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

Branch : **Electrical Engg.** Semester: **6th**

Subject: **Electrical Power System-III** Session: **Feb 2023 - Jun 2023**

Teacher: **Ashwani Kumar** Class Room:

Sr. No	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Rem
1	7	**Introduction to Switchgear**	- Switchgear, Essential features of Switchgear. - Switchgear elements and its operation. - Bus-bar arrangements. - Concept of short-circuit, short circuit current.	R1,R2,R3	
2	8	**Power System Faults**	- Types of faults: symmetrical faults, unsymmetrical faults. - Unsymmetrical faults: Analysis of L-to-L, L-to-G and L-L-to-G faults.	- do -	
3	4	**Fuses**	- Advantages and disadvantages of fuse. - Desirable characteristics of fuse element, fuse element materials. - Important terms related to fuse: current rating of fuse element, fusing current fusing factor, cut-off current, arcing time and breaking capacity. - Types of fuse: LV fuse and HV fuse. - LV fuse: semi-enclosed rewritable fuse and HRC fuse-their construction andworking. - HV fuse: cartridge type, liquid type and metal clad type-their construction &working.	- do -	
4	12	**Circuit Breakers**	- Difference between Switch, Isolator and Circuit Breakers. -Function of Isolator and Circuit breaker. -Difference between Fuse and Circuit Breaker. - Arc phenomenon in circuit breaker: principles and methods of arc extinction. - Terms related to circuit breaker: arc voltage, re-striking voltage and recoveryvoltage. - 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. - Circuit breaker rating: breaking capacity, making capacity and short-time rating.	- do -	

5	11	**Protective Relays**	-Introduction: fundamental requirement of relay, function of relay. -Electromagnetic attraction type relay. - Electromagnetic induction type relays. - Instantaneous relay, Inverse Time Relay, Definite Time lag relay. - Relays Terminology: Pick-up Current, Current Setting, Plug Setting Multiplier (PSM), Time Setting Multiplier (TSM), Time/PSM Curve. - Distance or Impedance Relay: definite-distance and time distance impedance relay. -Differential Relays: current differential and voltage balance differential relay. - Brief idea of Static and Microprocessor based relays & their applications.	- do -	
6	8	**Protection Schemes in Power System**	- Differential Protection Scheme for Alternators. - Protection Schemes for Transformer, Buchholz relay. - Merz-price voltage balance protection scheme for bus-bar and transmission line. - Earth fault or Leakage Protection.	- do -	
7	6	**Over-voltage Protection**	- Introduction: voltage surge, causes of overvoltage. - Lightening, lightening arresters such as rod gap, horn gap, multi-gap, expulsion type and valve type arrester. - Brief idea about surge absorber. - Transmission Line and substation protection against over-voltages.	- 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

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