"PVC" NSSK Govt. Polytechnic Bilaspur at Kalol
Lecture Planning (Theory)

Branch : **Electrical Engg.** Semester: **5th**

Subject : **Switchgear & Protection** Session: **Aug 25 - Dec 25**

Teacher : **Ashwani Kumar** Cass Room : **LT9**

Sr. No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Rem
1.	1-10	Basics of Protection	Necessity, functions of protective system, Normal and abnormal conditions. Types of faults and their causes. Protection zones and backup protection.	R1,R2,R3	
2.	11-26	Circuit Interruption Devices	Isolators - Vertical break, Horizontal break and Pantograph type. HRC fuses – Construction, working, characteristics and applications. Arc formation process, methods of arc extinction (High resistance and Low resistance), Arc voltage, Recovery voltage, Re-striking voltage, RRRV. HT circuit breakers: Sulphur-hexa Fluoride (SF6), Vacuum circuit breaker – (Working, construction, specifications and applications). L.T. circuit breaker: Air circuit breakers (ACB), Miniature circuit breakers (MCB), Moulded case circuit breakers (MCCB) and Earth leakage circuit breaker (ELCB)) - Working and applications. Brief introduction to gas insulated switchgear.	-do-	
3.	27-42	Protective Relays	Fundamental quality requirements: Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy. Basic relay terminology - Protective relay, Relay time, Pick up, Reset current, current setting, Plug setting multiplier, Time setting multiplier. Protective relays: Classification, principle of working, construction and operation of – Electromagnetic attraction (Attracted armature type, Solenoid type and Watt-hour meter type only) relays. Electromagnetic Induction relays: Over current relays: Block diagram, working. Distance relaying- Principle, operation of Definite distance relays. Directional relay: Need and operation. Operation of current and voltage differential relay. Brief introduction to Thermal Relay. Brief introduction to Static and Microprocessor based relays and their applications.	-do-	
4.	43-55	Protection of Alternator and Transformer Alternator Protection	Faults, Differential protection over current, earth fault, overheating and field failure protection. Reverse power protection. Transformer Protection: Different Faults (brief introduction), Differential, over current, earth fault, over heating protection, Limitations of differential protection. Buchholz relay: Construction, operation, merits and demerits.	-do-	

5	56-65	Protection of Motors, Bus-bar and Transmission Line Motor	Faults, Short circuit protection, Overload protection, Single phase preventer. 8 Bus bar and Transmission line Faults on Bus bar and Transmission Lines. Bus bar protection: Differential and Fault bus protection. Transmission line: Over current, Distance and Pilot wire protection.	-do-

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Signature of HOD (EE)

Reference Resource:

R1: Mehta V. K ,Rohit Mehta, Principles of Power System, S .Chand and Co., New Delhi.
R2: Gupta. J. B. Switchgear and Protection, S. K. Kataria and Sons, New Delhi.
R3: Singh, R. P. Switchgear and Power System Protection, PHI Learning, New Delhi.

"PVC" NSSK Govt. Polytechnic Bilaspur at Kalol

Practical Planning and Coverage

Branch : **Electrical Engg.**

Semester: **5th**

Subject : **Switchgear & Protection Lab**

Session: **Aug 25 - Dec 25**

Teacher : **Ashwani Kumar**

Lab : **Elect. Measurements Lab**

Pract. No.	Description of Practical	Reference for Procedure/ Writeup	Likely Dates	Actual Dates	Sign
1.	Identify various switchgears in the laboratory and write their specifications.	Lab Manual			
2.	Test HRC fuse by performing the load test.	Lab Manual			
3.	Test MCB by performing the load test.	Lab Manual			
4.	Dismantle MCCB/ELCB and identify various parts.	Lab Manual			
5	Dismantle ACB/VCB and identify different parts.	Lab Manual			
6	Set the plug and time (with PSM, TSM) of induction type electromagnetic relay.	Lab Manual			
7	Test electromagnetic over-current relay by performing load test.	Lab Manual			

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Signature of Teacher with Date

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