ELECTRICAL PRINCIPLES

UNIT CODE: ENG/CU/EI/CC/03/5

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Electrical principles skills

Duration of Unit: 140 hours

Unit Description

This unit describes the competencies required by a technician in order to apply a wide range of Electrical principles in their work. Which includes; Use the concept of basic Electrical quantities, use of the concepts of D.C and A.C circuits in electrical installation, use of basic electrical machine, use of power factor in electrical installation, use of earthing in Electrical installations, apply Electrostatic, apply Magnetism and Electromagnetism and finally transient in Electrical circuit analysis.

Summary of Learning Outcomes

1. Use the concept of basic Electrical quantities
2. Use the concepts of D.C and A.C circuits in electrical installation
3. Use of basic electrical machine
4. Use of power factor in electrical installation
5. Use of earthing in Electrical installations
6. Apply Electrostatics
7. Apply Magnetism and Electromagnetism
8. Apply Transient in Electrical circuit analysis

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Use the concept of basic Electrical quantities	❑ The meaning of SI unit ❑ SI unit of various types of Electrical parameters ❑ Ohm's law ❑ Calculations involving various Electrical parameters e.g Power, Current, Voltage, Resistance ❑ Instruments used in measuring various types of Electrical parameters	❑ Written tests ❑ Oral questioning ❑ Assignments ❑ Supervised exercises

2. Use the concepts of D.C and A.C circuits in electrical installation	❑ Meaning of terms ❑ AC and DC, parallel and series R-L, R-C, R-L-C circuits ❑ AC and DC network theorems e.g • Kirchoff's laws • Superposition • Thevinin's • Norton's • AC to DC and DC to AC Conversion	❑ Written tests ❑ Oral questioning ❑ Assignments ❑ Supervised exercises
3. Use of basic electrical machine	❑ Types of single phase Electrical machines ❑ DC machines, ❑ AC Single phase motors and generators ❑ Transformers ❑ Application of AC and DC machines	❑ Assignments ❑ Oral questioning ❑ Supervised exercises ❑ Written tests ❑ Practical tests
4. Use of power factor in electrical installation	❑ Meaning of power factor ❑ Meaning of terms ❑ Power triangle ❑ Power factor correction	❑ Assignments ❑ Oral questioning ❑ Practical tests ❑ Observation ❑ Supervised exercises ❑ Written tests
5. Use of earthing in Electrical installations	❑ Meaning of Earthing ❑ Terms in Earthing ❑ Earthing points in Electrical installation ❑ Methods of earthing ❑ Factors to consider in selecting an earthing method ❑ Testing an earthing system	❑ Assignments ❑ Supervised exercises ❑ Written tests ❑ Practical test
6. Apply Electrostatics	❑ Meaning of Electrostatic field • Sources of Electrical static field ❑ Meaning of capacitor and capacitance ❑ Meaning of terms ❑ Types capacitors ❑ Charging and discharging ❑ Capacitors connection ❑ Calculations involving capacitors	❑ Assignments ❑ Oral questioning ❑ Supervised exercises ❑ Written tests

7. Apply Magnetism and Electromagnetism	❑ Meaning of Magnetism and magnetic fields ❑ Sources of Magnetic field ❑ Meaning of Teams ❑ Electromagnetic losses e.g Hysteresis, Leakage and flux fringing ❑ Laws of Electromagnetism ❑ Calculations in the Electromagnetism	❑
8. Apply transients in Electrical Circuit Analysis	❑ Meaning of Growth and decay in R-L & R-C circuits ❑ Calculations involving R-L& R-C circuits ❑ Application of Growth and decay in R-L & R-C Circuits	❑ Assignments ❑ Oral questioning ❑ Supervised exercises ❑ Written tests

Suggested Delivery Methods

- Group discussions
- Demonstration by trainer
- Exercises by trainee

Recommended Resources

- Scientific Calculators
- Relevant reference materials
- Stationeries
- Electrical workshop
- Relevant practical materials
- Dice
- Computers with internet connection