Competency Standard (CS)

Electrical Installation & Maintenance

Level-1

Construction Sector

Competency Standard Code: CS-CON-EIM-L1-EN-V1

National Skills Development Authority
Chief Advisor's Office
Government of the People's Republic of Bangladesh

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This Competency Standard for **Electrical Installation & Maintenance** is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with **Construction Sector**, industry representatives, academia, related specialist, trainer and related employee.
Public and private institutions may use the information contained in this standard for activities benefitting Bangladesh.

Introduction

The NSDA aims to enhance an individual's employability by certifying completeness with skills. NSDA works to expand the skilling capacity of identified public and private training providers qualitatively and quantitatively. It also aims to establish and operationalize a responsive skills ecosystem and delivery mechanism through a combination of well-defined set of mechanisms and necessary technical supports.

Key priority economic growth sectors identified by the government have been targeted by NSDA to improve current job skills along with existing workforce to ensure required skills to industry standards. Training providers are encouraged and supported to work with industry to address identified skills and knowledge to enable industry growth and increased employment through the provision of market responsive inclusive skills training program. "**Electrical Installation & Maintenance**" is selected as one of the priority occupations of **Construction** Sector. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills training. Trainees who successfully pass the assessment will receive a qualification in the National Skills Qualification Framework (BNQF) under Bangladesh National Qualification Framework and will be listed on the NSDA's online portal.
This competency standard is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements. A series of stakeholder consultations, workshops were held to develop this document.

The document also details the format, sequencing, wording and layout of the Competency Standard for an occupation which is comprised of Units of Competence and its corresponding Elements.

Overview

A **Competency Standard** is a written specification of the knowledge, skills and attitudes required for the performance of an occupation, trade or job corresponding to the industry standard of performance required in the workplace.
The purpose of a competency standards is to:

- provide a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials
- enable industry recognised qualifications to be awarded through direct assessment of workplace competencies
- encourage the development and delivery of flexible training which suits individual and industry requirements
- encourage learning and assessment in a work-related environment which leads to verifiable workplace outcomes

Competency standards are developed by a working group comprised of representative from NSDA, Key Institutions, ISC, and industry experts to identify the competencies required of an occupation in **Construction Sector**.

Competency standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. CS acknowledge that people can achieve technical and vocational competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.
With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.
Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of competency are documented in a standard format that comprises of:

- unit title
- nominal duration
- unit code
- unit descriptor
- elements and performance criteria
- variables and range statement
- curricular content guide
- assessment evidence guide

Together, all the parts of a unit of competency:

- describe a work activity
- guide the assessor to determine whether the candidate is competent or not yet competent

The ensuing sections of this document comprise of a description of the relevant occupation, trade or job with all the key components of a unit of competency, including:

- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

Competency Standards for National Skill Certificate – 1 in Electrical Installation & Maintenance in Construction Sector

Level Descriptors of Skills Sector, BNQF Level 1-6

Level & Job classification	Knowledge Domain	Skills Domain	Responsibility Domain
6-Mid-Level Manager/ Sub Assistant Engineer	Comprehensive actual and theoretical knowledge within a specific work or study area with an awareness of the validity and limits of that knowledge, able to analyze, compare, relate and evaluate.	Specialised and wider range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems. Communicate professional issues and solutions to the team and to external partners/users.	Work under broad guidance and self-motivation to execute strategic and operational plan/s. Lead lower-level management. Diagnose and resolve problems within and among work groups.
5-Supervisor	Broad knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to scrutinize and break information into parts by identifying motives or causes.	Broad range of cognitive and practical skills required to generate solutions to specific problems in one or more work or study areas. Communicate practice-related problems and possible solutions to external partners.	Work under guidance of management and self-direction to resolve specific issues. Lead and take responsibility for the work and actions of group/team members. Bridge between management.
4-Highly Skilled Worker	Broader knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to solve problems to new situations by comparing and applying acquired knowledge.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information. Communicate using technical terminology and IT technology with partners and users as per workplace requirements.	Work under minimal supervision in specific contexts in response to workplace requirements. Resolve technical issues in response to workplace requirements and lead/guide a team/ group.
3-Skilled Worker	Moderately broad knowledge in a specific work or study area, able to perceive ideas and abstract from drawing and design according to workplace requirements.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools. Communicate with his team and limited external partners upholding the values, nature and culture of the workplace	Work or study under supervision with considerable autonomy. Participate in teams and responsible for group coordination.
2-Semi Skilled Worker	Basic understanding of underpinning knowledge in a specific work or study area, able to interpret and apply common occupational terms and instructions.	Skills required to carry out simple tasks, communicate with his team in the workplace presenting and discussing results of his work with required clarity.	Work or study under supervision in a structured context with limited scope of manipulation
1 –Basic Skilled Worker	Elementary understanding of ability to interpret the underpinning knowledge in a specific study area, able to interpret common occupational terms and instructions.	Specific Basic skills required to carry out simple tasks. Interpret occupational terms and present the results of own work within guided work environment/ under supervision.	Work under direct supervision in a structured context with limited range of responsibilities.

