FEDERAL MINISTRY OF EDUCATION

# National Skills Qualifications FOR ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIRS

## LEVEL 1, 2 & 3

**February, 2025**

NATIONAL BOARD FOR TECHNICAL EDUCATION
NBTE

Innovation Development and Effectiveness in the Acquisition of Skills (IDEAS) Project

THE WORLD BANK

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**National Board for Technical Education**

Plot B, Bida Road, P.M.B. 2239, Kaduna, Nigeria

## NATIONAL SKILLS QUALIFICATION

# ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIRS

# LEVELS 1-3

**FEBRUARY, 2025**

**Contents**

NATIONAL SKILLS QUALIFICATION

# ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIRS

# LEVEL 1

FEBRUARY, 2025

# GENERAL INFORMATION

**QUALIFICATION PURPOSE**

The National Skills Qualification in Electrical Installation Maintenance and Repairs is designed to produce a skilled Electrician who should be able to carry out domestic electrical installation, maintain and repair electrical faults in buildings

**QUALIFICATION OBJECTIVES**

The learner should be able to:

1. Handle most domestic electrical installation work involving installation of simple lighting and fire alarm systems with adherence to health and safety guidelines.

2. Use different electrical test instruments to identify and rectify faults in a simple domestic installation as well as being able to join and terminate different types of electric cables and conductors.

3. Independently carry out more complex domestic installation using different types of electrical wiring systems.

4. Install audio-visual and CCTV systems and components including the use of appropriate protective devices.

5. Install and maintain basic electrical machines as well as the ability to construct and install simple electric panel.

**Qualification: Electrical Installation, Maintenance and Repairs**

**NSQ Level:** **1**

**Credit Value:** **19**

**Guided Learning Hours:** **190**

**Level Purpose:**

This qualification is about Electrical Installation Maintenance and Repairs designed to produce an electrician who should be able to assist a Master-Craft person in domestic installation and carry out simple electrical maintenance in buildings.

**Level Objectives**

At the end of the Units, the Learner should be able to:

1. Communicate effectively in a workplace
2. Work in a team
3. Comply with the occupational health and safety requirements in electrical work environment;
4. Identify and draw basic electrical components and symbols;
5. Identify and use basic electrical tools, measuring instruments and materials.
6. Use protective devices in electrical installations;
7. Assist in basic electrical wiring and installations

**Level Assessment Requirements/Evidence Requirements**

The evidence required in this level are:

1. Question and Answer (Q&A)
2. Direct Observation of the learner's performance (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness testimony (WT)
5. Personal statement/reflective account (PS/RA)
6. Work Product (WP)

**Mandatory Units**

| Unit No | Reference Number | NSQ Title | Credit Value | Guided Learning Hours | Remark |
|---|---|---|---|---|---|
| 001 | CON/EI/001/L1 | Communication in a Work Environment | 3 | 30 | Level 1 |
| 002 | CON/EI/002/L1 | Occupational Health and Safety in a work environment | 3 | 30 | Level 1 |
| 003 | CON/EI/003/L1 | Teamwork | 2 | 20 | Level 1 |
| 004 | CON/EI/005/L1 | Electrical Components, Symbols, Drawing s and Layouts | 2 | 20 | Level 1 |
| 005 | CON/EI/006/L1 | Use of Electrical Tools, Measuring Instruments and Materials | 3 | 30 | Level 1 |
| 006 | CON/EI/007/L1 | Basic Electrical Wiring and Installation | 3 | 30 | Level 1 |
| 007 | CON/EI/008/L1 | Electrical Protective Devices | 3 | 30 | Level 1 |
| **TOTAL** | | | **19** | **190** | |

**Unit 1: Communication in a Work Environment**

| | |
|---|---|
| **Unit Reference Number:** | **CON/EI/001/L1** |
| **NSQ Level:** | **1** |
| **Credit Value:** | **3** |
| **Guided Learning Hours:** | **30** |

**Unit Purpose:**

At the end of this Unit, the Learner should be able to establish communication skills that is responsive and subject to change in meeting workers' /employers' needs in the work environment. Apply communication methods to share information and follow instructions in a work environment.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Use simple communication skills in a work environment | 1.1 | Use simple verbal means to pass on necessary information. | | | | | | | | | |
| | 1.2 | Be able to receive simple verbal instructions accurately. | | | | | | | | | |
| | 1.3 | Use non-verbal means to convey necessary information e.g. body language | | | | | | | | | |
| | 1.4 | Be able to receive simple non-verbal instruction | | | | | | | | | |
| | 1.5 | Interpret symbols and signs appropriately. | | | | | | | | | |
| LO 2: Know Sources of information in a work environment | 2.1 | Identify the sources of workplace information | | | | | | | | | |
| | 2.2 | Communicate appropriately with sources of information. | | | | | | | | | |
| | 2.3 | Use the various information flow systems in a work environment. | | | | | | | | | |
| | 2.4 | Solve workplace challenges using information | | | | | | | | | |
| | 2.5 | Report findings in accordance with procedures | | | | | | | | | |
| LO 3: Use various communication means in a work environment. | 3.1 | Identify, the various Communication equipment in the work environment. | | | | | | | | | |
| | 3.2 | Effectively use, various workplace communication equipment. | | | | | | | | | |
| | 3.3 | Communicate effectively using symbols, signs and codes. | | | | | | | | | |
| | 3.4 | Communicate effectively to the appropriate personnel. | | | | | | | | | |
| | 3.5 | Follow workplace communication protocols | | | | | | | | | |

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| Learners Signature: Date: |
| Assessors Signature: Date: |
| IQA Signature (if sampled): Date: |
| EQA Signature (if sampled): Date: |

**Unit 2: Occupational Health and Safety in a Work Environment**

| | |
|---|---|
| **Unit Reference Number:** | **CON/EI/002/L1** |
| **NSQ Level:** | **1** |
| **Credit Value:** | **3** |
| **Guided Learning Hours:** | **30** |

**Unit Purpose:**

At the end of this Unit, the Learner should be able to understand basic safety and health precautions and maintain personal health and hygiene to prevent hazards and deal with one appropriately in the workplace.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Recognize personal health and hygiene | 1.1 | Use personal protective equipment (PPE)appropriately | | | | | | | | | |
| | 1.2 | Maintain personal hygiene in the workplace | | | | | | | | | |
| | 1.3 | Follow workplace safety regulations | | | | | | | | | |
| | 1.4 | Comply with personal health and safety requirements. | | | | | | | | | |
| | 1.5 | State the importance of maintaining good personal hygiene in a workplace | | | | | | | | | |
| | 1.6 | Report workplace injuries and illnesses to appropriate personnel | | | | | | | | | |
| | 1.7 | Report illness and infection promptly to the appropriate personnel | | | | | | | | | |
| LO 2: Maintain a hygienic, safe and secure workplace | 2.1 | Follow health, hygiene and safety procedures at work place | | | | | | | | | |
| | 2.2 | Respond to Workplace Emergencies Effectively | | | | | | | | | |
| | 2.3 | Follow organizational security procedures | | | | | | | | | |
| | 2.4 | Implement Workplace Housekeeping Procedures | | | | | | | | | |
| | 2.5 | Keep Tools, Equipment and Materials at Work Environment appropriately | | | | | | | | | |
| LO 3: Prevent hazards and maintain a safe and secure workplace | 3.1 | Identify Workplace Hazards or potential hazards | | | | | | | | | |
| | 3.2 | Eliminate Workplace Hazards or potential hazards | | | | | | | | | |
| | 3.3 | Follow hazard reporting procedures | | | | | | | | | |
| | 3.4 | Use Safety Equipment appropriately (e.g. Fire Extinguishers) | | | | | | | | | |
| | 3.5 | Report safety concerns to supervisors | | | | | | | | | |
| | 3.6 | Follow emergency response protocols | | | | | | | | | |
| | 3.7 | Identify the Consequences of Unsafe Practices | | | | | | | | | |
| | 3.8 | Never work alone in any situation | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 3: Teamwork**

**Unit Reference Number:** **CON/EI/003/L1**

**NSQ Level:** **1**

**Credit Value:** **2**

**Guided Learning Hours:** **20**

**Unit Purpose:**

At the end of this Unit, the Learner should have been impacted with the skills, knowledge and understanding required to develop team spirit in the workplace as well as work effectively in teams by sharing tasks and respecting roles.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Develop Positive working relationships with colleagues | 1.1 | State the importance of developing positive working relationships with colleagues | | | | | | | | | |
| | 1.2 | Demonstrate respect when interacting with colleagues. | | | | | | | | | |
| | 1.3 | Assist team members when required | | | | | | | | | |
| | 1.4 | Report unresolved issues to supervisors | | | | | | | | | |
| | 1.5 | Communicate information to colleagues about own work that might affect others | | | | | | | | | |
| LO 2: Take responsibilities within the team | 2.1 | Recognize assigned roles and responsibilities within the team | | | | | | | | | |
| | 2.2 | Perform assigned tasks in line with the team rules and regulations | | | | | | | | | |
| | 2.3 | Participate effectively in teamwork e.g. team meetings and group discussions | | | | | | | | | |
| | 2.4 | Provide updates and progress on any challenge encountered to supervisors | | | | | | | | | |
| | 2.5 | Support team members when needed. | | | | | | | | | |
| LO 3: Compliance with the organizational policy | 3.1 | Work in line with organizational standards | | | | | | | | | |
| | 3.2 | Use organizational code of conduct. | | | | | | | | | |
| | 3.3 | Communicate information to colleagues in compliance with the policy of the organization | | | | | | | | | |
| | 3.4 | Maintain accurate workplace records. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

## Unit 4: Identification of Components, Symbols, Drawings and Layouts

| | |
|---|---|
| **Unit Reference Number:** | **CON/EI/004/L1** |
| **NSQ Level:** | **1** |
| **Credit Value:** | **2** |
| **Guided Learning Hours:** | **20** |

