



SIDDHARTH INSTITUTE OF ENGINEERING AND TECHNOLOGY, KORAPUT
DEPARTMENT OF ELECTRICAL ENGINEERING
LESSON PLAN

Name of the Course : TH-4 : SWITCHGEAR AND PROTECTION			
Name of the Faculty: Er. DEBASHISH MISHRA			
Semester from date : 01.07.2026 TO 05.11.2026			
Course Code :	EEPE303(a)	Semester :	5 th
Total Periods:	45 Periods	Examination :	3Hrs
Theory Periods :	45 Hrs.	Progressive Assessment :	30
Lecture :	3Hrs/week	End Term Exam :	70
Credit :	3	Total Marks :	100

VISION:

To create competent and industry ready Electrical Diploma Engineers with professional and social values to meet future challenges.

MISSION:

- To prepare diploma holders through “qualitative competency-based education system” to compete with national requirement along with core values.
- To produce dynamic Electrical Engineers to serve the society and industry.
- To develop leadership qualities, communication skills, critical thinking and attitude for lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES:

PEO1	Applying technical knowledge and skills learned in the field of Electrical Engineering to excel in professional and/or higher education.
PEO2	To provide students an excellent academic environment and make them aware the needs of Society and Industry to become a successful Professional/Entrepreneur.
PEO3	To engage in lifelong learning, career enhancement to adopt to emerging technologies.

COURSE OUTCOME:

CO1	Identify various types of faults in power system.
CO2	Select suitable switchgears for different applications.
CO3	Explain the test for performance of different protective relays.
CO4	Discuss protection systems of alternators and transformers.
CO5	Discuss protection schemes for motors and transmission lines.
CO6	Explain protection schemes for power system against overvoltage.

TOPIC WISE DISTRIBUTION OF PERIODS

Unit No.	Topics	Periods
I	Basics of Protection	07
II	Circuit Interruption Devices	12
III	Protective Relays	10
IV	Protection of Alternator and Transformer	09
V	Protection of Motors	07



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Week	Day	Theory Topic	Corresponding CO
1 st	MONDAY	NO CLASS	
	TUESDAY	NO CLASS	
	FRIDAY	Necessity, functions of protective system.	CO1
2 nd	MONDAY	Normal and abnormal conditions.	CO1
	TUESDAY	Types of faults and their causes.	CO1
	FRIDAY	Protection zones and backup protection	CO1
3 rd	MONDAY	Short circuit fault calculations in lines fed by generators through transformers	CO1
	TUESDAY	Need of current limiting reactors and their arrangements.	CO1
	FRIDAY	Isolators- Vertical break, Horizontal break and Pantograph type.	CO2
4 th	MONDAY	HRC fuses – Construction, working, characteristics and applications.	CO2
	TUESDAY	HRC fuses – characteristics and applications.	CO2
	FRIDAY	Arc formation process, methods of arc extinction (High resistance)	CO2
5 th	MONDAY	Arc formation process, methods of arc extinction (Low resistance)	CO2
	TUESDAY	Arc voltage, Recovery voltage, Re-striking voltage, RRRV	CO2
	FRIDAY	HT circuit breakers (Sulphur-hexa Fluoride (SF ₆) - Working, construction, specifications and applications	CO2
6 th	MONDAY	HT circuit breakers Vacuum circuitbreaker- Working, construction, specifications and applications	CO2
	TUESDAY	L.T. circuit breaker Air circuit breakers (ACB)- Working and applications.	CO2
	FRIDAY	L.T. circuit breaker- Miniature circuit breakers (MCB) - Working and applications.	CO2
7 th	MONDAY	L.T. circuit breaker-Moulded case circuit breakers (MCCB)- Working and applications.	CO2
	TUESDAY	L.T. circuit breaker- Earth leakage circuit breaker (ELCB)) - Working and applications.	CO2
	FRIDAY	Selection of LT and HT circuit breakers (ratings), Selection of MCCB for motors	CO2
8 th	MONDAY	Gas insulated switchgear.	CO2
	TUESDAY	Fundamental quality requirements: Selectivity, Speed, Sensitivity, Reliability, Simplicity, Economy	CO3
	FRIDAY	Basic relay terminology- Protective relay, Relay time, Pick up, Reset current	CO3
9 th	MONDAY	Current setting, Plug setting multiplier, Time setting multiplier	CO3
	TUESDAY	Protective relays: Classification, principle of working,	CO3
	FRIDAY	Construction and operation of – Electromagnetic -Attracted armature type relay,	CO3
10 th	MONDAY	Construction and operation of – Electromagnetic -Solenoid type relay,	CO3
	TUESDAY	Construction and operation of – Electromagnetic -Watt-hour meter type relay	CO3
	FRIDAY	Thermal relay. Block diagram and working of Static relay.	CO3

11 th	MONDAY	Overcurrent relay-Time current characteristics	CO3
	TUESDAY	Microprocessor based over current relays: Block diagram, working.	CO3
	FRIDAY	Distance relaying- Principle, operation of Definite distance relays.	CO3
12 th	MONDAY	Directional relay: Need and operation.	CO3
	TUESDAY	Operation of current and voltage differential relay.	CO3
	FRIDAY	Alternator Protection Faults	CO4
13 th	MONDAY	Differential protection Over current, earth	CO4
	TUESDAY	overheating and field failure, protection.	CO4
	FRIDAY	Reverse power protection.	CO4
14 th	MONDAY	Transformer Protection Faults	CO4
	TUESDAY	Differential, over current, earth fault	CO4
	FRIDAY	Over heating protection, Limitations of differential protection	CO4
15 th	MONDAY	Buchholz relay: Construction, operation, merits and demerits.	CO4
	TUESDAY	Bus-bar and Transmission Line Motor Faults.	CO5
	FRIDAY	Short circuit protection, Overload protection, Single phase preventer.	CO5
16 th	MONDAY	Bus bar and Transmission line, Faults on Bus bar and Transmission Lines.	CO5
	TUESDAY	Bus bar protection: Differential and Fault bus protection	CO5
	FRIDAY	Transmission line: Over current, Distance and Pilot wire protection.	CO5

Debasish
18/6/22

Signature of Faculty Concerned
(Electrical Engg.)

Rupratna
18/6/22

Head of Department
(Electrical Engg.)

Rupratna
18/6/2022

Principal

S.I.E.&T, KORAPUT

H.O.D
Electrical Engg
SIET, KORAPUT

Principal
Siddharth Institute of Engineering &
Technology Ektoguda, Koraput