List of Abbreviations

CS	-	Competency Standard
ISC	-	Industry Skills Council
CISC	-	Construction Industry Skills Councils
NSDA	-	National Skills Development Authority
BNQF	-	Bangladesh National Qualification Framework
OSH	-	Occupational Safety and Health
PPE	-	Personal Protective Equipment
SCVC	-	Standards and Curriculum Validation Committee
STP	-	Skills Training Provider
SOP	-	Standard Operating Procedure
UoC	-	Unit of Competency
CNC	-	Computer & Numeric Control
EIM	-	Electrical Installation & Maintenance
4 iR	-	4th Industrial Revolution

Approved by

44th Authority Meeting of NSDA

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Competency Standards for National Skill Certificate – 1 in
Electrical Installation & Maintenance
Course Structure

SL.	Unit Code and Title		UoC Level	Nominal Hours
Generic Units of Competencies				**40**
1	GU-01-L1-V1	Perform Computations Using Basic Mathematical Concepts	1	15
2	GU-02-L1-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	1	15
3	GU-06-L1-V1	Practice House Keeping Procedure	1	10
Sector Specific Units of Competencies				**20**
4	SU-CON-01-L1-V1	Interpret Drawings, Specifications and Manuals	1	20
Occupation Specific Units of Competencies				**280**
5	OU-CON-EIM-01-L1-V1	Use Hand Tools and Power Tools	1	20
6	OU- CON -EIM-02-L1-V1	Apply Fundamentals Skills for Electrical Works	1	40
7	OU- CON -EIM-03-L1-V1	Perform Installation of Electrical Fittings	1	20
8	OU- CON -EIM-04-L1-V1	Perform Circuit Connection	1	40
9	OU- CON -EIM-05-L1-V1	Perform Wire and Cable Joints	1	30
10	OU- CON -EIM-06-L1-V1	Perform Installation of Electrical Circuit	1	60
11	OU- CON -EIM-07-L1-V1	Perform Channel Wiring	1	70
			Learning Hours	**340**
			Workplace Visit	**20**
			Total Nominal Hours	**360**

Units & Elements at a Glance:

Generic Units of Competencies (40 hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU-01-L1-V1	Perform Computations Using Basic Mathematical Concepts	1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods for the calculation. 3. Use tool/instrument to perform calculations	15
GU-02-L1-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	1. Identify OSH policies and procedures. 2. Follow OSH procedure 3. Report hazards and risks. 4. Respond to emergencies 5. Maintain personal well-being	15
GU-06-L1-V1	Practice House Keeping Procedure	1. Sort and remove unnecessary items 2. Arrange items 3. Maintain work area, tools and equipment 4. Follow standardized work process and procedure 5. Perform work spontaneously	10
Total Hours			**40**

Sector Specific Unit of Competency (20 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SU-LE-01-L1-V1	Interpret Technical Drawings, Specifications and Manuals	1. Identify information from manuals 2. Identify drawings and specifications 3. Interpret drawings and specifications 4. Interpret manuals 5. Store manuals	20
Total Hours			**20**

Occupation Specific Units of Competencies (280 Hours)