**Unit Purpose:**

At the end of this Unit, the Learner should be able to identify components, interpret basic electrical symbols, follow relevant legends and sketch basic layouts for domestic installations. Also, they should be able to identify wiring, line and schematic diagrams.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Identify Basic Electrical Components and Symbols | 1.1 | Identify basic signs and symbols in electrical installation. | | | | | | | | | |
| | 1.2 | Identify some basic electrical components and accessories used in domestic installations. | | | | | | | | | |
| | 1.3 | Sketch basic electrical components e.g. Switch, Lamp holders, Socket outlets, etc. | | | | | | | | | |
| | 1.4 | Sketch basic electrical symbols e.g. Switch, Lamp holders, Socket outlets, etc. | | | | | | | | | |
| | 1.5 | Interpret electrical drawing abbreviations used in domestic installation | | | | | | | | | |
| LO 2: Identify Electrical circuit diagrams | 2.1 | Recognize legends and symbols in circuit diagrams | | | | | | | | | |
| | 2.2 | Identify electrical devices used in domestic installation. | | | | | | | | | |
| | 2.3 | Distinguish between wiring, line and schematic diagrams | | | | | | | | | |
| LO 3: Identify Electrical layout diagrams | 3.1 | Locate accessories in a layout diagram. | | | | | | | | | |
| | 3.2 | Identify components positions in layout diagrams | | | | | | | | | |
| | 3.3 | Sketch a simple layout diagram based on a schematic Drawing | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 5: Identification and Handling of Tools, Measuring Instruments and Materials**

**Unit Reference Number:** **CON/EI/005/L1**

**NSQ Level:** **1**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to identify the right tools and demonstrate proper handling of the tools.
Also, be able to Identify and use electrical measuring instruments effectively.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Identify and use Electrical Installation tools | 1.1 | Identify hand tools used for electrical installation and maintenance. | | | | | | | | | |
| | 1.2 | Identify power tools used for electrical installation and maintenance. | | | | | | | | | |
| | 1.3 | Sketch hand tools used in Electrical installation | | | | | | | | | |
| | 1.4 | Sketch power tools used in Electrical installation | | | | | | | | | |
| | 1.5 | Mention the importance of Hand and Power tools in carrying out electrical installation. | | | | | | | | | |
| | 1.6 | Apply hand tools correctly for assigned tasks. | | | | | | | | | |
| | 1.7 | Apply power tools safely in accordance with guidelines | | | | | | | | | |
| LO 2: Demonstrate handling and maintenance of electrical tools | 2.1 | Apply hand tools according to the organizational policies and manufacturer's manual | | | | | | | | | |
| | 2.2 | Apply power tools according to the organizational policies and manufacturers' manual | | | | | | | | | |
| | 2.3 | Observe tools for defects before use. | | | | | | | | | |
| | 2.4 | State Safety procedures in handling tools and materials | | | | | | | | | |
| | 2.5 | Carryout maintenance of basic electrical tools | | | | | | | | | |
| | 2.6 | Report faulty tools for repairs or replacement | | | | | | | | | |
| | 2.7 | Store tools securely after use | | | | | | | | | |
| LO 3: Use electrical Measuring Instruments | 3.1 | Identify basic electrical measuring instruments. | | | | | | | | | |
| | 3.2 | Measure current, voltage and resistance of electrical simple circuit using appropriate measuring instrument | | | | | | | | | |
| | 3.3 | Observe safety measures in the use of the electrical measuring instruments | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 6: Basic Electrical Wiring and Installation**

**Unit Reference Number:** **CON/EI/007/L1**

**NSQ Level:** **1**

**Credit value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to carry out basic electrical domestic installation.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Identify materials, fittings, and accessories for domestic installations | 1.1 | Identify cables used in domestic installations. | | | | | | | | | |
| | 1.2 | Select conduits and trucking for wiring correctly | | | | | | | | | |
| | 1.3 | Identify electrical accessories such as sockets and switches to be used in domestic installation. | | | | | | | | | |
| | 1.4 | Identify lighting fixtures used in domestic wiring. | | | | | | | | | |
| | 1.5 | Choose circuit breakers used in domestic installations correctly. | | | | | | | | | |
| LO 2: Prepare for domestic electrical installation | 2.1 | Select appropriate tools for domestic wiring | | | | | | | | | |
| | 2.2 | Measure cables accurately | | | | | | | | | |
| | 2.3 | Cut cables accurately | | | | | | | | | |
| | 2.4 | Strip cable insulation properly. | | | | | | | | | |
| | 2.5 | Join conductors securely using appropriate connectors | | | | | | | | | |
| LO 3: Install basic domestic electrical systems | 3.1 | Route cables neatly within conduits and trunking | | | | | | | | | |
| | 3.2 | Fix electrical fittings in designated locations | | | | | | | | | |
| | 3.3 | Connect wiring securely to fittings | | | | | | | | | |
| | 3.4 | Follow standard wiring procedures for safe installation. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 7: Electrical Protective Devices**

**Unit Reference Number:** **CON/EI/008/L1**

**NSQ Level:** **1**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to understand the purpose and use of protective devices in electrical installation.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning (RPL)
4. Witness testimony
5. Personal statement/Reflective account

| Learning outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Demonstrate the use of electrical protective devices in electrical installation | 1.1 | Identify basic protective devices and warning signs used in electrical installations. | | | | | | | | | |
| | 1.2 | Locate protective devices in electrical installation. | | | | | | | | | |
| | 1.3 | Identify sizes and types of protective devices for a particular installation. | | | | | | | | | |
| | 1.4 | Identify causes of abnormal conditions in electrical installations. | | | | | | | | | |
| | 1.5 | Operate the protective devices correctly in accordance with approved procedures and regulations. | | | | | | | | | |
| | 1.6 | Sketch the symbols of protective devices in electrical installation. | | | | | | | | | |
| | 1.7 | Outline the uses of protective devices in electrical installations | | | | | | | | | |
| | 1.8 | Outline proper earthing lightening and surge protection measures. | | | | | | | | | |
| LO 2: Apply safety measures in handling protective devices | 2.1 | Observe protective devices for defects before use | | | | | | | | | |
| | 2.2 | Use protective devices according to safety standards | | | | | | | | | |
| | 2.3 | Report defective protective devices for repair or replacement | | | | | | | | | |
| | 2.4 | Work safely when handling protective devices. | | | | | | | | | |
| LO 3: Install simple protective devices | 3.1 | Provide safe handling of protective devices before installation | | | | | | | | | |
| | 3.2 | Install single phase protective device in a domestic installation | | | | | | | | | |
| | 3.3 | Work safely at all times when handling protective devices complying with health and safety and other relevant regulations and guidelines. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

NATIONAL SKILLS QUALIFICATION

# ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIRS

# LEVEL 2

FEBRUARY, 2025

**Qualification: Electrical Installation, Maintenance and repairs**

**NSQ Level:** **2**

**Credit Value:** **26**

**Guided Learning Hours:** **260**

**Level Objective:**

At the end of the Units, the Learner should be able to:

1. Communicate effectively in the workplace.
2. Apply the occupational health and safety requirements in electrical work environment.
3. Work effectively in a team
4. Carry out different types of electrical wiring systems (surface, conduit and trunking).
5. Carry out installations and maintenance of domestic electrical systems.
6. Install a fire alarm system in a building.
7. Carry out general tests in electrical installations following statutory and industry standards.
8. Identify and use the various types of cables and conductors, their selection, jointing, and termination.
9. Select appropriate illumination based on the standard luminous intensity and carry out the installation of simple lighting systems.
10. Use protective devices in electrical installation.
11. Use warning sign on all hazard electrical installation

**Level Assessment Requirements/Evidence Requirements**

The evidence required at this level includes:

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness testimony (WT)
5. Personal statement/reflective account (PS/RA).
6. Work Product (WP)

**Mandatory Units**

| Unit No. | Reference Number | NOS Title | Credit Value | Guided Learning Hours | Remark |
|---|---|---|---|---|---|
| 001 | CON/EI/001/L2 | Communication System in a Work Environment | 3 | 30 | Level 2 |
| 002 | CON/EI/002/L2 | Occupational Health and Safety requirements in a Work environment | 3 | 30 | Level 2 |
| 003 | CON/EI/003/L2 | Teamwork in electrical workplace | 2 | 20 | Level 2 |
| 004 | CON/EI/004/L2 | Types of Wiring in Electrical Installation | 5 | 50 | Level 2 |
| 005 | CON/EI/005/L2 | Domestic Installations I | 4 | 40 | Level 2 |
| 006 | CON/EI/006/L2 | Protective Devices: Installation and Operation | 3 | 30 | Level 2 |
| 007 | CON/EI/007/L2 | Cable: Types, Selection, Jointing and Termination | 3 | 30 | Level 2 |
| 008 | CON/EI/008/L2 | Testing Electrical Systems, Equipment, and Components | 3 | 30 | Level 2 |
| **TOTAL** | | | **26** | **260** | |

**Optional Units**

| Unit No | Reference Number | NOS Title | Credit Value | Guided Learning Hours | Remark |
|---|---|---|---|---|---|
| 009 | CON/EI/009/L2 | Lighting Systems/Illumination | 3 | 30 | Level 2 |
| 010 | CON/EI/010/L2 | Installation of Fire Alarm Systems in Building | 3 | 30 | Level 2 |
| **TOTAL** | | | **6** | **60** | |

**NOTE:** This is a 29-credit value qualification and to achieve this qualification; learners are required to achieve 26 credits from mandatory units and3 credit from the optional units. Each Credit is equivalent to approx. 10 Guided Learning Hours (GLH).

