

Academic Year: 2025-26

Date: 14/12/2025

Institute Name & Code: K. K. Wagh Polytechnic, Nashik-3 (0078)

Program and Code: Artificial intelligence & machine Learning (AIML) **Course Code & Abbr.:** 312302 (BEE)

Course Name: Basic Electrical & Electronics Engg.

Name of Faculty: Ms. K. J. Patil

Class: FYAN-Neural

Total Hrs: 60 **Course Index:** CO202

Semester: II **Scheme:** K

• Course Outcomes (COs): Theory & Practical

By learning course Electrical and Electronics Engineering (BEE-312302) First Year students will be able to:

- CO202.1 Calculate and measure basic electrical quantities and parameters
- CO202.2 Use different electrical machines by making connections
- CO202.3 Use electrical safety devices in electrical circuit
- CO202.4 Use relevant diode in different electronic circuits
- CO202.5 Use BJT and FET in various electronic circuits.
- CO202.6 Use various types of sensors and transducers

• Teaching and Examination Scheme:

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme				Credits	Paper Duration	Assessment Scheme											
				Actual Contact Hrs/Week			SLH	NLH		Theory			Based on LL & TSL Practical				Based on SL				
				CL	TL	LL				FA-TH	SA-TH	Total	FA-PR	SA-PR	SLA						
										Max	Max	Max	Min	Max	Min	Max	Min				
12302	Basic Electrical And Electronics Engineering	BEE	AEC	2	-	2	-	4	5	1.5	30	70*#	100	40	50	20	50@	20	50	20	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

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

• Laboratory Learning Outcome (LLO)

LLO	Practical -Laboratory Learning Outcome (LLO)
LLO 16.1	Connect the Zener diode in the circuit and test its operation in forward and reverse bias mode.
LLO 17.1	*Determine the voltage regulation by using Zener diode under variable input and output conditions.
LLO 18.1	Check the output waveform of L, C and π filters on CRO of rectifier circuit.
LLO 19.1	*Make the input and output connections of UPS and measure the output voltage under online and offline mode.
LLO 20.1	*Make the input, output connections and check the operation of UPS under normal and overload condition.
LLO 21.1	*Test input /output characteristics of NPN transistor in CE configuration.

LLO 23.1	*Check the switch ON and switch OFF condition of LED by using transistor.
LLO 25.1	*Measure temperature of liquid using RTD (PT-100) transducer.
LLO 25.1	Measure Temperature of liquid using Thermocouple measurement
. LLO 28.1	*Measure the resistance of LDR in varying light intensity.
LLO 29.1	Measure displacement using LVDT.
LLO 29.1	Measure displacement using Potentiometer

● **Practical Plan:**

Sr. No	COS	Practical - Laboratory Learning Outcome (LLO)	Practical Titles	Date of Plan		Remark	Faculty Sign with Assessment Date
				From	To		
1	CO4	LLO 16.1	Connect the Zener diode in the circuit and test its operation in forward and reverse bias mode.	A:18/12/2025 B:19/12/2025 C:20/12/2025	A:01/01/2026 B:26/12/2025 C:27/12/2025		
2	CO4	LLO 17.	*Determine the voltage regulation by using Zener diode under variable input and output conditions.	A:01/01/2026 B:26/12/2025 C:27/12/2025	A:08/01/2026 B:02/01/2026 C:03/01/2026		
3	CO4	LLO 18.1	Check the output waveform of L, C and π filters on CRO of rectifier circuit.	A:08/01/2026 B:02/01/2026 C:03/01/2026	A:15/01/2026 B:09/01/2026 C:10/01/2026		
4	CO4	LLO 19.1	*Make the input and output connections of UPS and measure the output voltage under online and offline mode.	A:15/01/2026 B:09/01/2026 C:10/01/2026	A:15/01/2026 B:16/01/2026 C:17/01/2026		
5	CO4	LLO 20.1	*Make the input, output connections and check the operation of UPS under normal and overload condition.	A:15/01/2026 B:16/01/2026 C:17/01/2026	A:22/01/2026 B:23/01/2026 C:24/01/2026		
6	CO5	LLO 21.1	*Test input /output characteristics of NPN transistor in CE configuration.	A:22/01/2026 B:23/01/2026 C:24/01/2026	A:29/01/2026 B:30/01/2026 C:31/01/2026		
7	CO5	LLO 23.1	*Check the switch ON and switch OFF condition of LED by using transistor.	A:29/01/2026 B:30/01/2026 C:31/01/2026	A:05/02/2026 B:06/02/2026 C:07/02/2026		
8	CO5	LLO 25.1	*Measure temperature of liquid using RTD (PT-100) transducer.	A:05/02/2026 B:06/02/2026 C:07/02/2026	A:12/02/2026 B:13/02/2026 C:14/02/2026		
9	CO5	LLO 25.1	Measure Temperature of liquid using Thermocouple measurement	A:12/02/2026 B:13/02/2026 C:14/02/2026	A:26/02/2026 B:20/02/2026 C:21/02/2026		

