# Fundamentals of Electrical Theory Course No. 17101 Credit: 1.0

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| --- | --- | --- | --- |
| **Student name:**  |  | **Graduation Date:** |  |

Pathways and CIP Codes: **Automation Engineering Pathway (15.0406)**

Course Description: This course is designed to provide participants with fundamental knowledge and skills in industrial electrical systems. The emphasis is on understanding the principles of electricity, safety protocols, and basic troubleshooting techniques commonly used in industrial settings.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: Introduction to Electricity

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Understanding basic electrical concepts  |  |
| 1.2 | Voltage, current, resistance, and power  |  |
| 1.3 | Ohm's Law and its applications  |  |
| 1.4 | Series and parallel circuits  |  |

## Benchmark 2: Electrical Components

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Overview of common electrical components (e.g., resistors, capacitors, inductors)  |  |
| 2.2 | Types and applications of switches, relays, and contactors  |  |
| 2.3 | Transformers and their applications  |  |
| 2.4 | Motors and motor control basics  |  |

## Benchmark 3: Electrical Safety

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Importance of electrical safety in industrial environments  |  |
| 3.2 | Personal protective equipment (PPE)  |  |
| 3.3 | Lockout/tagout procedures  |  |
| 3.4 | Safe work practices and procedures  |  |

## Benchmark 4: Reading Electrical Diagrams

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Introduction to electrical schematics and diagrams  |  |
| 4.2 | Interpreting symbols and notations  |  |
| 4.3 | Understanding ladder diagrams  |  |

## Benchmark 5: Electrical Measurements and Testing

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Introduction to electrical measurement tools (multimeters, oscilloscopes)  |  |
| 5.2 | Measurement of voltage, current, resistance  |  |
| 5.3 | Basic testing and troubleshooting techniques  |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

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