**Unit 1: Communication in a Work Environment**

**Unit Reference Number:** **CON/EI/001/L2**

**NSQ Level:** **2**

**Credit Value:** **3**

**Guided Learning Hours (GLH): 30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to use communication skills in a dynamic work environment, adapting messages to varied audiences and situations.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness testimony (WT)
5. Personal statement/reflective account (PS/RA)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Develop effective workplace communication systems | 1.1 | Use verbal communication clearly and professionally | | | | | | | | | |
| | 1.2 | Recognize workplace symbols and signs | | | | | | | | | |
| | 1.3 | Process instructions accurately from supervisors | | | | | | | | | |
| | 1.4 | Communicate with subordinates effectively. | | | | | | | | | |
| | 1.5 | Maintain professional communication with colleagues and clients. | | | | | | | | | |
| LO 2: Determine the source of information in a work environment | 2.1 | Locate the source of information in a work environment. | | | | | | | | | |
| | 2.2 | Relate appropriately with sources of information. | | | | | | | | | |
| | 2.3 | Compare information from different sources to validate data | | | | | | | | | |
| | 2.4 | Use information to avoid challenges in a work situation. | | | | | | | | | |
| | 2.5 | Report findings in accordance with procedure in a work environment. | | | | | | | | | |
| LO 3: Demonstrate proficiency in the use of communication means in a work environment. | 3.1 | Locate the various communication equipment in the work environment. | | | | | | | | | |
| | 3.2 | Operate effectively the various communication equipment in a work environment. | | | | | | | | | |
| | 3.3 | Communicate information effectively using symbols, signs and codes. | | | | | | | | | |
| | 3.4 | Communicate information effectively to the right personnel. | | | | | | | | | |
| | 3.5 | Comply with instruction in line with the ethics of the work environment. | | | | | | | | | |

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|---|---|
| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 2: Occupational Health, Safety and Environmental Requirements**

| | |
|---|---|
| **Unit Reference Number:** | **CON/EI/002/L2** |
| **NSQ Level:** | **2** |
| **Credit Value:** | **3** |
| **Guided Learning Hours:** | **30** |

**Unit Purpose:**

At the end of this Unit, the Learner should be able to understand and implement advanced health, safety, and environmental precautions, maintain personal health and hygiene, and prevent hazards appropriately in the workplace.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness testimony (WT)
5. Personal statement/reflective account (PS/RA)
6. Simulation

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Recognize personal health and hygiene | 1.1 | Demonstrate the proper use of personal protective equipment (PPE). | | | | | | | | | |
| | 1.2 | Use personal protective equipment (PPE). Appropriately | | | | | | | | | |
| | 1.3 | Report workplace injuries, illness, and infection promptly to the appropriate person | | | | | | | | | |
| | 1.4 | Work safely at all times, complying with health, safety and other relevant regulations and guidelines | | | | | | | | | |
| | 1.5 | State the importance of maintaining good personal hygiene | | | | | | | | | |
| | 1.6 | Address workplace injuries appropriately | | | | | | | | | |
| LO 2: Maintain a hygienic, safe and secure workplace | 2.1 | Implement health, hygiene, and safety procedures at the workplace | | | | | | | | | |
| | 2.2 | Implement emergency response procedures in a simulated environment | | | | | | | | | |
| | 2.3 | Follow organizational security procedures | | | | | | | | | |
| | 2.4 | Maintain tools and equipment in line with organizational standards | | | | | | | | | |
| LO 4: Prevent hazards and maintain a safe and secure workplace | 3.1 | Detect any hazard or potential hazard in a workplace | | | | | | | | | |
| | 3.2 | Implement corrective actions to eliminate identified hazards | | | | | | | | | |
| | 3.3 | Use specialized safety equipment correctly | | | | | | | | | |
| | 3.4 | Report safety incidents accurately | | | | | | | | | |
| | 3.5 | Describe the consequences of accidents and near accidents in the work environment | | | | | | | | | |
| | 3.6 | Describe the organizational procedures during emergencies | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 3: Teamwork**

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|---|---|
| **Unit Reference Number:** | **CON/EI/003/L2** |
| **NSQ Level:** | **2** |
| **Credit Value:** | **2** |
| **Guided Learning Hours:** | **20** |

**Unit Purpose:**

At the end of this Unit, the Learner should have the skills, knowledge, and understanding required to develop team spirit in the workplace and be able to collaborate effectively with a diverse team in a work environment, taking on greater individual responsibility and contributing to organizational success

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness testimony (W.T)
5. Personal statement/Reflective Account (PS/RA)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Demonstrate Positive working relationships with colleagues | 1.1 | Explain the importance of building positive team relationships in a technical environment. | | | | | | | | | |
| | 1.2 | Identify key roles and responsibilities within the team. | | | | | | | | | |
| | 1.3 | Assist team members when required | | | | | | | | | |
| | 1.4 | Communicate directives and information to subordinates with respect | | | | | | | | | |
| | 1.5 | Communicate information to colleagues about own work that might affect others | | | | | | | | | |
| LO 2: Recognize responsibilities within the team | 2.1 | Recognize own role and responsibilities within the team | | | | | | | | | |
| | 2.2 | Accept individual roles in team projects | | | | | | | | | |
| | 2.3 | Participate effectively in teamwork | | | | | | | | | |
| | 2.4 | Execute assigned tasks accurately under team protocols | | | | | | | | | |
| LO 3: Comply with the organizational policy | 3.1 | Operate in full compliance with organizational policies | | | | | | | | | |
| | 3.2 | Use organizational code of conduct to guide decision making | | | | | | | | | |
| | 3.3 | Communicate information to colleagues in compliance with policy of the organization | | | | | | | | | |
| | 3.4 | Maintain accurate records as required by organizational procedures | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 4: Types of Wiring in Electrical Installation**

**Unit Reference Number:** **CON/EI/004/L2**

**NSQ Level:** **2**

**Credit Value:** **5**

**Guided Learning Hours:** **50**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to compare and apply various wiring methods such as surface, conduit, and trunking wiring in electrical installations with technical accuracy and adherence to NERC regulations, NEMSA guidelines and other safety regulations.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal statement/Reflective Account (PS/RA)
6. Work Product (WP)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Differentiate types of Wiring Methods | 1.1 | Identify types of wiring methods | | | | | | | | | |
| | 1.2 | Select the right type of wiring for a particular installation. | | | | | | | | | |
| | 1.3 | Select and use appropriate materials for a particular wiring method. | | | | | | | | | |
| | 1.4 | State the advantages and disadvantages of different types of wiring methods. | | | | | | | | | |
| LO 2: Carryout Surface Wiring in domestic installation | 2.1 | Work safely at all times, complying with necessary health and safety regulation. | | | | | | | | | |
| | 2.2 | Carryout surface wiring methods in electrical installation. | | | | | | | | | |
| | 2.3 | Sketch a surface wiring diagram | | | | | | | | | |
| | 2.4 | Demonstrate the use of appropriate tools and equipment for surface wiring. | | | | | | | | | |
| | 2.5 | Carryout wiring in a sequential order using appropriate tools and techniques | | | | | | | | | |
| | 2.7 | Carry out test of the completed surface wiring using the appropriate instrument. | | | | | | | | | |
| LO 3: Carryout Conduit Wiring in domestic installation | 3.1 | Always Work safely, complying with necessary health and safety regulations. | | | | | | | | | |
| | 3.2 | Describe conduit wiring methods in electrical installation. | | | | | | | | | |
| | 3.3 | Sketch a conduit wiring diagram. | | | | | | | | | |
| | 3.4 | Identify the materials and accessories used in conduit wiring. | | | | | | | | | |
| | 3.5 | Demonstrate the use of appropriate tools and equipment for conduit wiring | | | | | | | | | |
| | 3.6 | Carryout conduit wiring in a sequential order using appropriate tools and techniques | | | | | | | | | |
| | 3.7 | Carry out tests of completed conduit wiring using the appropriate instrument. | | | | | | | | | |
| LO 4: Carryout Trunking Wiring | 4.1 | Always Work safely, complying with necessary health and safety regulations. | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| in domestic installation | 4.2 | Describe trunking methods in electrical installation. | | | | | | | | | |
| | 4.3 | Sketch a trunking wiring diagram | | | | | | | | | |
| | 4.4 | Demonstrate the use of appropriate tools and equipment for trunking wiring. | | | | | | | | | |
| | 4.5 | Identify the materials and accessories used in a trunking wiring system. | | | | | | | | | |
| | 4.6 | Carryout trunking in a sequential order using appropriate tools and techniques | | | | | | | | | |
| | 4.7 | Carry out tests of the completed trunking wiring system using appropriate instruments. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 5: Domestic Installations I**

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|---|---|
| **Unit Reference Number:** | **CON/EI/005/L2** |
| **NSQ Level:** | **2** |
| **Credit Value:** | **4** |
| **Guided Learning Hours:** | **40** |

**Unit Purpose:**

At the end of this Unit, the Learner should be able to carry out domestic electrical installations, and testing of such installations using appropriate testing instruments in adherence to NERC regulations, NEMSA guidelines and other regulatory standards

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal statement/Reflective Account (PS/RA)
6. Work Product (WP)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Install lighting circuits in a domestic installation | 1.1 | Assemble lighting circuits using proper tools and techniques | | | | | | | | | |
| | 1.2 | Interpret relevant lighting circuit diagrams to carry out required work. | | | | | | | | | |
| | 1.3 | Identify different lighting circuits applications. | | | | | | | | | |
| | 1.4 | Identify typical connections of lighting equipment in a building. | | | | | | | | | |
| | 1.5 | Select appropriate lighting circuit fittings based on technical specifications | | | | | | | | | |
| | 1.6 | Install lighting circuit based on the circuit diagram complying with industry best practice | | | | | | | | | |
| | 1.7 | Carry out tests of the completed lighting circuit installation using appropriate instruments. | | | | | | | | | |
| LO 2: Install power circuits in domestic installation | 2.1 | Assemble power circuits using appropriate tools and techniques | | | | | | | | | |
| | 2.2 | Identify relevant lighting circuit diagrams to carry out required work. | | | | | | | | | |
| | 2.3 | Identify different power circuit applications. | | | | | | | | | |
| | 2.4 | Identify typical connections of power equipment in a building. | | | | | | | | | |
| | 2.5 | Select appropriate power circuit components and fittings based on technical specifications | | | | | | | | | |
| | 2.6 | Install power circuit based on the circuit diagram complying with industry best practice | | | | | | | | | |
| | 2.7 | Carry out tests of the completed lighting circuit installation using appropriate instruments. | | | | | | | | | |
| LO 3: Inspect Domestic Installation | 3.1 | Observe the safety regulations on inspection of domestic installation. | | | | | | | | | |
| | 3.2 | Carry out visual inspection on all connections made on domestic installation. | | | | | | | | | |
| | 3.3 | Identify defects, loose contacts, and abnormal joints in the installation. | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3.4 | Demonstrate tightening of all loose contacts and joints. | | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 6: Protective Devices: Installation and Operation**

