

Maharashtra State Board of Technical Education, Mumbai
TEACHING PLAN (TP-TH)/ Course Information Sheet (CIS)

K-1

Academic Year: 2025-26

Date: 15/12/2025

Institute Name : K. K. Wagh Polytechnic, Nashik-3

Institute Code (0078)

Program and Code: Computer Technology (CM)

Course Code & Abbr.: 312302 (BEE)

Course Name: Basic Electrical and Electronics Engineering (BEE) **Course Index:** CI202 **Total Hrs:** 30 Hrs

Class: FYCM-Mac

Semester: IInd **Scheme:** K

Name of Faculty: Mr. D.K.Lakhe

• Teaching and Examination Scheme:

Course Title	Course Code /Abbr	Course Category	Learning Scheme					Credits	TH Paper Duration(Hrs.)	Assessment Scheme								Total Marks			
			Actual Contact Hrs/Week			SLH	NLH			Theory				Based on LL & TSL Practical							
			CL	TL	LL					FA-TH	SA-TH	Total	FA-PR	SA-PR	SLA						
Basic Electrical and Electronics Engineering	BEE 312302	AEC	4	-	4	2	10	5	1.5	30	70*#	100	40	50	20	50 @	20	50	10	250	

Abbreviations: CL- Class Room 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 , TLOs-Theory Learning Outcomes

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\\$ Internal Online Examination

• Course Outcomes (COs): Theory

FYCM-Win students will be able to achieve & demonstrate the following COs on completion of course based learning

CO/ TLO No.	Course Outcomes (COs) / Theory Learning Outcomes (TLOs)
CO202.1(CO1)	Calculate and measure basic electrical quantities and parameters.
TLO 1.1	Apply Faraday's law of electromagnetic induction and Fleming's right hand rule, Lenz's law for induced emf to find its magnitude and direction.
TLO 1.2	Differentiate alternating current (AC) and direct current (DC)
TLO 1.3	Explain parameters of single phase AC sinusoidal waveform.
TLO 1.4	Describe the silent features of three phase AC supply system.
TLO 1.5	Explain star and delta connection in three phase AC system.
TLO 1.6	Calculate the phase and line current and voltage in star and delta connections.
CO202.2(CO2)	Use different electrical machines by making connections.
TLO 2.1	Explain the working principle of the given type of transformer.
TLO 2.2	Distinguish the construction of the given type of transformer.
TLO 2.3	Describe the construction and working of the given type of DC motor.
TLO 2.4	Select relevant type of DC motor for the given application with justification
TLO 2.5	Explain working principle and operation of Universal motor.
TLO 2.6	Describe the procedure to connect stepper motor for the given application with sketches.
CO202.3(CO3)	Use electrical safety devices in electrical circuit
TLO 3.1	Describe the characteristics and features of the given type of protective device.
TLO 3.2	Select the relevant protective device for the given application with justification
TLO 3.3	Select suitable switchgear for the given situation with justification.
TLO 3.4	State the I.E. rule related to be applied for the given type of earthing with justifications.

● Teaching Plan:

Unit No. (Learning Hrs.)	TLOs	Title/Topic Details with CO	Plan (From-To & No. of Lectures)	Actual Execution (From-To & No. of Lectures)	Teaching Method/Media	Remark
01 (11)	1.1	Unit – 1. Basic Electrical Fundamentals 1.1 Electric and magnetic circuits.	15/12/2025 To 17/12/2025 (02)		Chalk,Board + LCD Projector + Class room Demonstration + PPT Presentations + MKCL ERA LMS	
		1.2 Series and parallel magnetic circuits.				
		1.3 Faraday's laws of electromagnetic induction, Fleming's right hand rule, Lenz's law.	22/12/2025 To 24/12/2025 (02)			
		1.4 Dynamically and statically induced emf, self and mutual inductance.				
	1.2	1.5 AC and DC quantity, advantages of AC over DC supply.	29/12/2025 To 31/12/2025 (02)		Chalk,Board + LCD Projector + Classroom Demonstration + PPT Presentations + MKCL ERA LMS	
	1.3	1.6 Single phase AC, sinusoidal AC wave: instantaneous value, cycle, amplitude, time period, frequency, angular frequency, RMS value, Average value for sinusoidal waveform, form factor, peak factor.	05/01/2026 To 07/01/2026 (02)			
	1.4	1.7 Three phase supply system over single phase supply system, Phase sequence and balanced and unbalanced load	12/01/2026 To 14/01/2026 (02)			
	1.5 1.6	1.8 Star and delta connections, Phase and line current, phase and line voltage in star connected and delta connected balanced system	19/01/2026 (01)			
02 (10)	2.1	Unit – 2. Electrical Machines. 2.1 Transformer: Working principle, emf equation, Voltage ratio, current ratio and transformation ratio, losses.	21/01/2026 To 28/01/2026 (02)		Chalk,Board + LCD Projector + PPT Presentations + MKCL ERA LMS	
	2.2	2.2 DC motor construction - parts its function and material used.	02/02/2026 To 04/02/2026 (02)			
	2.3	2.3 DC motor -Principle of operation.	09/02/2026 (01)			
	2.4	2.4 Types of DC motors, schematic diagram, applications of dc shunt, series and compound motors.	11/02/2026 To 16/02/2026 (02)			
	2.5	2.5 Universal motor: principle of operation, reversal of rotation and applications.	18/02/2026 (01)		Chalkboard + LCD Projector + PPT Presentations + You Tube	
	2.6	2.6 Stepper motor: types, principle of working and applications.	23/02/2026 To 25/02/2026 (02)			