Code	Unit of Competency	Elements of Competency	Hours
OU-CON-EIM-01-L1-V1	Use Hand Tools and Power Tools	1. Prepare for work 2. Use hand tools 3. Use power tools 4. Perform basic preventive maintenance 5. Clean workplace and store tools	20
OU- CON-EIM-02-L1-V1	Apply Fundamental Skills for Electrical Works	1. Prepare for works 2. Interpret basic electrical concept 3. Identify the elements of electrical circuit 4. Use electrical formulas 5. Perform measurement of electrical quantities 6. Maintain workplace, tools, equipment and materials	40
OU- CON-EIM-03-L1-V1	Perform Installation of Electrical Fittings	1. Prepare for works 2. Fix-up switch board, channel and junction box 3. Perform fixing of batten holder 4. Perform fixing of ceiling rose 5. Maintain workplace, tools, equipment and materials	20
OU- CON-EIM-04-L1-V1	Perform Circuit Connection	1. Prepare for works 2. Perform series circuit connection 3. Perform parallel circuit connection 4. Perform series and parallel (mixed) circuit connection 5. Maintain workplace, tools, equipment and materials	40
OU- CON-EIM-05-L1-V1	Perform Wire and Cable Joints	1. Prepare for works 2. Prepare cable for joint 3. Make pigtail joint 4. Make western union joint 5. Make T-Joint 6. Make married joint	30

		7. Maintain workplace, tools, equipment and materials	
OU- CON-EIM-06-L1-V1	Perform Installation of Electrical Circuit	1. Prepare for works 2. Control lamp by SPST and SPDT switch 3. Control calling bell from two point 4. Install tube light circuit 5. Install Ceiling Fan with regulator 6. Maintain Workplace, Tools, Equipment and Materials	60
OU- CON-EIM-07-L1-V1	Perform Channel Wiring	1. Prepare for works 2. Install Channel 3. Install accessories of wiring 4. Install electrical circuit 5. Test the wiring 6. Maintain Workplace, Tools and Materials	70
Total Hours			**280**

Generic Units of Competencies

Unit Code and Title	**GU-01-L1-V1: Perform Computations Using Basic Mathematical Concepts**
Unit Descriptor	This unit of competency requires the knowledge, skills and attitude to perform computations using basic mathematical concepts in the workplace. It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical method/concept for the calculation and using appropriate instruments tools to perform calculation.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables Training Components
1. Identify calculation requirements in the workplace	1.1 Job requirements are identified; 1.2 **Measurements** are selected in accordance with job requirement; 1.3 Calculation requirements are identified from **workplace information.**
2. Select appropriate mathematical methods for the calculation.	2.1 Mathematical methods are identified; 2.2 **Appropriate method** is selected to carry out the calculation r equirements; 2.3 Tolerance and clearance limits are identified and adjusted according to the job requirements.
3. Use tool/instrument to perform calculations	3.1 Work instructions are confirmed and applied to the job in hand; 3.2 Materials to be measured are identified as per job specification; 3.3 Appropriate **tool/ instrument** is selected based on materials to be measured.
Range of Variables	
Variable	**Range** (may include but not limited to)
1. Measurements	1.1 Length 1.2 Width 1.3 Weight 1.4 Tolerance
2. workplace information	2.1 Job Order 2.2 Design 2.3 Working drawing 2.4 Verbal instructions 2.5 Written Instruction
3. Appropriate method	3.1 Addition 3.2 Subtraction 3.3 Division

	3.4 Multiplication 3.5 Conversion 3.6 Percentage and ratio calculation
4. Tool/ Instrument	4.1 Calculator 4.2 Scale 4.3 Measuring tape 4.4 Marker
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Identified calculation requirements from workplace information 1.2 Selected appropriate method to carry out the calculation requirements 1.3 Selected measurements 1.4 Selected appropriate methods 1.5 Used tool/instrument 1.6 Added numbers 1.7 Subtracted numbers 1.8 Multiplied numbers. 1.9 Divided numbers. 1.10 Completed calculations using appropriate tools/instruments
2. Underpinning Knowledge	2.1. Numerical concept 2.2. Basic mathematical methods such as addition, subtraction, multiplication and division and percentage. 2.3. Mathematical language, symbols and terminology. 2.4. Measuring units
3. Underpinning Skills	3.1 Interpret numerical concept 3.2 Interpret mathematical methods such as addition, subtraction, multiplication and division and percentage. 3.3 Interpret mathematical language, symbols and terminology. 3.4 Interpret measuring units
4. Underpinning Attitudes	4.1. Commitment to occupational health and safety 4.2. Environmental concerns 4.3. Eagerness to learn 4.4. Tidiness and timeliness 4.5. Respect for rights of peers and seniors in workplace 4.6. Communication with peers and seniors in workplace
5. Resource Implications	5.1. Work place Procedure 5.2. Materials relevant to the proposed activity 5.3. All tools, equipment, material and documentation required. 5.4. Relevant specifications or work instructions