**Unit Reference Number:** **CON/EI/006/L2**

**NSQ Level:** **2**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to install, operate, and maintain protective devices in electrical installations in compliance with statutory regulations and industry standards.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal statement/Reflective Account (PS/RA)
6. Work Product (WP)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Differentiate types of Protective Devices | 1.1 | Identify common protective devices used in electrical installations. | | | | | | | | | |
| | 1.2 | Locate protective devices in an electrical circuit. | | | | | | | | | |
| | 1.3 | Select the appropriate size and type of protective device for a particular installation. | | | | | | | | | |
| | 1.4 | Identify causes of abnormal conditions in electrical installations. | | | | | | | | | |
| | 1.5 | Sketch the symbols of protective devices in electrical circuits. | | | | | | | | | |
| LO 2: Describe the uses of Protective Devices | 2.1 | Identify different methods of protecting electrical installations | | | | | | | | | |
| | 2.2 | Outline the uses of protective devices in electrical installations | | | | | | | | | |
| | 2.3 | State the advantages and disadvantages of the following protective device.<br>(i) Fuse<br>(ii) Circuit breakers | | | | | | | | | |
| LO 3: Install and operate Protective Devices | 3.1 | Differentiate between current-operated and voltage-operated protective devices. | | | | | | | | | |
| | 3.2 | Assemble protective devices using correct procedures | | | | | | | | | |
| | 3.3 | Carry out the installation of protective devices in accordance with safe working practices. | | | | | | | | | |
| | 3.4 | Operate protective devices in line with approved standards. | | | | | | | | | |
| | 3.5 | Distinguish between the operation of a fuse and a circuit breaker. | | | | | | | | | |
| LO 4: Maintain and Troubleshoot Protective Devices | 4.1 | Identify appropriate instruments used for troubleshooting protective devices in electrical installations | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4.2 | Test the operation of protective devices in an installation. | | | | | | | | | |
| | 4.3 | Identify abnormal conditions in protective devices | | | | | | | | | |
| | 4.4 | Test protective devices to confirm proper operation | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 7: Cable: Types, Selection, Jointing and Termination**

**Unit Reference Number:** **CON/EI/007/L2**

**NSQ Level:** **2**

**Credit Value:** **2**

**Guided Learning Hours:** **20**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to identify, install, joint, terminate, and test various types of cables and conductors, following NERC regulations, NEMSA guidelines and industry best practices

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal statement/Reflective Account (PS/RA)
6. Work Product (WP)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Install electrical cables | 1.1 | Identify types of cables, their ratings and applications | | | | | | | | | |
| | 1.2 | Select appropriate cable for a specific installation. | | | | | | | | | |
| | 1.3 | Identify different methods of laying electrical cables. | | | | | | | | | |
| LO 2: Carryout Jointing and termination electrical cables | 2.1 | Identify basic tools and materials used in cable jointing. | | | | | | | | | |
| | 2.2 | Carry out jointing of different cables in accordance with relevant safe work practices. | | | | | | | | | |
| | 2.3 | Terminate cables using appropriate techniques. | | | | | | | | | |
| | 2.4 | Demonstrate safe handling and installation practices. | | | | | | | | | |
| LO 3: Test and troubleshoot Electrical Cables | 3.1 | Identify causes of cable faults. | | | | | | | | | |
| | 3.2 | Select appropriate equipment for cable fault location. | | | | | | | | | |
| | 3.3 | Use appropriate methods for cable fault location. | | | | | | | | | |
| | 3.4 | Use appropriate testing instruments to carry out tests on cables and conductors | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 8: Testing Electrical Systems, Equipment, and Components**

**Unit Reference Number:** **CON/EI/008/L2**

**NSQ Level:** **2**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to carry out various tests such as continuity, polarity, earth effectiveness, and short-circuit on electrical systems and components, ensuring compliance with safety standards and operational specifications.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal Statement/Reflective Account (PS/RA)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Understand Safety Regulations for Testing Electrical systems | 1.1 | State safety regulations related to electrical testing. | | | | | | | | | |
| | 1.2 | Outline the safety regulations in handling testing instruments. | | | | | | | | | |
| | 1.3 | Explain the importance of using personal protective equipment while carrying out testing. | | | | | | | | | |
| LO 2: Test electrical systems | 2.1 | Identify instruments used for continuity, polarity, and insulation tests | | | | | | | | | |
| | 2.2 | Inspect the instruments to confirm their functionality | | | | | | | | | |
| | 2.3 | Demonstrate continuity test using standard procedures. | | | | | | | | | |
| | 2.4 | Demonstrate polarity testing using standard procedures. | | | | | | | | | |
| LO 3: Record and report Test results | 3.1 | Record test results in a clear and organized format | | | | | | | | | |
| | 3.2 | Compare test results against regulatory standards | | | | | | | | | |
| | 3.3 | Communicate findings through formal test reports | | | | | | | | | |
| | 3.4 | Maintain records of test results for future reference | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 9: Lighting Systems/Illumination**

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|---|---|
| **Unit Reference Number:** | **CON/EI/009/L2** |
| **NSQ Level:** | **2** |
| **Credit Value:** | **3** |
| **Guided Learning Hours:** | **30** |

**Unit Purpose:**

At the end of this Unit, the Learner should be able to plan, install, and maintain simple lighting systems with technical accuracy and compliance with illumination standards.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal Statement/Reflective Account (PS/RA)
6. Work Product (WP)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Understand Fundamentals of Lighting Systems | 1.1 | List types of lighting systems. | | | | | | | | | |
| | 1.2 | Explain illumination concepts (luminous intensity, lumen, lux) | | | | | | | | | |
| | 1.3 | Sketch simple diagrams lighting points in a given installation. | | | | | | | | | |
| | 1.4 | State the safety requirements in lighting installations | | | | | | | | | |
| LO 2: Install Lighting Systems | 2.1 | Identify materials, accessories and equipment required to carry out the installation of illumination devices effectively. | | | | | | | | | |
| | 2.2 | Identify the most appropriate lighting system for a given area e.g. hospital, library, sports complex disco hall, etc. | | | | | | | | | |
| | 2.3 | Assemble lighting fixtures using the appropriate methods | | | | | | | | | |
| | 2.4 | Install lighting systems in accordance with electrical installation standards and regulations | | | | | | | | | |
| | 2.5 | Test the installed lighting systems to proper functioning. | | | | | | | | | |
| LO 3: Lighting systems maintenance | 3.1 | Identify faults in lighting system. | | | | | | | | | |
| | 3.2 | Identify the possible causes of lighting faults. | | | | | | | | | |
| | 3.3 | Carryout different test to determine faults in lighting systems. | | | | | | | | | |
| | 3.4 | Carryout maintenance on lighting systems. | | | | | | | | | |
| | 3.5 | Record and report lighting system performance. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 10: Installation of Fire Alarm Systems in Buildings**

**Unit Reference Number:** **CON/EI/010/L2**

**NSQ Level:** **2**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to install fire alarm systems in buildings while addressing the technical and safety regulations guiding such installations.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below.

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness Testimony (WT)
5. Personal Statement/Reflective Account (PS/RA)
6. Work Product (WP)

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Comply with the Safety Regulations and Guidelines in Fire alarm Installation | 1.1 | State statutory and industry safety regulations for fire alarm installations. | | | | | | | | | |
| | 1.2 | Comply with statutory and industry safety regulations for fire alarm installations. | | | | | | | | | |
| | 1.3 | Recognize proper fire alarm codes and standards. | | | | | | | | | |
| | 1.4 | Identify MCBs used for fire alarm systems sub-circuits in the Distribution Board (DB) | | | | | | | | | |
| | 1.5 | Explain the guidelines governing fire alarm system installation. | | | | | | | | | |
| LO 2: Prepare for the Installation of the fire alarm system | 2.1 | Identify types of alarm systems. | | | | | | | | | |
| | 2.2 | Distinguish the operation of different alarm systems. | | | | | | | | | |
| | 2.3 | Describe the operation of a fire alarm system. | | | | | | | | | |
| | 2.4 | Determine the optimal locations for fire alarm placement. | | | | | | | | | |
| | 2.5 | Develop a detailed installation plan for a fire alarm system | | | | | | | | | |
| LO 3: Install and test Fire alarm system | 3.1 | Use necessary tools to install fire alarm equipment and components in line with system installation, relevant regulations, and code of practice | | | | | | | | | |
| | 3.2 | Verify the installation in line with the industry's best practice | | | | | | | | | |
| | 3.3 | Carry out tests to confirm the functionality of the system and component | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

NATIONAL SKILLS QUALIFICATION

# ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIRS

# LEVEL 3

FEBRUARY, 2025

**Qualification: Electrical Installation Maintenance and Repairs**

**NSQ Level:** **3**

**Credit Value:** **37**

**Guided Learning Hours:** **370**

**Level Objective:**

At the end of the Level, the Learner should be able to:

1. Communicate effectively and work collaboratively in an electrical work environment.
2. Adhere to occupational health, safety, and environmental regulations in electrical installations.
3. Demonstrate effective teamwork and leadership in electrical installation projects.
4. Install, test, maintain, and inspect types of wiring systems (surface, conduit, and trunking) following industry standards.
5. Execute domestic electrical installations, including testing, troubleshooting and Inspection
6. Select, install, and operate protective devices to ensure system safety and reliability.
7. Implement electrical earthing techniques and perform earthing system testing.
8. Diagnose faults, conduct repairs, and maintain electrical systems and equipment.
9. Install and maintain audio-visual (AV) and CCTV systems in buildings.
10. Carry out underground cable and overhead line installations.
11. Iinstall, maintain and service AC and DC machines used in electrical applications.
12. Assemble and install electrical panels following proper engineering standards.

**Level assessment requirements/evidence requirements**

The evidence required in this level includes:

1. Question and Answer (Q&A)
2. Direct Observation (DO)
3. Recognition of Prior Learning (RPL)
4. Authentic statement/Witness testimony (WT)
5. Personal statement/reflective account (PS/RA)
6. Product of the learner’s work (WP)
7. Professional Discussion (PD)

**Mandatory Units**

| Unit No | Reference Number | NOS Title | Credit Value | Guided Learning Hours | Remark |
|---|---|---|---|---|---|
| 001 | CON/EI/001/L3 | Communication System in a Work Environment | 3 | 30 | Level 3 |
| 002 | CON/EI/002/L3 | Occupational Health, Safety and environment Requirement | 3 | 30 | Level 3 |
| 003 | CON/EI/003/L3 | Teamwork | 3 | 30 | Level 3 |
| 004 | CON/EI/004/L3 | Types of Wiring in Electrical Installation | 5 | 50 | Level 3 |
| 005 | CON/EI/005/L3 | Domestic Installations II | 6 | 60 | Level 3 |
| 006 | CON/EI/006/L3 | Protective Devices: Installation and Operation | 4 | 40 | Level 3 |
| 007 | CON/EI/007/L3 | Electrical Earthling Systems | 4 | 40 | Level 3 |
| 008 | CON/EI/008/L3 | Troubleshooting, Repairs and Maintenance of Electrical Systems, Equipment and Components | 4 | 40 | Level 3 |
| 009 | CON/EI/010/L3 | Underground Cables and Overhead Line Installation | 3 | 30 | Level 3 |
| **TOTAL** | | | **35** | **350** | |

**Optional Units**

| Unit No | Reference Number | NOS Title | Credit Value | Guided Learning Hours | Remark |
|---|---|---|---|---|---|
| 010 | CON/EI/011/L3 | Electrical (AC and DC) Machines | 3 | 30 | Level 3 |
| 011 | CON/EI/012/L3 | Assembly and Installation of Electrical Panel | 3 | 30 | Level 3 |
| 012 | CON/EI/009/L3 | Installation and Maintenance of Audio-Visual and CCTV Systems | 3 | 30 | Level 3 |
| **TOTAL** | | | **9** | **90** | |

**NOTE:** This is a 38-credit value qualification and to achieve this qualification; learners are required to achieve 35 credits from mandatory units and 3 credits from the optional units. Each Credit is equivalent to approx. 10 Guided Learning Hours (GLH).