03 (09)	3.1	Unit – 3.Electrical Safety and Protective Devices. 3.1 Low rating Fuse: Operation, types	02/03/2026 (02)		Video demonstration + MKCL ERA LMS
		3.2 Switch Fuse Unit and Fuse Switch Unit: Differences, use of multimeter for electrical quantities/ parameters measurements.	09/03/2026 To 11/03/2026 (02)		
		3.3 MCB and ELCB/RCB: Operation and general specifications	16/03/2026 To 18/03/2026 (02)		
	3.4	3.4 Earthing: Types, Importance of earthing, factors affecting earthing resistance.	23/03/2026 To 25/03/2026 (02)		Chalk,Board + LCD Projector + Class room Demonstration + PPT Presentations
		3.5 Measures for reducing earth resistance, I.E rules relevant to earthing.	25/03/2026 (01)		
		Total	30		

- Chapter wise CO-PO Mapping:

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
CO1	3	--	--	2	-	-	2	-	-
CO2	2	--	--	2	-	-	2	-	-
CO3	2	--	--	3	2	2	3	-	-

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

Sr. No.	Programme Outcomes (POs)	Programme Specific Outcomes (PSOs)
1.	PO-1 Basic and Discipline Specific Knowledge	PSO1 Apply acquired skills of programming, networking, hardware & database for computer based problem solving and software development.
2.	PO-2 Problem Analysis	
3.	PO-3 Design/ Development of Solution	
4.	PO-4 Engineering Tools	
5.	PO-5 Engineering Practices for Society, Sustainability and Environment	PSO-2 Pursue higher studies in the field of Computer Science / Computer Engineering /Information Technology.
6.	PO-6 Project Management	
7.	PO-7 Life Long Learning	

- Weightage to Learning Efforts & Assessment Purpose (Specification Table):

Unit No.	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Basic Electrical Fundamentals	CO1	11	4	6	4	14
2	Electrical Machines	CO2	10	2	6	4	12
3	Electrical Safety and protective devices	CO3	09	2	4	4	10
		Total :	30	08	16	12	36

- **Learning Assessment (Theory):**

A. Formative assessment (FA-TH)

- Two offline unit tests of 30 marks (Basic Electrical of 15 marks, Basic Electronics of 15 marks) and average of two unit test marks will be consider for out of 30 marks.
- For formative assessment of laboratory learning 50 marks (Basic Electrical -25 marks, Basic Electronics- 25marks).
- Each practical will be assessed considering 60% weightage to process, 40% weightage to product.
- Note: Unit test will be conducted on written pattern (Not MCQ based)

B. Summative Assessment (SA-TH)

- End semester assessment of 70 marks through online MCQ examination.
- End semester summative assessment of 50 marks for laboratory learning (Basic Electrical- 25 marks, Basic Electronics- 25 marks)

Final Score out of 100 Marks will be derived as the total score of

(SA-TH + FA-TH [Average of class test marks]) i.e. (70+30) =100

- **Learning Assessment (Practical):**

A. Formative assessment (FA-PR)

- For the Formative Assessment (FA-PR) each experiment will be assessed out of 50 marks. Practical will be assessed considering 60% weightage to process and 40% weightage to product.
- Final term work(FA-PR) of 50 marks is calculated based on scored in Formative Assessment for each experiment Term Work Marks = $(50 * \text{Total Marks Obtained in FA-PR}) / (50 * \text{Total Number of Experiments})$