6. Methods of Assessment	6.1. Written Test 6.2. Demonstration 6.3. Oral Questioning 6.4. Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by NSDA certified assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	**GU-02-L1-V1: Apply Occupational Safety and Health (OSH) Procedure in the Workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required in applying occupational safety and health (OSH) procedures in the workplace. It specifically includes identifying OSH policies and procedures, following OSH procedure, reporting to emergencies, and maintaining personal well-being.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures.	1.1. **OSH policies** and **safe operating procedures** are accessed and stated; 1.2. **Safety signs and symbols** are identified and followed; 1.3. Emergency response, evacuation procedures and other contingency measures are determined according to workplace requirements.
2. Follow OSH procedure	2.1 **Personal protective equipment (PPE)** is selected and collected as required; 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices; 2.3 A clear and tidy workplace is maintained as per workplace standard; 2.4 PPE is maintained to keep them operational and compliant with OHS regulations.
3. Report hazards and risks.	3.1 **Hazards** and risks are identified, assessed and controlled; 3.2 Incidents arising from hazards and risks are reported to designated authority.
4. Respond to emergencies	4.1 Alarms and warning devices are responded; 4.2 Workplace **emergency procedures** are followed; 4.3 **Contingency measures** during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures; 4.4 Frist aid procedures is applied during emergency situations.
5. Maintain personal well-being	5.1 OHS policies and procedures are adhered to; 5.2 OHS awareness programs are participated in as per workplace guidelines and procedures; 5.3 Corrective actions are implemented to correct unsafe condition in the workplace; 5.4 **"Fit to work" records** are updated and maintained according to workplace requirements.
Range of Variables	
Variables	**Range** (may include but not limited to):

1. OSH Policies	1.1. Bangladesh standards for OHS 1.2. Fire Safety Rules and Regulations 1.3. Code of Practice 1.4. Industry Guidelines
2. Safe Operating Procedures	2.1 Orientation on emergency exits, fire extinguishers, fire escape, etc. 2.2 Emergency procedures 2.3 First Aid procedures 2.4 Tagging procedures 2.5 Use of PPE 2.6 Safety procedures for hazardous substances
3. Safety Signs and symbols	3.1 Direction signs (exit, emergency exit, etc.) 3.2 First aid signs 3.3 Danger Tags 3.4 Hazard signs 3.5 Safety tags 3.6 Warning signs
4. Personal Protective Equipment (PPE)	4.1 Gas Mask 4.2 Gloves 4.3 Safety boots 4.4 Face mask 4.5 Overalls 4.6 Goggles and safety glasses 4.7 Sun block 4.8 Chemical/Gas detectors
5. Hazards	5.1 Chemical hazards 5.2 Biological hazards 5.3 Physical Hazards 5.4 Mechanical and Electrical Hazard 5.5 Mental hazard 5.6 Ergonomic hazard
6. Emergency Procedures	6.1 Fire fighting 6.2 Earthquake 6.3 Medical and first aid 6.4 evacuation`
7. Contingency measures	7.1 Evacuation 7.2 Isolation 7.3 Decontamination
8. “Fit to Work” records	8.1 Medical Certificate every year 8.2 Accident reports, if any 8.3 Eye vision certificate

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 stated OSH policies and safe operating procedures. 1.2 followed safety signs and symbols. 1.3 used personal protective equipment (PPE). 1.4 maintained workplace clear and tidy. 1.5 assessed and controlled hazards. 1.6 followed emergency procedures. 1.7 followed contingency measures. 1.8 implemented corrective actions.
2. Underpinning knowledge	2.1 Define OSH 2.2 OHS Workplace Policies and Procedures 2.3 Work Safety Procedures 2.4 Emergency Procedures 2.5 Hazard control procedure 2.6 Different types of Hazards 2.7 PPE and there uses 2.8 Personal Hygiene Practices 2.9 OHS Awareness
3. Underpinning skills	3.1 Accessing OSH policies 3.2 Handling of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace
5. Resource implications	5.1 Workplace 5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, materials and documentation required 5.4 OSH Policies and Procedures
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio

7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by NSDA certified assessor

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	GU-06-L1-V1: Practice House Keeping Procedure
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Practice housekeeping procedure. It specifically includes sorting and removing unnecessary items, arranging items, maintaining work area, tools and equipment, following standardized work process and procedure and performing work spontaneously.
Nominal Hours	**10 Hours**
Elements of Competency	**Performance Criteria** **Bold underlined** terms are elaborated in the Range of Variables
1. Sort and remove unnecessary items	1.1 Reusable, recyclable materials are sorted in accordance with company/office procedures; 1.2 **Unnecessary items** are removed and disposed of in accordance with company or office procedures.
2. Arrange items	2.1 Items are arranged in accordance with company/office housekeeping procedures; 2.2 Work area is arranged according to job requirements; 2.3 Activities are prioritized based on instructions; 2.4 Items are provided with clear and visible **identification marks** based on procedure; 2.5 Safety equipment and evacuation passages are kept clear and accessible based on instructions.
3. Maintain work area, tools and equipment	3.1 Cleanliness and orderliness of work area is maintained in accordance with company/office procedures; 3.2 Tools and equipment are cleaned in accordance with manufacturer's instructions/manual; 3.3 **Minor repairs** are performed on tools and equipment in accordance with manufacturer's instruction/manual; 3.4 Defective tools and equipment are reported to immediate supervisor.
4. Follow standardized work process and procedure	4.1 Materials for common use are maintained in designated area based on procedures; 4.2 Work is performed according to standard work procedures. Abnormal incidents are reported to immediate supervisor.
5. Perform work spontaneously	5.1 Work is performed as per instruction; 5.2 Company and office **decorum** are followed and complied with; 5.3 Work is performed in accordance with OSH requirements.
Range of Variables	

Variable	**Range** (may include but not limited to):
1. Unnecessary items	1.1 Non-recyclable materials 1.2 Pictures, posters and other materials not related to work activity 1.3 Unserviceable tools and equipment 1.4 Waste materials
2. Identification marks	2.1 Colour coding 2.2 Labels 2.3 Tags
3. Minor repairs	3.1 Application of lubricants 3.2 Replacement of parts 3.3 Sharpening of tools 3.4 Tightening of nuts, bolts and screws
4. Decorum	4.1 Behaviour 4.2 Company/office rules and regulations 4.3 Company/office uniform
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 sorted and removes unnecessary items 1.2 arranged items 1.3 maintained work area, tools and equipment 1.4 followed standardized work process and procedures 1.5 performed work spontaneously.
2. Underpinning knowledge	2.1 Environmental requirements relative to work safety 2.2 Principles of 5S 2.3 Reading skills required to interpret instructions 2.4 Work process and procedures 2.5 Work-related documentation requirements.
3. Underpinning skills	3.1 Arranging items 3.2 Maintaining work area, tools and equipment 3.3 Following standardizing work process
4. Underpinning attitude	6.1 Commitment to occupational health and safety 6.2 Promptness in carrying out activities 6.3 Sincere and honest to duties 6.4 Environmental concerns 6.5 Eagerness to learn 6.6 Tidiness and timeliness 6.7 Respect for rights of peers and seniors in workplace 6.8 Communication with peers and seniors in workplace

2. Resource implications	The following resources must be provided: 5.1 Work place Procedure 5.2 Materials relevant to the proposed activity 5.3 All tools, equipment, material and documentation required. 5.4 Relevant specifications or work instructions
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio
4. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by NSDA certified assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Sector Specific Unit of Competency

