

Department of Electrical and Electronics Engineering

COURSE MODULES OF THE SUBJECT TAUGHT FOR THE SESSION SEP – DEC 2023-2024

Course Syllabi with CO's

Faculty Name: Ms. Swapna H				Academic Year: 2023-2024			
Department: Electrical & Electronics Engineering							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
18EEL77	Relay and High Voltage Lab	Core	Subject Knowledge of High voltage Engineering, Power system protection, Power System Analysis	1	-	2	42
Objectives	<ul style="list-style-type: none">• To conduct experiments to verify the characteristics of over current, over voltage, under voltage relays both electromagnetic and static type.• To verify the operation of negative sequence relay.• To conduct experiments to verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay.• To conduct experiments on generator, motor and feeder protection.• To conduct experiments to study the spark over characteristics for both uniform and non-uniform configurations using High AC and DC voltages.• To measure high AC and DC voltages• To experimentally measure the breakdown strength of transformer oil.• To experimentally measure the capacitance of different electrode configuration models using Electrolytic Tank.						
Topics Covered as per Syllabus							
PART - A							
1. Over current relay : a) Inverse Definite Minimum Time(IDMT) non-directional characteristics b) Directional features c) IDMT directional 2. IDMT characteristics of over voltage or under voltage relay. (Electromechanical type). 3. Operation of negative sequence relay.							
PART - B							
5. Operating characteristics of microprocessor based (numeric) over –current relay. 6. Operating characteristics of microprocessor based (numeric) over/under voltage relay.							
PART - C							
7. Motor protection scheme-fault studies. 8. Generator protection scheme							
PART - D							
9. Spark over characteristics of air insulation subjected to high voltage AC, with spark over voltage corrected to STP for uniform and non-uniform field configuration. 10. Spark over characteristics of air insulation subjected to high voltage DC 11. Measurement of HVAC and HVDC using standard spheres. 12. Breakdown strength of transformer oil using oil-testing unit. 13. Field Mapping using Electrolytic Tank for any one of the following Models: Cable/ Capacitor/ Transmission Line/ Sphere Gap							

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Bloom's Taxonomy Level L3 – Applying, L4 – Analysing, L5 – Evaluating, L6 – Creating

List of Text Books

1. Department Relay And High Voltage Laboratory Manual
2. High Voltage Engineering, M.S.Naidu and Kamaraju- 4th Edition, THM, 2008.
3. High Voltage Engineering Fundamentals, E.Kuffel and W.S. Zaengl, 2nd Edition, ElsevierPress, 2005.
4. Switchgear & Protection Sunil S.Rao, Khanna Publishers, 13th Edition, 2008.
5. Power System Protection & Switchgear, Badriram & Viswa Khanna, TMH, 1st edition, 2001.

List of Reference Books

1.High Voltage Engineering Theory and Practice, Mazen Abdel-Salam, Hussein Anis, Ahdab El-Morshedy, Roshdy Radwan, 2nd Edn(Revised & Expanded) Marcel-Dekker Publishers(Special Indian Edn.).

List of URLs, Text Books, Notes, Multimedia Content, etc

1. www.vlab.com
2. http://electrical-engineering-portal.com
3. http://nptel.iitm.ac.in/courses.php

Course Outcomes	Course outcomes:
	<p>At the end of the course the student will be able to:</p> <ol style="list-style-type: none"> 1. Ability to set Time Setting Multiplier, Plug Setting Multiplier for Electromagnetic over Current Relay, Over Voltage Relay, negative sequence relays for a given actuating quantity and examine its characteristics [L4] 2. Ability to set Plug Setting Multiplier, Time Setting Multiplier for a given actuating quantity for numerical relay and examine its characteristics. [L4] 3. Ability to estimate asymmetric fault current for protection of generator and Motor [L5] 4. Analyze the spark over characteristics for air for both uniform and non-uniform configurations using High AC and DC voltages and measure high AC and DC voltages and breakdown strength of transformer oil. [L4] 5. Draw electric field and estimate the capacitance of different electrode configuration models [L5].

Internal Assessment Marks: 40 (Record is evaluated for 30 marks and IA Test is for 10 marks)

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Course Code:	18EEL77	TITLE: Relay and High Voltage Lab						Faculty Name:	Ms. Swapna H			
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	1	-	-	-	3	-	1	3	1	-	2
CO-2	3	1	-	-	-	3	-	1	3	1	-	2
CO-3	3	1	-	-	-	3	-	1	3	1	-	2
CO-4	3	1	-	-	-	3	-	1	3	1	-	2
CO-5	3	1	-	-	-	2	-	-	3	1	-	2

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution '-' = No Contribution

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Department of EEE
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The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Course Code:	18EEL77	TITLE: Relay and High Voltage Lab
List of Course Outcomes	PSO1	PSO2
CO-1	-	2
CO-2	-	2
CO-3	-	2
CO-4	-	2
CO5	-	2

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Lab Incharge: Ms. Swapna H

Lab Instructor: Mr. Kushal R

HoD

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