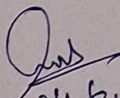




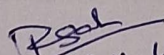
**LESSON PLAN**

DISCIPLINE:- ELECTRICAL ENGINEERING	SEMESTER:- 5 <sup>TH</sup>	NAME OF THE TEACHING FACULTY:- SUDIPTA KUMAR DAS
SUBJECT:- TH:4(a)-SWITCHGEAR AND PROTECTION	NO. OF DAYS PER WEEK CLASS ALLOTTED:- 3	SEMESTER FROM DATE:- 01-07-2026 TO DATE :-05-11-2026  NO.OF.WEEK: 15
Week	Class day	Theory
1 <sup>st</sup>	1 <sup>st</sup>	<u>UNIT I: BASICS OF PROTECTION</u> 1.1 Necessity, functions of protective system.
	2 <sup>nd</sup>	1.2 Normal and abnormal conditions.
	3 <sup>rd</sup>	1.3 Types of faults and their causes.
2 <sup>nd</sup>	1 <sup>st</sup>	1.4 Protection zones and backup protection
	2 <sup>nd</sup>	1.5 Short circuit fault calculations in lines fed by generators through transformers
	3 <sup>rd</sup>	1.5 Short circuit fault calculations in lines fed by generators through transformers
3 <sup>rd</sup>	1 <sup>st</sup>	1.6 Need of current limiting reactors and their arrangements.
	2 <sup>nd</sup>	<u>UNIT II: CIRCUIT INTERRUPTION DEVICES</u> 2.1 Isolators- Vertical break, Horizontal break and Pantograph type.
	3 <sup>rd</sup>	2.2 HRC fuses – Construction, working, characteristics and applications.
4 <sup>th</sup>	1 <sup>st</sup>	2.3 Arc formation process, methods of arc extinction (High resistance and Low resistance), Arc voltage, Recovery voltage, Re-striking voltage, RRRV.
	2 <sup>nd</sup>	2.3 Arc formation process, methods of arc extinction (High resistance and Low resistance), Arc voltage, Recovery voltage, Re-striking voltage, RRRV.
	3 <sup>rd</sup>	2.4 HT circuit breakers (Sulphur-hexa Fluoride (SF <sub>6</sub> ), Vacuum circuit breaker) - Working, construction, specifications and applications.
5 <sup>th</sup>	1 <sup>st</sup>	2.4 HT circuit breakers (Sulphur-hexa Fluoride (SF <sub>6</sub> ), Vacuum circuit breaker) - Working, construction, specifications and applications.
	2 <sup>nd</sup>	2.5 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.
	3 <sup>rd</sup>	2.5 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.
6 <sup>th</sup>	1 <sup>st</sup>	2.6 Selection of LT and HT circuit breakers (ratings), Selection of MCCB for motors.
	2 <sup>nd</sup>	2.6 Selection of LT and HT circuit breakers (ratings), Selection of MCCB for motors.
	3 <sup>rd</sup>	2.7 Gas insulated switchgear.
7 <sup>th</sup>	1 <sup>st</sup>	2.7 Gas insulated switchgear.
	2 <sup>nd</sup>	<u>UNIT II: PROTECTIVE RELAYS</u> 3.1 Fundamental quality requirements: Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy
	3 <sup>rd</sup>	3.2 Basic relay terminology- Protective relay, Relay time, Pick up, Reset current, current setting, Plug setting multiplier, Time setting multiplier.
8 <sup>th</sup>	1 <sup>st</sup>	3.3 Protective relays: Classification, principle of working, construction and operation of – Electromagnetic (Attracted armature type, Solenoid type, Watt-hour meter type) relay,
	2 <sup>nd</sup>	3.3 Protective relays: Classification, principle of working, construction and operation of – Electromagnetic (Attracted armature type, Solenoid type, Watt-hour

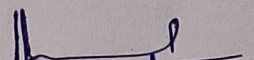
		meter type) relay
	3 <sup>rd</sup>	3.4 Thermal relay. Block diagram and working of Static relay.
9 <sup>th</sup>	1 <sup>st</sup>	3.5 Overcurrent relay-Time current characteristics.
	2 <sup>nd</sup>	3.6 Microprocessor based over current relays: Block diagram, working .
	3 <sup>rd</sup>	3.7 Distance relaying- Principle, operation of Definite distance relays.
10 <sup>th</sup>	1 <sup>st</sup>	3.8 Directional relay: Need and operation.
	2 <sup>nd</sup>	3.9 Operation of current and voltage differential relay.
	3 <sup>rd</sup>	<b>UNIT IV: PROTECTION OF ALTERNATOR AND TRANSFORMER :</b> 4.1 Alternator Protection Faults, Differential protection Over current, earth fault, overheating and field failure, protection.
11 <sup>th</sup>	1 <sup>st</sup>	4.1 Alternator Protection Faults, Differential protection Over current, earth fault, overheating and field failure, protection.
	2 <sup>nd</sup>	4.1 Alternator Protection Faults, Differential protection Over current, earth fault, overheating and field failure, protection.
	3 <sup>rd</sup>	4.2 Reverse power protection
12 <sup>th</sup>	1 <sup>st</sup>	4.2 Reverse power protection
	2 <sup>nd</sup>	4.3 Transformer Protection Faults, Differential, over current, earth fault, over heating protection, Limitations of differential protection.
	3 <sup>rd</sup>	4.3 Transformer Protection Faults, Differential, over current, earth fault, over heating protection, Limitations of differential protection.
13 <sup>th</sup>	1 <sup>st</sup>	4.4 Buchholz relay: Construction, operation, merits and demerits.
	2 <sup>nd</sup>	4.4 Buchholz relay: Construction, operation, merits and demerits.
	3 <sup>rd</sup>	<b>UNIT IV: PROTECTION OF MOTORS</b> 5.1 Bus-bar and Transmission Line Motor Faults. Short circuit protection, Overload protection, Single phase preventer.
14 <sup>th</sup>	1 <sup>st</sup>	5.1 Bus-bar and Transmission Line Motor Faults. Short circuit protection, Overload protection, Single phase preventer.
	2 <sup>nd</sup>	5.2 Bus bar and Transmission line
	3 <sup>rd</sup>	5.3 Faults on Bus bar and Transmission Lines.
15 <sup>th</sup>	1 <sup>st</sup>	5.4 Bus bar protection: Differential and Fault bus protection.
	2 <sup>nd</sup>	5.4 Bus bar protection: Differential and Fault bus protection.
	3 <sup>rd</sup>	5.5 Transmission line: Over current, Distance and Pilot wire protection

  
24.6.26

Signature of faculty

  
24.6.26

Signature of sr lecturer  
Head of Dept. (HOD)  
Electrical & ETC F.  
G. I. E. T. (POLY), . . . . .

  
24/6/26

Signature of principal  
**Principal**  
**GIET (Polytechnic)**  
Jagatpur, Cuttack