GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Diploma in Vocation (D.Voc.), 3rd Semester
Branch: Electrical Wiring, Refrigeration and Air Conditioning
Subject Name: Basic Electrical Practices
Subject Code: 1230401

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory		Tutorial/ Practical		
L	P	OJT	C	University exams (ESE)	Progressive Assessment (PA)	External Practical /viva Exam(ESE)	Internal evaluation Practical /viva Exam(PA)	
3	0	0	3	50	0	0	0	50

L- Lectures; P- Practical; OJT- On Job Training; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Program Objectives:

- Apply knowledge of electrical engineering fundamentals in practical applications.
- Identify, analyze and solve basic electrical and automation problems.
- Use modern tools, AI concepts, IoT, and smart technologies in electrical systems.
- Design and develop simple electrical and smart automation systems.
- Follow safety standards and professional practices in electrical installations.
- Work effectively as an individual or team member in electrical and AI-based projects.

Course Content: Theory

Unit No.	Content	No. of Hours
1.	**Introduction to PCB and Artificial Intelligence** • Introduction to PCB, PCB designing, wet etching, dry etching, track correction, wiring, single sided and double-sided PCB. • Basics of AI & Machine Learning • AI in electrical industry • Sensors and data collection • Introduction to IoT • Basics of cloud monitoring	7
2	**AI Applications in Electrical Systems** • Smart home automation • Load monitoring & energy management • Predictive maintenance of motors • Fault detection using AI • AI-based energy saving systems	10
3	**Basic Electrical Wiring Practices** • Types of wiring: • Cleat wiring • Batten wiring • Casing and capping wiring • Conduit wiring (surface & concealed – demonstration) • One-way and two-way switch control • Staircase wiring, Godown wiring	7
4	**Electrical Machines with AI Integration**	8

	• Introduction to motors & transformers • Motor protection systems • Condition monitoring using sensors • Vibration & temperature analysis • Smart grid basics • Fault detection system prototype	
5	**Smart Lighting Fundamentals** • Types of smart lights • Role of sensors in lighting automation: • LDR (Day/Night control) • PIR (Motion detection) • Relay module for AC load control • Energy-efficient LED lighting	10
	Total	42

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
20	25	5	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Electrical Workshop: A Text Book – R. P. Singh
2. A Textbook of Electrical Workshop Practices – Dr. Umesh Rathore & Naresh Kumar Sharma
3. Workshop Practices in Electrical Engineering – M. L. Gupta

(b) Open source software and website:

1. https://nptel.ac.in/

Course Outcomes:

At the end of this course students will be able to:

1. Explain the fundamentals of PCB design and fabrication methods including wet etching, dry etching, wiring, and track correction.
2. Describe the basics of Artificial Intelligence (AI), Machine Learning, IoT, sensors, and cloud monitoring in electrical applications.
3. Apply AI techniques in electrical systems such as smart home automation, energy management, predictive maintenance, and fault detection.
4. Demonstrate basic electrical wiring practices including cleat, batten, casing–capping, conduit wiring, staircase wiring, and godown wiring.
5. Explain working principles of motors and transformers and implement AI-based condition monitoring using sensors.
6. Design and implement basic smart lighting systems using LDR, PIR sensors, relay modules, and energy-efficient LED lighting.