SYNERGY SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: Electrical Engineering Subject: - Switchgear and protection	Semester: - 5TH Sem EE No. of Days/week class Allotted: -3	Name of the teaching faculty: DR ANANTA KUMAR SAHOO No. of weeks: -15 SESSION-2026-2027 WINTER Starting date- 01.07.2026 Closing date- 05.11.2026
No. of week	**No. of class**	**Topic to be Taught**
1	1ST	Necessity, functions of protective system.
	2ND	Normal and abnormal conditions.
	3RD	Types of faults and their causes.
2	1ST	Protection zones and backup protection
	2ND	Short circuit fault calculations in lines fed by generators through transformers
	3RD	Need of current limiting reactors and their arrangements.
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	2ND	Isolators- Vertical break, Horizontal break and Pantograph type
	3RD	HRC fuses – Construction, working,
4	1ST	HRC fuses – Construction, working, characteristics and applications.
	2ND	Arc formation process, methods of arc extinction (High resistance and Low resistance)
	3RD	Arc voltage, Recovery voltage, Re-striking voltage, RRRV.
5	1ST	HT circuit breakers (Sulphur-hexa Fluoride (SF6), Vacuum circuit breaker).
	2ND	HT circuit breakers (Sulphur-hexa Fluoride (SF6), Vacuum circuit breaker) - Working, construction, specifications and applications.
	3RD	L.T. circuit breaker (Air circuit breakers (ACB), Miniature circuit breakers (MCB)
6	1ST	Moulded case circuit breakers (MCCB) and Earth leakage circuit breaker (ELCB)) - Working and applications
	2ND	Moulded case circuit breakers (MCCB) and Earth leakage circuit breaker (ELCB)) - Working and applications
	3RD	Selection of LT and HT circuit breakers (ratings), Selection of MCCB for motors
7	1ST	Gas insulated switchgear.
	2ND	Fundamental quality requirements: Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy.
	3RD	Basic relay terminology- Protective relay, Relay time, Pick up, Reset current, current setting, Plug setting multiplier, Time setting multiplier.
8	1ST	Protective relays: Classification, principle of working
	2ND	Construction and operation of – Electromagnetic (Attracted armature type, Solenoid type, Watt-hour meter type) relay
	3RD	Thermal relay. Block diagram and working of Static relay.
9	1ST	Over current relay-Time current characteristics.
	2ND	Microprocessor based over current relays: Block diagram, working.
	3RD	Distance relaying- Principle, operation of Definite distance relays.

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10	1ST	Directional relay: Need and operation.
	2ND	Operation of current and voltage differential relay.
	3RD	Alternator Protection Faults,
11	1ST	Differential protection Over current, earth fault, overheating and field failure, protection.
	2ND	Differential protection Over current, earth fault, overheating and field failure, protection.
	3RD	Reverse power protection.
12	1ST	Transformer Protection Faults, Differential, over current,
	2ND	Earth fault, over heating protection,
	3RD	Limitations of differential protection.
13	1ST	Buchholz relay: Construction, operation, .
	2ND	Buchholz relay: Construction, operation, merits and demerits.
	3RD	Bus-bar and Transmission Line Motor Faults.
14	1ST	Short circuit protection, Overload protection, Single phase preventer..,
	2ND	Bus bar and Transmission line
	3RD	Faults on Bus bar and Transmission Lines
15	1ST	Bus bar protection: Differential and Fault bus protection.
	2ND	Transmission line: Over current
	3RD	Transmission line: Distance and Pilot wire protection.

Prepared by 03/06/26

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