

Maharashtra State Board of Technical Education, Mumbai

TEACHING PLAN (TP)

Academic Year: 2025-26 (EVEN)

Institute Code and Name: 0078- K. K. Wagh Polytechnic, Nashik

Programme and Code: Electrical Engineering (EE)

Course and Code: Maintenance of Electrical Equipments (MEE)

Scheme: K Allocated Hrs.: 64

Name of Faculty: Mr.S.R.Pawar

Semester: Sixth

Course Index: 604

Course Code: 316328

Class: TYEE-OHM

COURSE LEVEL LEARNING OUTCOMES (COS)

CO1 - Follow safety norms to prevent accidents while using electrical equipment.

CO2 - Test electrical equipment.

CO3 - Maintain rotating electrical machines.

CO4 - Maintain single phase and three phase transformers.

CO5 - Maintain insulation systems of electrical equipment.

TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category	Learning Scheme				Credits	Paper Duration	Assessment Scheme											
				Actual Contact Hrs/Week		SLH	NLH			Theory			Based on LL & TSL Practical				Based on SL				
				FA-TH	SA-TH					Total		FA-PR		SA-PR		SLA					
				Max	Max					Max	Min	Max	Min	Max	Min	Max	Min				
316328	Maintenance of Electrical Equipments	MEE	DSE	4	-	4	2	10	5	3	30	70	100	40	25	10	25#	10	25	10	175

Total IKS Hrs for Sem.: 0 Hrs

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative

Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment Legends: @ Internal Assessment, # External Assessment,

*# On Line Examination, @\\$ Internal Online Examination

“CH-Eric Examination, CH-Internal Climate Examination

SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	3	2	3	3	-	3			
CO2	3	3	2	3	2	2	3			
CO3	3	3	2	3	2	2	3			
CO4	3	3	2	3	2	2	3			
CO5	3	3	2	3	2	2	3			

Legends: - High: 03, Medium: 02, Low: 01, No Mapping: -

*PSOs are to be formulated at institute level

Maharashtra State Board of Technical Education

Teaching Plan (TP)

K-1

Academic Year: 2025-26

Program: Electrical Engineering (Ohm)

Course: Maintenance of Electrical Equipments (MEE)

Name of faculty: Mr.S.R.Pawar

Institute Code: 0078

Course Code: 316328

Semester: Fifth (EE-6K)

Unit No. (Allotted Hrs.)	CO	TLO aligned to COs	Unit Name and Learning Content Title/ Details	No. of Lecture	Plan (From-To)	Actual Execution (From-To)	Pedagogy Used (Teaching method/ Media)	Remark
1 (08)	CO-1	1.1	Unit - I Safety and prevention of accidents	01	15/12/2025		Chalk, Board + LCD Projector + MKCL ERA LMS	
		1.2	1.1 Hazards, accidents, safety					
		1.3	1.2 Dos and Don'ts for electrical supervisors.	01	16/12/2025			
		1.4	1.3 Electric shock: factors influencing severity of shock, rescuing a person from electric shock, different CPR Technique to be employed under accidental condition.	01	17/12/2025			
		1.5	1.4 Artificial respiration: types & procedures.	01	20/12/2025			
		1.6	1.5 Precautions against electric fire.	01	22/12/2025			
		1.7	1.6 Types of fire extinguishers, "PASS" & "RACE" in case of fire.	01	21/08/2025			
			1.7 Objectives of earthing. Earthing of electrical equipment as per IS 3043-1987	01	23/12/2025			
			1.8 Protection of electrical equipment against electric shock (class 0 to class III).	01	24/12/2025			
			1.9 Causes of failure of electrical Equipment: internal and external	01	27/12/2025			
			1.10 Role of BIS in testing of electrical Equipment.	01	29/12/2025			
2 (18)	CO-2	2.1	Unit - II Testing and Maintenance	01	30/12/2025		Chalk, Board + LCD Projector +	
		2.2	2.1 Objectives of testing.					
		2.3	2.2 Methods of testing: direct, indirect and regenerative.	02	31/12/2025 03/01/2026			

		2.6 2.7 2.8 2.9 2.10 2.11	2.3 Categories of Tests: routine, type, special and supplementary tests. 2.4 Tolerance. 2.5 Ingress protection, IP marking. 2.6 Significance of maintenance of electrical equipment. 2.7 Types of maintenance-routine, preventive, breakdown maintenance. 2.8 Factors affecting the preventive maintenance schedule. 2.9 Procedure for developing preventive maintenance schedule. 2.10 Foundations: requirements and factors affecting rotating machine foundation. 2.11 Tools/instruments: bearing puller, filler gauge, dial indicator, spirit level, megger, earth tester, growler, test lamps, multimeter, spanner sets, and screwdrivers.	02 01 02 02 01 02 02 02	05/01/2026 06/01/2026 07/01/2026 10/01/2026 12/01/2026 13/01/2026 14/01/2026 17/01/2026 19/01/2026 20/01/2026 21/01/2026 31/01/2026 02/02/2026 03/02/2026 04/02/2026 07/02/2026		MKCL ERA LMS	
3 (08)	CO-3	3.1 3.2 3.3 3.4	Unit - III Procedure for developing preventive maintenance schedule of Rotating Machines 3.1 Recommended maintenance schedules: Single phase and three phase induction motors (IS 900 – 1992), three phase alternators and synchronous motors. 3.2 Induction motor testing: Routine, type and special test of single phase induction motor as per IS 7572 – 1974 and three phase induction motor as per IS4029 - 2010. 3.3 Alternator and synchronous motor testing: Routine, type and special test of three phase alternator and synchronous motor as per IS 7132-1973. 3.4 Trouble shooting chart for single phase and three phase induction motor (IS 900 – 1992).	02 02 02 02	07/02/2026 09/02/2026 10/02/2026 11/02/2026 14/02/2026 16/02/2026 16/02/2026 17/02/2026		Chalk, Board + LCD Projector + Class room Demonstrat ion+ PPT Presentatio ns	