**Unit 1: Communication System in a Work environment**

**Unit Reference Number: CON/EI/001/L3**

**NSQ Level: 3**

**Credit Value: 3**

**Guided Learning Hours: 30**

**Unit Purpose:**

At the end of this Unit, the Learner should be equipped with the communication skills necessary for effective teamwork and information exchange in a complex electrical work environment.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Professional Discussion
6. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Demonstrate an Effective Communication system in a work environment | 1.1 | Supervise the use of audio, electronic, and visual tools to pass on necessary information. | | | | | | | | | |
| | 1.2 | Describe non–verbal means of communication. | | | | | | | | | |
| | 1.3 | Read the concept of symbols and signs appropriately. | | | | | | | | | |
| | 1.4 | Interpret the concept of symbols and signs appropriately. | | | | | | | | | |
| | 1.5 | Apply active listening techniques in workplace communication | | | | | | | | | |
| LO 2: Promote the use of sources of information in a work environment | 2.1 | Participate in creating and making functional the sources of information in an organization. | | | | | | | | | |
| | 2.2 | Interpret workplace information sources effectively. | | | | | | | | | |
| | 2.3 | Relate appropriately with the sources of information. | | | | | | | | | |
| | 2.4 | Differentiate between formal and informal communication systems | | | | | | | | | |
| | 2.5 | Maintain proper documentation for records and communication | | | | | | | | | |
| LO 3: Use various communication means in a work environment. | 3.1 | Supervise to ensure the accessibility of the communication equipment in the work environment. | | | | | | | | | |
| | 3.2 | Describe the effective use of the various communication channels in a work environment. | | | | | | | | | |
| | 3.3 | Demonstrate the use of various communication means in a work environment. | | | | | | | | | |
| | 3.4 | Supervise the effective information flow to the right personnel. | | | | | | | | | |
| | 3.5 | Supervise the effective deployment of the use of | | | | | | | | | |

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| | | symbols, signs and codes. | | | | | | | | | |
| | 3.6 | Supervise to ensure that instructions are obeyed and disseminated in line with ethics of the work environment. | | | | | | | | | |
| LO 4: Maintain and deploy communication equipment | 4.1 | Inspect the communication equipment and ensure that they are in good working condition. | | | | | | | | | |
| | 4.2 | Monitor the maintenance of the communication equipment regularly. | | | | | | | | | |
| | 4.3 | Propose the replacement of communication equipment in the event of loss or damage. | | | | | | | | | |
| | 4.4 | Supervise the proper storage of the communication equipment | | | | | | | | | |
| | 4.5 | Train colleagues on effective use of communication systems | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 2: Occupational Health, Safety and Environmental Requirements**

**Unit Reference Number:** **CON/EI/002/L3**

**NSQ Level:** **3**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to understand and apply workplace safety measures, hazard prevention, and emergency response in electrical installations.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Professional Discussion
6. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Maintain personal health and hygiene | 1.1 | Use personal protective equipment (PPE) appropriately | | | | | | | | | |
| | 1.1 | Work safely at all times, complying with health and safety and other relevant regulations and guidelines (e.g. Nigerian Factory Act for Health and Safety 2015) | | | | | | | | | |
| | 1.2 | Demonstrate the proper selection of personal protective equipment (PPE). | | | | | | | | | |
| | 1.3 | Demonstrate the proper use of personal protective equipment (PPE). | | | | | | | | | |
| | 1.4 | Report workplace injuries, illness, and infection promptly to the appropriate person | | | | | | | | | |
| | 1.5 | Supervise to ensure workplace cleanliness and proper waste disposal. | | | | | | | | | |
| | 1.6 | Explain the importance of maintaining good personal hygiene. | | | | | | | | | |
| | 1.7 | Describe how to deal with cuts, grazes and wounds and why it is important to do so. | | | | | | | | | |
| LO 2: Maintain a hygienic, safe and secure workplace | 2.1 | Discuss the importance of working in a healthy, safe and hygiene workplace. | | | | | | | | | |
| | 2.2 | Attend to any accidents or near accidents quickly and accurately. | | | | | | | | | |
| | 2.3 | Promote health, hygiene and safety procedures during work. | | | | | | | | | |
| | 2.4 | Practice emergency procedures at the workplace | | | | | | | | | |
| | 2.5 | Supervise to ensure that organizational security procedures are followed. | | | | | | | | | |
| | 2.6 | Supervise to ensure the disposal of waste and pollution control with organic and inorganic waste disposal methods. | | | | | | | | | |

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| | 2.7 | Promote sound and noise control using appropriate protection methods and guidelines. | | | | | | | | | |
| LO 3:<br>Prevent hazards and maintain a safe and secure workplace | 3.1 | Evaluate any hazard or potential hazard in a workplace | | | | | | | | | |
| | 3.2 | Support the Implementation of corrective actions to eliminate identified hazards | | | | | | | | | |
| | 3.3 | Monitor the Usage of specialized safety equipment correctly | | | | | | | | | |
| | 3.4 | Assess safety incidents accurately | | | | | | | | | |
| | 3.5 | Summarize the consequences of accidents and near accidents in the work environment | | | | | | | | | |
| | 3.6 | Summarize the organizational procedures during emergencies | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 3: Teamwork**

**Unit Reference Number:** **CON/EI/003/L3**

**NSQ Level:** **3**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to develop teamwork, leadership, and problem-solving skills required for collaborative electrical installation and maintenance projects

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Professional Discussion
6. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Demonstrate Positive working relationships with colleagues | 1.1 | Explain the importance of building positive team relationships in a technical environment. | | | | | | | | | |
| | 1.2 | Identify key roles and responsibilities within the team. | | | | | | | | | |
| | 1.3 | Share knowledge and expertise with team members | | | | | | | | | |
| | 1.4 | Communicate directives and information to subordinates with respect | | | | | | | | | |
| | 1.5 | Encourage a positive team dynamic and motivation. | | | | | | | | | |
| LO 2: Recognize responsibilities within the team | 2.1 | Explain individual responsibilities in a team setting | | | | | | | | | |
| | 2.2 | Recognize the importance of interdependence among team members | | | | | | | | | |
| | 2.3 | Demonstrate accountability in assigned tasks | | | | | | | | | |
| | 2.4 | Evaluate the impact of teamwork on project efficiency. | | | | | | | | | |
| LO 3: Monitor and improve team performance | 3.1 | Set measurable team goals for project completion. | | | | | | | | | |
| | 3.2 | Track progress and address performance gaps. | | | | | | | | | |
| | 3.3 | Use feedback mechanisms to improve teamwork | | | | | | | | | |
| | 3.4 | Recognize and celebrate team achievements | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 4: Types of Wiring in Electrical Installation**

**Unit Reference Number:** **CON/EI/004/L3**

**NSQ Level:** **3**

**Credit Value:** **5**

**Guided Learning Hours:** **50**

**Unit Purpose:**

At the end of this Unit, the Learner should be equipped with the skills to carry out and supervise surface, conduit and trunking wiring in electrical installations in accordance with safe working practices and the relevant regulations regarding electrical wiring;

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Work Product
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Evaluate different Wiring Methods | 1.1 | Explain types of wiring methods, including:<br>- Single-phase and three-phase systems<br>- Radial and ring circuits<br>-Series and parallel circuits | | | | | | | | | |
| | 1.2 | Describe the characteristics and applications of each type of wiring system | | | | | | | | | |
| | 1.3 | Justify the selection of the right type of wiring for a particular installation. | | | | | | | | | |
| | 1.4 | Use appropriate materials for a particular wiring method. | | | | | | | | | |
| | 1.5 | Evaluate the advantages and disadvantages of different types of wiring methods. | | | | | | | | | |
| LO 2: Demonstrate and apply Surface Wiring in compliance to regulations | 2.1 | Describe the types of surface wiring in electrical installation. | | | | | | | | | |
| | 2.2 | Select the correct wiring system components, including cables, tools and accessories. | | | | | | | | | |
| | 2.3 | Apply appropriate tools and equipment for surface wiring. | | | | | | | | | |
| | 2.4 | Justify the selection of suitable tools and materials for surface wiring. | | | | | | | | | |
| | 2.5 | Analyze the drawing of a typical electrical surface wiring | | | | | | | | | |
| | 2.6 | Execute surface wiring installations in compliance with safe working practices and in accordance with NERC/NEMSA and other statutory wiring regulations. | | | | | | | | | |
| | 2.7 | Inspect to ensure connections and terminations are properly secured and meet safety standards | | | | | | | | | |
| | 2.8 | Analyze after testing completed surface wiring using appropriate instruments. | | | | | | | | | |
| LO 3: Demonstrate and apply Conduit | 3.1 | Describe types of conduit wiring methods in electrical installation including:<br>- Rigid conduits (e.g., PVC, steel) | | | | | | | | | |

