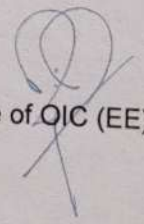
5	11	<b>Protective Relays</b>	<ul style="list-style-type: none"> <li>-Introduction: fundamental requirement of relay, function of relay.</li> <li>-Electromagnetic attraction type relay.</li> <li>- Electromagnetic induction type relays.</li> <li>- Instantaneous relay, Inverse Time Relay, Definite Time lag relay.</li> <li>- Relays Terminology: Pick-up Current, Current Setting, Plug Setting Multiplier (PSM), Time Setting Multiplier (TSM), Time/PSM Curve.</li> <li>- Distance or Impedance Relay: definite-distance and time distance impedance relay.</li> <li>-Differential Relays: current differential and voltage balance differential relay.</li> <li>- Brief idea of Static and Microprocessor based relays &amp; their applications.</li> </ul>	- do -
6	8	<b>Protection Schemes in Power System</b>	<ul style="list-style-type: none"> <li>- Differential Protection Scheme for Alternators.</li> <li>- Protection Schemes for Transformer, Buchholz relay.</li> <li>- Merz-price voltage balance protection scheme for bus-bar and transmission line.</li> <li>- Earth fault or Leakage Protection.</li> </ul>	- do -
7	6	<b>Over-voltage Protection</b>	<ul style="list-style-type: none"> <li>- Introduction: voltage surge, causes of overvoltage.</li> <li>- Lightning, lightning arresters such as rod gap, horn gap, multi-gap, expulsion type and valve type arrester.</li> <li>- Brief idea about surge absorber.</li> <li>- Transmission Line and substation protection against over-voltages.</li> </ul>	- do -

**REFERENCE RESOURCES:**

- R1. Principles of Power Systems by V.K. Mehta, S Chand and Co., New Delhi.
- R2. A Course in Electrical Power by A. Chakraborty, Dhanpat Rai & Sons, New Delhi
- R3. www.electrical4u.com



Signature of Teacher with Date



Signature of OIC (EE)