B. Summative Assessment (SA-PR)

- A comprehensive Final Internal Practical examination (SA-PR) of 50 (Basic Electrical -25 marks, Basic Electronics- 25marks) for Marks will be conducted by MSBTE at the end of semester.
- The schedule of MSBTE Practical Examination will be display on Notice board prior to examination. The schedule of examination will be given by MSBTE
- **Self-Learning(SLA):** Self-learning Activities (SLA) includes micro project / assignment / other activities related to\subject and it will be evaluated out of 50 Marks (Basic Electrical -25 marks, Basic Electronics- 25 marks)
- **LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED**

Sr. No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Single Phase Transformer: 1kVA, single-phase, 230/150 V, air cooled	6
2	Single phase auto transformer (Dimmer stat) – 0-230 volt 2/5Amp	6,13
3	CRO - 20 MHz. Dual channel	2,3,18
4	Three phase Auto Transformer -10/5 kVA, Input 415 V 3 phase. 50 Hz. Output 0-415 V, 10/20 A	4,5
5	Rheostat (0-500 Ohm, 1.2A), Nichrome wire wound rheostat on epoxy resin or class F insulating tube with two fixed and one sliding contact	7
6	Rheostat (0-100 Ohm, 5A), Nichrome wire wound rheostat on epoxy resin or class F insulating tube with two fixed and one sliding contact	8
7	DC Ammeter range (0-5-10A), Portable analog PMMC type as per relevant BIS standard	7
8	DC series and shunt machines at least one each (up to 230 V, 3/5 HP).	7,8

Sr. No	Equipment Name with Broad Specifications	Relevant LLO Number
9	D. C. Supply, A 230 V d.c. supply (with inbuilt rectifier to convert a.c.to d.c)	7,8
10	DC Voltmeter Range (0-150/300V), Portable analog PMMC type as per relevant BIS standard.	7,8
11	AC Ammeter range (0-2.5-5-10A), Portable analog MI type as per relevant BIS standard	5,6,13,14
12	AC Voltmeter Range (150/300/600V), Portable analog MI type as per relevant BIS standard	5,6
13	Lamp Bank load -230 V 0-10 A	13,14
14	Tachometer, noncontact type 0-10000rpm	7,8,9,10
15	Single phase Universal motor -1/4 or 1/2 HP ,230 V	9
16	Earth tester analog/digital type	15
17	Variable DC power supply 0-30V, 2A, SC protection, display for voltage and current.	16,17,21,22,23,24
18	Digital Multimeter: 3 1/2 digit	1,16,17,21,22,23

- **References:**

1. Suggested Learning Materials / Books:

Sr. No	Author	Title	Publisher with ISBN Number
1	Theraja, B. L. Theraja, A. K.	A Text Book of Electrical Technology Vol-I	S.Chand and Co. New Delhi 2014 ISBN: 9788121924405
2	Mittle, V. N.	Basic Electrical Engg.	Tata McGraw-Hill, New Delhi ISBN : 978-0-07-0088572-5
3	Hughes, Edward	Electrical Technology	Pearson Education, New Delhi ISBN-13: 978-0582405196
4	Saxena, S. B. Lal	Fundamentals of Electrical Engineering	Cambridge University Press, New Delhi ISBN : 9781107464353

2. Learning Websites & Portal

Sr. No	URL
1	https://www.electrical4u.com/
2	https://studyelectrical.com/
3	https://archive.nptel.ac.in/courses/117/106/117106108/
4	https://archive.nptel.ac.in/courses/108/105/108105155/
5	https://youtu.be/ivP_8w4FegE?si=5BLH_hvyhros570A
6	https://byjus.com/physics/working-principle-of-an-electrical-fuse/
7	https://youtu.be/9Xgn40eGcqY?si=YQy0vmxQ_yGR8-tz
8	https://youtu.be/ikLhqUCQKkc?si=8VqRbV1zZIQUSYLD

3. Video reference URL

Sr. No	URL
1	https://www.youtube.com/watch?v=jz92oOkJFNA
2	https://www.youtube.com/watch?v=shJAV59NS6k
3	https://www.youtube.com/watch?v=t-EhLjdAY0M
4	https://www.youtube.com/watch?v=XplD4hAvXVY
5	https://youtube.com/watch?v=8VhgQ9Q9ixA
6	https://www.youtube.com/watch?v=FVU5xOeiiKA

Signature of Faculty

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Name: Prof. M. P. Bhosale

CC- BEE Course File