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| Wiring in compliance to regulations | | - Flexible conduits (e.g., nylon, polypropylene). | | | | | | | | | |
| | 3.2 | Apply appropriate tools and equipment for conduit wiring | | | | | | | | | |
| | 3.3 | Justify the selection of suitable tools and materials for conduit wiring. | | | | | | | | | |
| | 3.4 | Prepare the appropriate conduits and fittings for a given installation. | | | | | | | | | |
| | 3.5 | Draw a typical electrical conduit wiring | | | | | | | | | |
| | 3.6 | Demonstrate appropriate installation and termination of conduit wiring systems, including:<br>-Cutting and bending conduits<br>- Fitting conduit connectors and couplers<br>- Pulling cables through conduits | | | | | | | | | |
| | 3.7 | Execute conduit wiring installations in compliance with safe working practices wiring and in accordance with NERC/NEMSA and other statutory wiring regulations. | | | | | | | | | |
| | 3.8 | Conduct visual inspections of conduit wiring systems to identify defects or damage and to ensure connections are properly secured and meet safety standards | | | | | | | | | |
| | 3.9 | Analyze after testing completed conduit wiring using appropriate instruments to verify the correct operation and safety of conduit wiring systems. | | | | | | | | | |
| LO 4: Demonstrate and apply Trunking Wiring in compliance to regulations | 4.1 | Describe the purpose and benefits of trunking wiring systems | | | | | | | | | |
| | 4.2 | Describe types of trunking wiring methods in electrical installation including:<br>▪ Surface trunking<br>▪ Underfloor trunking<br>▪ Skirting trunking. | | | | | | | | | |
| | 4.3 | Select and prepare the correct trunking and fittings for a given installation | | | | | | | | | |
| | 4.4 | Use appropriate tools and equipment for trunking wiring. | | | | | | | | | |
| | 4.5 | Justify the selection of suitable | | | | | | | | | |

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| | | tools and materials for trunking wiring. | | | | | | | | | |
| | 4.6 | Draw a typical electrical trunking wiring | | | | | | | | | |
| | 4.7 | Demonstrate appropriate installation and termination of trunking wiring systems, including:<br>▪ Cutting and bending trunking<br>▪ Fitting trunking connectors and couplers<br>▪ Pulling cables through trunking | | | | | | | | | |
| | 4.8 | Execute trunking wiring installations in compliance with safe working practices wiring and in accordance with NERC/NEMSA and other statutory wiring regulations. | | | | | | | | | |
| | 4.9 | Identify the risks associated with trunking wiring system installation and maintenance | | | | | | | | | |
| | 4.10 | Conduct visual inspections of trunking wiring systems to identify defects or damage and to ensure connections are properly secured and meet safety standards | | | | | | | | | |
| | 4.11 | Analyze after test completed trunking wiring using appropriate instruments to verify correct operation and safety of trunking wiring systems. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 5: Domestic Installations II**

**Unit Reference Number: CON/EI/005/L3**

**NSQ Level: 3**

**Credit Value: 6**

**Guided Learning Hours: 60**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to carry out all domestic electrical installations, testing and troubleshooting of such installations in accordance with the industry's best practices

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Work Product
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Supervise the installation of Lighting and Power Circuit | 1.1 | Supervise to ensure that circuit identification is carried out within the building. | | | | | | | | | |
| | 1.2 | Interpret electrical diagrams, plans, and specifications to determine the requirements for the lighting and power circuit installation. | | | | | | | | | |
| | 1.3 | Ensure proper selection of cables, conduits, and accessories for lighting and power circuits. | | | | | | | | | |
| | 1.4 | Develop a work plan and schedule to ensure the installation is completed efficiently and safely. | | | | | | | | | |
| | 1.5 | Supervise to ensure that all electrical equipment and components are correctly rated and suitable for the intended use | | | | | | | | | |
| | 1.6 | Supervise the assembly, connections, and termination of lighting and power equipment in the building in accordance with the relevant regulations and standards. | | | | | | | | | |
| | 1.7 | Inspect to ensure that load balancing is properly applied across circuits | | | | | | | | | |
| | 1.8 | Verify the correct phase sequencing, polarity, and earthing connections. | | | | | | | | | |
| | 1.9 | Supervise to ensure that all personnel involved in the installation are aware of and comply with safety procedures and protocols | | | | | | | | | |
| LO 2: Apply Energy Efficiency and Load Management in Domestic Installations | 2.1 | Calculate power demand for different appliances to optimize energy usage | | | | | | | | | |
| | 2.2 | Recommend energy-efficient lighting and power solutions | | | | | | | | | |
| | 2.3 | Implement smart home automation for better energy control | | | | | | | | | |
| | 2.4 | Identify areas where renewable energy sources can be integrated | | | | | | | | | |
| | 2.5 | Ensure balanced phase loads to minimize energy losses | | | | | | | | | |
| | 2.6 | Educate users on best practices for reducing electricity consumption. | | | | | | | | | |
| LO 3: Inspect and verify | 3.1 | Examine the installed electrical systems for proper component placement. | | | | | | | | | |

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| Domestic Installation for Compliance | 3.2 | Supervise and carry out visual inspection on all connections made on domestic installation. | | | | | | | | | |
| | 3.3 | Inspect wiring terminations for signs of loose connections, overheating, or improper insulation | | | | | | | | | |
| | 3.4 | Verify the adequacy of main earthing and bonding connections | | | | | | | | | |
| | 3.5 | Document findings and recommend corrective actions for non-compliant installations | | | | | | | | | |
| | 3.6 | Ensure that the completed installation is ready for testing and commissioning | | | | | | | | | |
| | 3.7 | Supervise the tightening of all loose contacts and joints. | | | | | | | | | |
| | 3.8 | Identify and rectify any defects or faults found during testing and commissioning | | | | | | | | | |
| LO 4: Test and Commission a Domestic Installation | 4.1 | Demonstrate and supervise the use of the testing instruments. | | | | | | | | | |
| | 4.2 | Select appropriate testing instruments such as millimeters, mega meters, and earth testers | | | | | | | | | |
| | 4.3 | Verify the voltage levels and phase balancing of the installation | | | | | | | | | |
| | 4.4 | Test the operation of protective devices such as circuit breakers and residual current devices (RCDs) | | | | | | | | | |
| | 4.5 | Simulate load conditions to ensure system performance under operational demand | | | | | | | | | |
| | 4.6 | Discuss the regulation that governs domestic installation testing. | | | | | | | | | |
| | 4.7 | Supervise and carryout the various tests using appropriate instruments. | | | | | | | | | |
| | 4.8 | Prepare a test report and certify the installation for safe use | | | | | | | | | |
| | 4.9 | Complete and maintain accurate records of the installation, including electrical diagrams, test results, and certificates of compliance. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 6: Protective Devices, Installation and Operation**

**Unit Reference Number: CON/EI/006/L3**

**NSQ Level: 3**

**Credit Value: 4**

**Guided Learning Hours: 40**

**Unit Purpose:**

At the end of this Unit, the Learner should be able to understand the purpose and use of protective devices as well as install, operate and maintain protective devices in an electrical installation.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment materials below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Work Product
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Evaluate Types of Protective Devices | 1.1 | Analyze protective devices used in electrical installations. | | | | | | | | | |
| | 1.2 | Describe the following types of protective devices:<br>- Fuses(all the different types of fuses and application)<br>- Circuit breakers- Residual current devices (RCDs)<br>- Residual current circuit breakers (RCCBs)<br>- Surge Protection Devices (SPDs)<br>- lightening arrestors | | | | | | | | | |
| | 1.3 | Analyze the suitability of different protective devices for various applications and installations | | | | | | | | | |
| | 1.4 | Evaluate the appropriate location for protective devices in electrical installation. | | | | | | | | | |
| | 1.5 | Propose the appropriate size and type of protective devices for a particular installation. | | | | | | | | | |
| | 1.6 | Proper solution for abnormal conditions of protective devices in electrical installations. | | | | | | | | | |
| | 1.7 | Ensure the operation of the protective devices in accordance with approved procedures and regulations. | | | | | | | | | |
| | 1.8 | Draw the symbols of protective devices in electrical installation. | | | | | | | | | |
| | 1.9 | Supervise the installation of protective devices. | | | | | | | | | |
| | 1.10 | Explain the working principles of fuses and circuit breakers. | | | | | | | | | |
| | 1.11 | Explain how to determine fusing factor, current ratings, and fusing current. | | | | | | | | | |
| LO 2: Determine the Uses of Protective Devices | 2.1 | Assess different methods of protecting electrical installations | | | | | | | | | |
| | 2.2 | Analyze the uses of protective devices in electrical | | | | | | | | | |

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| | | installations | | | | | | | | | |
| | 2.3 | Evaluate the advantages and disadvantages of each protective device. | | | | | | | | | |
| | 2.4 | Explain the potential consequences of incorrect or inadequate protective devices | | | | | | | | | |
| | 2.5 | Determine the current ratings of the protective devices used in electrical installation and equipment. | | | | | | | | | |
| LO 3: Install and Operate Protective Devices | 3.1 | Determine the appropriate regulations for the various sizes and types of protective devices. | | | | | | | | | |
| | 3.2 | Determine the load demand of a building to match with the current rating of fuses and other protective devices. | | | | | | | | | |
| | 3.3 | Distinguish between the operation of a fuse and a miniature circuit breaker (MCB). | | | | | | | | | |
| | 3.4 | Differentiate between current operated and voltage operated protective devices. | | | | | | | | | |
| | 3.5 | Test the operation of protective devices in an installation. | | | | | | | | | |
| | 3.6 | Supervise the installation activities of protective devices in accordance with safe working practices. | | | | | | | | | |
| | 3.7 | Carry out troubleshooting and repairs of protective devices in electrical installation. | | | | | | | | | |
| | 3.8 | Replace appropriate size of melted fuse element in an installation. | | | | | | | | | |
| LO 4: Install and Operate Protective Devices | 4.1 | Determine the appropriate regulations for the determination of the various sizes and types of protective devices. | | | | | | | | | |
| | 4.2 | Determine the load demand of a building to match with the current rating of fuses and other protective devices. | | | | | | | | | |

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| 4.3 | Analyze the operation of fuses and miniature circuit breaker (MCB) | | | | | | | | | |
| 4.4 | Evaluate the operation of current and voltage operated protective devices. | | | | | | | | | |
| 4.5 | Supervise the installation of protective devices in accordance with safe working practices. | | | | | | | | | |
| 4.6 | Conduct tests to verify the correct operation of protective devices. | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 7: Electrical Earthing Systems**

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| **Unit Reference Number:** | **CON/EI/007/L3** |
| **NSQ Level:** | **3** |
| **Credit Value:** | **4** |
| **Guided Learning Hours:** | **40** |