10	CO6	. LLO 28.1	*Measure the resistance of LDR in varying light intensity.	A:26/02/2026 B:20/02/2026 C:21/02/2026	A:05/03/2026 B:27/03/2026 C:28/03/2026		
11	CO6	LLO 29.1	Measure displacement using LVDT.	A:05/03/2026 B:27/03/2026 C:28/03/2026	A:12/03/2026 B:06/03/2026 C:07/03/2026		
12	CO6	LLO 29.1	Measure displacement using Potentiometer	A:12/03/2026 B:06/03/2026 C:07/03/2026	A:26/03/2026 B:13/03/2026 C:14/03/2026		

- Formative Assessment Criteria:**

Performance Indicators		Weightage
Process Related (15 Marks)		60%
1	Handling of the components	10%
2	Identification of components	20%
3	Measuring value using suitable instrument	20%
4	Working in teams	10%
Product Related (10 Marks)		40%
1	Calculated theoretical values of given component	10%
2	Interpretation of result	05%
3	Conclusions	05%
4	Practical related questions	15%
5	Submitting the journal in time	05%
Total (25 Marks)		100%

- Formative & Summative Assessment Criteria:**

1. Formative Assessment (F.A.) of each experiment will be done out of 25 marks on the basis of Tool Selection Ability, Use of Appropriate tool to perform the Identified tasks, Quality of output achieved, Answer to sample questions and Submit report in time total
2. Final term work(FA-PR) of 25 marks is calculated based on scored in Formative Assessment for each experiment

$$\text{Term Work Marks} = (25 * \text{Total Marks Obtained in P.A.}) / (25 * \text{Total Number of Experiments})$$
3. Self-learning Activities (SLA) includes micro project / assignment / other activities related to subject and it will be evaluated out of 25 Marks
4. A comprehensive Final Internal Practical examination (SA-PR) of 25 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.

- **Practical wise CO Mapping:**

Practical No.	CO104.1	CO104.2	CO104.3	CO104.4	CO104.5	CO104.6
PR. No. 1				✓		
PR. No. 2				✓		
PR. No. 3				✓		
PR. No. 4				✓		
PR. No. 5				✓		
PR. No. 6					✓	
PR. No. 7					✓	
PR. No. 8					✓	
PR. No. 9					✓	
PR. No. 10						✓
PR. No.11						✓
PR. No.12						✓

- **Unit wise CO-PO Mapping:**

Course Outcomes (COs)	Programme Outcomes (POs)							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 & Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO -1	PSO -2
CO4	3	-	-	1	-	1	2	2	2
CO5	3	-	-	1	-	1	2	2	2
CO6	2	-	-	2	2		3	2	2

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

PSO1: Apply fundamental concepts of Computer Engineering and Artificial Intelligence and machine learning to solve technical problems.

PSO2: Implement the domain knowledge to achieve successful career as an engineering professional

● **References:**

1. Books:

Sr. No	Author	Title	Publisher
1	Sedha R.S.	Applied Electronics	S. Chand, New Delhi,2015 ISBN:9788121927833
2	V.K. Mehta	Principles of Electronics	S.Chand and Co Ram Nagar, New Delhi-110055,11th edition 2014 ISBN 9788121924504
3	Jegathesan, V.	Basic Electrical and Electronics Engineering	Wiley India, New Delhi 2014 ISBN : 97881236529513
4	Boylestad, Robert Nashelsky Louis	Electronic Devices and Circuit Theory	Pearson Education. New Delhi 2014 ISBN:9780132622264
5	Sawhney A.K.	Electrical and Electronic Measurements and Instrumentation	Dhanpat Rai and Sons, New Delhi,2005, ISBN:13-9788177000160
6	Kalsi H.S.	Electronic Instrumentation	McGraw Hill, New Delhi,2010 ISBN:13-97800707020

2. Web Sites:

Sr. No	Link /Portal	Description
1	https://www.youtube.com/watch?v=anCnrtjNLQM	LVDT
2	https://qr.page/g/4PABoASTZYW	Transistor as an Amplifier
7	https://www.tutorialspoint.com/difference-between-bjt-and-fet	BJT's and FET's
8	https://www.tutorialspoint.com/difference-between-sensor-and-transducer	Sensors and Transducers
9	https://www.electrical4u.com/jfet-or-junction-field-effect-transistor/	Junction Field Effect Transistor
10	https://fossee.in/	Open Source Electronics Simulation software
11	https://cloud.scilab.in/	Open Source Scilab Cloud for Electronics Simulation

Ms. K. J. Patil

(Name & signature of staff)

Mrs. R. Y. Thombare

(Name & signature of HOD)

CC- 1. Lab File

2.Course File-BEE

3. Notice Board-MPRL Lab

4. Progressive Assessment