4 (18)	CO-4	Unit - IV Testing and troubleshooting of transformers 4.1 Recommended maintenance schedules: transformers (IS 10028, part III – 1981)	02	18/02/2026 21/02/2026			
		4.2 Routine, type, supplementary, special tests of transformers, nomenclature of transformer terminals as per IS 2026-1981.	02	23/02/2026 24/02/2026		Chalk, Board + LCD Projector	
		4.3 4.4 Polarity test.	02	24/02/2026 25/02/2026		Class room Demonstration +	
		4.5 4.6 Phasing out test.	02	28/02/2026 02/03/2026		Class room Demonstration +	
		4.6 Back-to-Back test.	03	04/03/2026 To 07/03/2026		PPT Presentations	
		4.7 Trouble-shooting chart for single phase and three phase transformers.	03	09/03/2026 To 11/03/2026			
		4.8 Foundations: requirements for static machine foundations, factors governing them as per IS 10028 part 2.	02	14/03/2026 16/03/2026			
5 (08)	CO-5	Unit - V Testing and reconditioning of electrical machine insulation 5.1 Classification of insulating materials as per IS 8504- 1994.	01	17/03/2026			
		5.2 Factors affecting life of insulating materials.	01	18/03/2026		Chalk, Board	
		5.3 5.4 Measurement of insulation resistance by megger, voltmeter, dielectric absorption, polarisation index.	01	23/03/2026		+ +	
		5.4 Transformer oil: properties, contaminating agents.	01	24/03/2026		MKCL	
		5.5 5.6 Testing of transformer oil as per IS 1866: Dielectric strength test, acidity test, sludge test, crackle test, flashpoint and fire point test.	02	25/03/2026 28/03/2026		ERA LMS	
		5.6 Reconditioning of insulation: centrifugal purifiers, streamline filter (Vacuum type) for purification and filtering of insulating oil. Cleaning and drying, re-varnishing, construction and working of vacuum Impregnation plant.	01	28/03/2026			
		5.7 History sheets of transformers and induction motors: [Part A: machine specifications with component specifications	01	04/04/2026			

		(installation information, bearings, oil type, core weight etc. as applicable); Part B: date wise: observations of parameters such as voltage, current, temperature etc., symptoms, works carried out under maintenance).				
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ASSESSMENT METHODOLOGIES/TOOLS

A. Formative assessment (Assessment for Learning) (FA-TH)

1. For formative assessment of laboratory learning 25 marks.
2. Each practical will be assessed considering appropriate % weightage to process and product and other instructions of assessment.
3. Two unit tests of 30 marks will be conducted and an average of two unit tests considered.

B. Summative Assessment (Assessment of Learning) (SA-TH)

1. End semester summative assessment of 25 marks for laboratory learning.
2. End semester assessment of 70 marks through offline mode of examination.

SUGGESTED LEARNING MATERIALS / BOOKS

Sr. No	Author	Title	Publisher with ISBN Number
1	Bhattacharya S. K.	Electrical Machines	McGraw Hill Education. New Delhi, ISBN : 9789332902855
2	Theraja B.L.	Electrical Technology Vol-II (AC and DC machines)	S.Chand and Co.Ltd., New Delhi ISBN : 9788121924375
3	Bandyopadhyay M. N.	Electrical Machines Theory and Practice	PHI Learning Pvt. Ltd., New Delhi, ISBN :9788120329973 VI
4	Jean-Claude Trigeassous	Electrical Machine Diagnosis	John Wiley & Sons, Inc ISBN:978-1-84821-263-3.

LEARNING WEBSITES & PORTALS

Sr. No	Link / Portal	Description
1	https://www.youtube.com/watch?v=w4jHpHoYZhk	How to Use a Fire Extinguisher
2	https://www.youtube.com/watch?v=wrawEAaJrrY	Artificial respiration methods
3	https://www.youtube.com/watch?v=CvuDFgFFOa8	Fundamentals of Transformer Commissioning and Maintenance Testing
4	https://www.youtube.com/watch?v=ntOc4h792UE	Motor Maintenance & Troubleshooting
5	https://www.youtube.com/watch?v=uMxK6djp_rI	Electric Motor Repair & Rebuild Instructions
6	https://youtu.be/JvsPnGbUH5M	power transformer oil filtration and treatment
7	https://nptel.ac.in/	Relevant information from NPTEL
8	https://www.electricaltechnology.org/	Relevant information
9	https://www.electrical4u.com/	Relevant information

Mr. S. R. Pawar

(Name & Signature of Faculty)

Prof. S. B. Pawar

(Name & Signature of HOD)