**Unit Purpose:**

At the end of the unit, the learner will be able to install, test and maintain electrical earthing systems in a domestic electrical installation.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Work Product
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Understand Earthing Techniques in Electrical Installation | 1.1 | Define earthing and its role in electrical safety | | | | | | | | | |
| | 1.2 | Analyze the materials required for earthing installation | | | | | | | | | |
| | 1.3 | Describe the tools and equipment used in earthing installation | | | | | | | | | |
| | 1.4 | Interpret earthing symbols in electrical diagrams | | | | | | | | | |
| | 1.5 | Explain the techniques used in earthing installation e.g. pipe earthing, rod earthing, plate earthing etc. | | | | | | | | | |
| | 1.6 | Explain safety precautions for earthing installation | | | | | | | | | |
| LO 2: Apply Earthing Installation | 2.1 | Interpret information from job instructions and other documentation used in the earthing installation. | | | | | | | | | |
| | 2.2 | Prepare site and materials for earthing installation | | | | | | | | | |
| | 2.3 | Apply appropriate earthing methods based on system requirements ensuring compliance with the NERC/NEMSA and other regulatory requirements | | | | | | | | | |
| | 2.4 | Report any instance where earthing requirement cannot be fully met. | | | | | | | | | |
| LO 3: Inspect Earthing Testing. | 3.1 | Explain the following as it relates to earthing; a) Earth continuity conductor b) Earthing lead c) Earth electrode etc. | | | | | | | | | |
| | 3.2 | Carryout resistance testing for earthing systems | | | | | | | | | |
| | 3.3 | Explain the different methods of reducing earth resistance. | | | | | | | | | |
| | 3.4 | Inspect completed installation to ensure compliance | | | | | | | | | |
| | 3.5 | Explain the factors influencing earth resistance e.g. condition of soil, depth etc. | | | | | | | | | |
| | 3.6 | Record tests results and compare with the standard values | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

## Unit 8: Troubleshooting, Repairs and Maintenance of Electrical Systems, Equipment and Components

**Unit Reference Number:** **CON/EI/008/L3**

**NSQ Level:** **3**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

### Unit Purpose:

At the end of the unit, the learner will be equipped with the skills to

a) Diagnose and detect faults in electrical installation and equipment
b) Carry out repair and maintenance of faulty electrical systems.

### Unit Assessment Requirements/Evidence Requirements

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Professional Discussion
6. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Apply Maintenance Principles and Techniques | 1.1 | Analyze symptoms of common electrical faults | | | | | | | | | |
| | 1.2 | Apply diagnostic tools and instruments to detect electrical faults | | | | | | | | | |
| | 1.3 | Analyze circuit diagrams to locate faults | | | | | | | | | |
| | 1.4 | Proper solutions to rectify common electrical faults | | | | | | | | | |
| | 1.5 | Diagnose faults in typical electrical equipment. | | | | | | | | | |
| | 1.6 | Discuss the procedure of maintaining electrical equipment regularly and effectively. | | | | | | | | | |
| LO 2: Apply Fault Finding in Electrical Systems | 2.1 | Diagnose faults using sense organs i.e. symptom recognition. | | | | | | | | | |
| | 2.2 | Use instructional manual in clarification of a particular fault location for simplicity. | | | | | | | | | |
| | 2.3 | Use appropriate measuring instrument in detecting electrical fault in an installation. | | | | | | | | | |
| | 2.4 | Apply troubleshooting techniques for effective fault finding. | | | | | | | | | |
| | 2.5 | Differentiate between minor and major faults. | | | | | | | | | |
| LO 3: Supervise Maintenance of Electrical System/Equipment | 3.1 | Describe the various types of maintenance such as Preventive maintenance, Corrective maintenance etc. | | | | | | | | | |
| | 3.2 | Apply IEE regulations on remedies of electrical equipment. | | | | | | | | | |
| | 3.3 | Observe adequate precautions to prevent damage to components, tools and equipment during fault clearing. | | | | | | | | | |
| | 3.4 | Document findings and actions for future reference | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 9: Underground Cables and Overhead Line Installation**

**Unit Reference Number: CON/EI/009/L3**

**NSQ Level: 3**

**Credit Value: 3**

**Guided Learning Hours: 30**

**Unit Purpose:**

At the end of the unit, the learner will be able to carry out installation, troubleshooting and maintenance of underground cables and overhead conductors.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Work Product
5. Witness testimony
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Carry out Underground Cables Installation | 1.1 | Determine types of cable used for underground installation works. | | | | | | | | | |
| | 1.2 | Prepare trench to appropriate depth for cable laying. | | | | | | | | | |
| | 1.3 | Demonstrate the methods for conveying underground cable to site. | | | | | | | | | |
| | 1.4 | Discuss the materials and tools used for joints and termination in underground cables. | | | | | | | | | |
| | 1.5 | Explain the types of tapes used for underground cables. | | | | | | | | | |
| | 1.6 | Analyze the methods of installing underground cables. | | | | | | | | | |
| | 1.7 | Determine the instruments used in Testing underground cables and their functions | | | | | | | | | |
| | 1.8 | Perform various tests associated with underground cables | | | | | | | | | |
| | 1.9 | Carry out underground cable installation and termination in line with standards and regulations | | | | | | | | | |
| LO 2: Carry out Overhead Line (OHL) Installation | 2.1 | Determine different conductors used for OHL installation works. | | | | | | | | | |
| | 2.2 | Prepare supports for OHL installation. | | | | | | | | | |
| | 2.3 | Demonstrate the methods for conveying OHL materials to the site. | | | | | | | | | |
| | 2.4 | Describe the materials and tools used for joints and termination OHL conductors. | | | | | | | | | |
| | 2.5 | Analyze the methods of installation of OHL conductors. | | | | | | | | | |
| | 2.6 | Carry out OHL conductor installation and termination in line with standards and regulations | | | | | | | | | |
| LO 3: Test and troubleshoot for underground and overhead | 3.1 | Determine the instruments used in Testing underground cables and OHL conductors | | | | | | | | | |
| | 3.2 | Perform various tests associated with underground cables and | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| conductors | | OHL conductors | | | | | | | | | |
| | 3.3 | Analyze faults associated with underground cables and OHL conductors | | | | | | | | | |
| | 3.4 | Maintain and repair defects on conductors | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 10: Electrical (AC and DC) Machines**

**Unit Reference Number: CON/EI/010/L3**

**NSQ Level: 3**

**Credit Value: 3**

**Guided Learning Hours: 30**

**Unit Purpose:**

At the end of the unit, the learner will be able to understand and carry out the installation, operation, maintenance, and repair of electric AC and DC machines.

**Unit assessment requirements/evidence requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Witness testimony
5. Professional Discussion
6. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Understand the installation and operation of Electric Machines | 1.1 | Describe the principles of operation of electric machines. | | | | | | | | | |
| | 1.2 | Differentiate between AC and DC electrical machines. | | | | | | | | | |
| | 1.3 | Distinguish between electric motor and generator. | | | | | | | | | |
| | 1.4 | Enumerate types of electric motors and their applications. | | | | | | | | | |
| | 1.5 | List the major parts of an electric machine. | | | | | | | | | |
| | 1.6 | Dismantle electric machine in line with safety regulations | | | | | | | | | |
| | 1.7 | Assemble all the parts in line with the procedures. | | | | | | | | | |
| LO 2: Maintain Alternating Current (AC) Machines | 2.1 | Explain the various types of AC motors and their applications | | | | | | | | | |
| | 2.2 | Mention the major parts of an AC motor. | | | | | | | | | |
| | 2.3 | Carry out maintenance of AC motor in line with safety procedures and regulations | | | | | | | | | |
| LO 3: Maintain Direct Current (DC) Machines | 3.1 | List the types of DC machines. | | | | | | | | | |
| | 3.2 | Explain DC Machines and its characteristics. | | | | | | | | | |
| | 3.3 | Explain the applications of series shunt and separately excited DC machines. | | | | | | | | | |
| | 3.4 | Explain the concepts of the following as used in DC machines<br>▪ Number of poles<br>▪ Number of parallel conductors<br>▪ Frequency<br>▪ Wave winding<br>▪ Lap winding<br>▪ Armature current<br>▪ Back E.M.F. | | | | | | | | | |
| | 3.5 | Carry out maintenance work in DC machine in line with safety procedures and regulations | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 11: Installation of Electrical Panel**

**Unit Reference Number:** **CON/EI/011/L3**

**NSQ Level:** **3**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of the unit, the learner will be able to install electrical control panels following industry standards.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Work Product
5. Witness testimony
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Understand the need for the Construction of Electrical Panel | 1.1 | Determine the load in the construction of electric panels. | | | | | | | | | |
| | 1.2 | Analyze the components required for panel construction. | | | | | | | | | |
| | 1.3 | Ensure safety precautions in work environment before constructing electrical panel. | | | | | | | | | |
| LO 2: Assemble Electrical Panel | 2.1 | Apply relevant procedures for assembling panels. | | | | | | | | | |
| | 2.2 | Assemble and wire panel components | | | | | | | | | |
| | 2.3 | Discuss construction of electric panel using safe and appropriate procedures. | | | | | | | | | |
| | 2.4 | Observe safety precautions while assembling an electrical panel. | | | | | | | | | |
| | 2.5 | Conduct risk assessment to ensure that the work is carried out safely. | | | | | | | | | |
| | 2.6 | Use appropriate materials and equipment to assemble a functional, durable and safe electric panel. | | | | | | | | | |
| LO 3: Install Electric Panel | 3.1 | Ensure that installation of panel is carried out in accordance with the manufacturers' specification and guidelines. | | | | | | | | | |
| | 3.2 | Ensure that color coding is adhered i.e. Red (R), Yellow (Y), Blue (B), Neutral (N) while installing the panel. | | | | | | | | | |
| | 3.3 | Interpret circuit diagrams and layout drawings within the panel. | | | | | | | | | |
| | 3.4 | Test panel for proper operation | | | | | | | | | |
| | 3.5 | Implement safety measures during panel installation | | | | | | | | | |

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| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

**Unit 12: Installation and Maintenance of Audio-Visual and CCTV Systems**

**Unit Reference Number:** **CON/EI/012/L3**

**NSQ Level:** **3**

**Credit Value:** **3**

**Guided Learning Hours:** **30**

**Unit Purpose:**

At the end of the unit, the learner will be able to install and test an Audio-Visual and CCTV systems in Building.

**Unit Assessment Requirements/Evidence Requirements**

The unit requires the various assessment methods below;

1. Question and Answer (Q&A)
2. Observation
3. Recognition of Prior Learning
4. Work Product
5. Witness testimony
6. Professional Discussion
7. Personal Statement/Reflective Account

| Learning Outcome (LO) | Performance Criteria (PC) | | Evidence Type | | | | | Evidence Ref Page Number | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LO 1: Determine the location of AVS/CCTV Installation | 1.1 | Explain the principle of Audio-Visual system/CCTV design | | | | | | | | | |
| | 1.2 | Identify appropriate locations for installations of AVS/CCTV. | | | | | | | | | |
| | 1.3 | Describe installation safety measures of AVS/CCTV. | | | | | | | | | |
| LO 2: Prepare for the installation of AVS/CCTV | 2.1 | Enumerate the materials to be used for the installation and positioning of devices and accessories. | | | | | | | | | |
| | 2.2 | Describe the termination methods for the installation surveillance equipment and safety procedures required for the installation of surveillance equipment. | | | | | | | | | |
| | 2.3 | Observe safety procedures required for the installation of surveillance equipment | | | | | | | | | |
| | 2.4 | Differentiate between wired and wireless systems | | | | | | | | | |
| LO 3: Carryout Installation of AVS/CCTV systems | 3.1 | Identify cables, connectors, and power supplies used in AVS/CCTV. | | | | | | | | | |
| | 3.2 | Install cables, connectors and power supplies used in AVR/CCTV | | | | | | | | | |
| | 3.3 | Carry out the installation of surveillance equipment (AVS/CCTV) in accordance with specified standard. | | | | | | | | | |
| | 3.4 | Configure system settings based on specifications | | | | | | | | | |
| | 3.5 | Perform troubleshooting for system malfunctions | | | | | | | | | |
| | 3.6 | Test installed systems for proper functionality | | | | | | | | | |

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|---|---|
| Learners Signature: | Date: |
| Assessors Signature: | Date: |
| IQA Signature (if sampled): | Date: |
| EQA Signature (if sampled): | Date: |

## TOOLS AND EQUIPMENT FOR ELECTRICAL INSTALLATION MAINTENANCE AND REPAIRS

To effectively deliver quality training in the **Electrical Installation Maintenance and Repairs** and ensure competency, the right set of tools and equipment is crucial. The quantity in the list is for 15 - 20 learners in a workshop,

| Hand Tools | | |
|---|---|---|
| **S/N** | **Description** | **Quantity** |
| 1 | Pliers (Combination and Needle Nose) | 2 – Dozen |
| 2 | Screwdrivers (set). | 2 – Dozen each |
| 3 | Cable Cutters | 2 – Dozen |
| 4 | Wire Strippers | 2 – Dozen |
| 5 | Crimping Tools | 2 – Dozen |
| 6 | Hammer. | 2 – Dozen |
| 7 | Pipe Bender | 2 – Dozen |
| 8 | Voltage Tester | 2 – Dozen |
| 9 | Fish Tape | 2 – Dozen |
| 10 | Electrician Knife. | 2 – Dozen |
| 11 | Hacksaw | 2 – Dozen |
| 12 | Allen Keys | 2 – Dozen |
| 13 | Wrenches. | 2 – Dozen |
| 14 | Chisels (sets) | 2 – Dozen |
| 15 | Files (sets) | 2 – Dozen |
| 16 | Bearing puller | 6 – sets |
| 17 | Impact Drill | 2 – Dozen |
| 18 | Soldering Iron | 2 – Dozen |
| 19 | Soldering Gun | 2 – Dozen |
| 20 | Solder Sucker | 2 – Dozen |
| 21 | Pot and Ladle | 1 – Dozen |
| 22 | Blow lamp | 1 – Dozen |
| 23 | Rawl plug | 2 – Dozen |
| **Measuring Instrument** | | |
| 24 | Multimeter (Analog | 2 – Dozen |
| 25 | Multimeter (Digital) | 2 – Dozen |
| 26 | Insulation Resistance Tester (Megger) | 6 pieces |
| 27 | Earth Resistance Tester | 6 pieces |
| 23 | Clamp Meter (AC/DC). | 1- Dozen |
| 24 | Socket Tester | 6 sets |
| 25 | Tachometer | 6 pieces |
| 26 | Frequency meter | 6 sets |
| 27 | Oscilloscope | 6 pieces |
| 28 | Residual Current Device (RCD) Tester | 6 pieces |
| 29 | Circuit Breaker Finder | 6 pieces |
| 30 | Thermal Imager | 6 pieces |
| 31 | Energy meter | 6 pieces |

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|---|---|---|
| **Installation Equipment** | | |
| 32 | Conduit Bender (Bending Spring) | 6 pieces |
| 33 | Cable Puller (Fish tape) | 1- Dozen |
| 34 | Cable Ladders and Trays | 6 sets |
| 35 | Electrical Boxes | 1- Dozen |
| 36 | Circuit Breakers and Fuses | 1- Dozen each |
| 37 | Buzzer | 1 – Dozen |
| 38 | Smoke sensor | 1 – Dozen |
| 39 | Siren | 1- Dozen |
| **Safety Equipment** | | |
| 40 | Insulated Gloves | 2- Dozens |
| 41 | Safety Boots (Insulated and Non-slip) | 2 – Dozens |
| 42 | Safety Goggles/Face Shields | 2 – Dozens |
| 43 | Hard Hats (Helmet) | 2 – Dozens |
| 44 | Ear Protection | 2 – Dozens |
| 45 | Flame-Resistant Clothing | 2 – Dozens |
| 46 | Rubber Mats | 2 – Dozens |
| 47 | Fire Extinguishers | 6 pieces |
| 48 | Sand Buckets | 6 pieces |
| 49 | Fire Blankets | 6 pieces |
| **Electrical Components & Materials** | | |
| 50 | Cable Glands | 1 – Dozen |
| 51 | Switches | 2 – Dozens |
| 52 | Sockets and Plugs | 2 – Dozens each |
| 53 | Distribution Boards (DB) single and three phase | 1 – Dozen each |
| 54 | Wiring Board | 2 – Dozens |
| 55 | Wiring Cubicles | 2 – Dozens |
| 56 | Lighting Fixtures | 2 – Dozens |
| 57 | Transformers systems. | 1- Dozen |
| 58 | Lighting Control Systems | 2 – Dozens |
| 59 | Push Button Switches | 2 – Dozens |
| 60 | Wire and Cable | 6 – Rolls |
| 61 | Conduits | 2- Bundles |
| 62 | Conduit Fittings and Accessories | 2 – Dozens each |
| 63 | Motor Starters (assorted) | 6 sets each |
| 64 | Electric Timers | 6 sets each |
| 65 | AC/ DC Relays (assorted) | 6 sets each |
| 66 | Temperature Controls (Electric Thermometers) | 6 sets each |
| **Measurement & Layout Tools** | | |
| 67 | Measuring Tape | 2 – Dozens |
| 68 | Spirit Level | 2 – Dozens |
| 69 | Laser Distance Meter | 6 – sets |
| 70 | Protractor | 1- Dozen |

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|---|---|---|
| 71 | Marking Tools | 6 sets |
| 72 | Angle Finder | 6 sets |

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| **Training Simulators and Demonstrators** | | |
| 73 | Electrical Wiring Trainers | Installed in all Computers |
| 74 | PLC Trainers | Installed in all Computers |
| 75 | Panel Wiring Kits | 2- Dozen |
| 76 | Circuit Simulation Software | Installed in all Computers |
| **Workbenches and Storage** | | |
| 77 | Workbenches | 2 – Dozen |
| 78 | Toolboxes and Tool Carts | 1- Dozen each |
| 79 | Storage Racks | 6 Sets |
| 80 | Lockers | 6 sets |
| **Consumables** | | |
| 81 | P.V.C. Pipes of various sizes | 2 – Bundles each |
| 82 | P.V.C. Pipes accessories | 6 - Packets each |
| 83 | Copper wires of various gauges | 6 – Rolls each |
| 84 | Cables of various sizes and cores | 2 – Rolls each |
| 85 | Junction boxes (for underground termination) | 6 - Packets each |
| 86 | Switches of various types | 6 - Packets each |
| 87 | LED (A/C,DC) various types | 6 - Packets each |
| 88 | Trunkings and accessories | 2 – Bundles each |
| 89 | Lamp holders (assorted) | 6 - Packets each |
| 90 | Earth rods and accessories | 6 sets |
| 91 | Buzzers | 1- Dozen |
| 92 | Fuses (different ratings) | Assorted |
| 93 | Socket outlets (5A, 13A, 15A,) | 6 - Packets each |
| 94 | Switches (single, double, triple poles) | 6 - Packets each |
| 95 | Joint boxes | 6 - Packets |
| 96 | Ceiling Rose | 6 – Packets |
| 97 | Ceiling Fan Regulator | 6 – sets |
| 98 | Knockout Boxes | 6 – Packets |
| 99 | Patrex boxes | 6 - Packets |
| 100 | Metallic Box 3Phase Changeover Switches<br>(60A, 100A, 200A) | 6 -Sets each |
| 101 | Knife Switch Changeover<br>Single Phase (30A, 60A, 100A, 200A)<br>3 Phase -4 poles (30A, 60A, 100A, 200A) | <br>6 - Sets each<br>6 - Sets each |
| 102 | Phase Indicators | 6 – Sets |
| 103 | Cable Clips, Aluminium type, Tower Clip type | 24 Packets<br>24 Packets |
| 104 | Assorted Nails and Screws | 24 Packets |
| 105 | Rubber Pegs | 24 Packets |
| 106 | Cable Connectors (assorted) | Dozen sticks |

**Reviewers of the NOS for Electrical Installation, Maintenance and Repairs**

| S/N | NAME | ORGANIZATION | PHONE No. | E-MAIL |
|---|---|---|---|---|
| 1. | Engr. Kabir Ahmed lele | Ask.M IT & Energy global Resources LTD | 08166796767 | bappakabir@hotmail.com |

**Overview of the Review Process**

The objective of the review was to update the **National Occupational Standard (NOS)** for the **Electrical Installation, Maintenance, and Repairs Levels 1, 2, and 3** to align with current trends in the engineering profession in Nigeria and internationally. The review ensures that the Learning Outcomes (LOs) and Performance Criteria (PCs) are:

- More skills-based rather than knowledge-based only.
- Differentiated by complexity, responsibility, and requirements across levels.
- Free of unnecessary jargon and written in simple, understandable English.
- Designed for easy use by both learners and assessors.

Each unit has been reviewed for clarity, structure, and alignment with best practices in occupational standards and competency-based training. Descriptors were used to differentiate between levels of the NOS

# National Skills Qualifications

FOR

# ELECTRICAL INSTALLATION, MAINTENANCE AND REPAIRS

LEVEL 1, 2 & 3

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