Unit Code and Title	SU-CON-01-L1-V1: Interpret Drawings, Specifications and Manuals
Unit Descriptor	This unit covers the knowledge, skill and attitude required to interpret drawings, specifications and manuals. It specifically includes the tasks of identifying information, identifying, identifying drawings and specifications, interpreting drawings and specifications, interpreting manuals and storing manuals.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Identify information from manuals	1.1 Appropriate manuals are identified and accessed; 1.2 Version and date of the manual are checked to ensure up-to-date specifications of tools, equipment, materials and procedures.
2. Identify drawings and specifications	2.1 Relevant **drawings** and **specifications** are correctly identified; 2.2 **Terms and abbreviations** are interpreted; 2.3 **Signs and symbols** are identified.
3. Interpret drawings and specifications	3.1 Drawing components, assemblies are identified; 3.2 Dimensions are identified according to job requirement; 3.3 Terms and abbreviations contained in the drawings are interpreted; 3.4 Schedules, dimensions and specifications contained in the drawings are interpreted; 3.5 Signs and symbols contained in the drawings are interpreted.
4. Interpret manuals	5.1 Relevant sections, chapters of manuals are determined in relation to the work to be conducted; 5.2 Information and procedure in the manual are interpreted according to job requirements; 5.3 Work steps are correctly identified in accordance with manufacturer's specification; 5.4 Correct sequencing and adjustments are interpreted in accordance with information contained in the manual.
5. Store manuals	4.1. Documents are collected and packed; 4.2. Documents are stored to prevent damage, and ready access and updating of information when required.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Drawings	2.1 Technical Drawings 2.2 Sketch

2. Specifications	3.1 Product specifications 3.2 Performance specifications 3.3 Method specifications
3. Terms and abbreviations	BOQ Bill of Quantities RFI Request for Information RFQ Request for Quotation RFP Request for Proposal Site Plan Layout of buildings, roads, utilities on a site RCC Reinforced Cement Concrete PCC Plain Cement Concrete MEP Mechanical, Electrical, and Plumbing HVAC Heating, Ventilation, and Air Conditioning GI Galvanized Iron MS Mild Steel CAD Computer-Aided Design FFL Finished Floor Level NGL Natural Ground Level DPC Damp Proof Course Lintel Horizontal support above openings Elevation External view of a building Section Cut-through view of structure Plan Top view of structure layout DB Distribution Board LV Low Voltage HV High Voltage UPS Uninterruptible Power Supply VFD Variable Frequency Drive AHU Air Handling Unit DG Diesel Generator ATS Automatic Transfer Switch QA/QC Quality Assurance / Quality Control HSE Health, Safety, and Environment PPE Personal Protective Equipment VAT Value Added Tax
4. Signs and symbols	4.1 Architectural Symbols ▪ Door symbols ▪ Window symbols ▪ Wall types ▪ Stairs ▪ Room names and numbers

	▪ Section and elevation indicators marks. ▪ Finish symbols 4.2 Structural Symbols ▪ Columns ▪ Beams and girders ▪ Footings ▪ Slabs ▪ Reinforcement 4.3 Electrical Symbols ▪ Switches ▪ Outlets ▪ Lighting fixtures ▪ Circuit lines ▪ Panel boards and breakers 4.4 Plumbing Symbols ▪ Water supply lines ▪ Drainage and vent pipes. ▪ Fixtures ▪ Valves ▪ Pumps and tanks 4.5 HVAC Symbols ▪ Ducts ▪ Diffusers, grilles, and registers. ▪ Fans and blowers. ▪ Thermostats. ▪ Air conditioning units, chillers, heaters. 4.6 Site or Civil Symbols
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Interpreted schedules, dimensions and specifications contained in the drawings 1.2 Interpreted signs and symbols contained in the drawings 1.3 Interpreted information and procedure in the manual 1.4 Interpreted correct sequencing and adjustments in accordance with information contained in the manual
2. Underpinning knowledge	2.1 Types of construction manuals 2.2 signs and symbols used in construction drawing 2.3 units of measurement 2.4 units of conversion 2.5 Drawings and specifications 2.6 Terms and abbreviations.
3. Underpinning skills	3.1 Identifying appropriate manuals 3.2 Identifying drawings and specifications

	3.3 Interpreting drawings and specifications 3.4 Storing manuals.
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace.
5. Resource implications	5.1 Pens 5.2 Telephone 5.3 Computer 5.4 Writing materials 5.5 Online communication.
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 demonstration 6.2 oral questioning 6.3 written test 6.4 portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by a NSDA certified/nominated assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Occupation Specific Units of Competencies

Unit Code and Title	OU-CON-EIM-01-L2-V1: Use Hand Tools and Power Tools
Unit Descriptor	This unit covers the skills, knowledge and attitude to use hand tools and power tools. It specifically includes the tasks of practicing OSH, identifying tools, using hand tools, power tools, performing basic preventive maintenance and cleaning and storing tools.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Prepare for work	1.1 **Safe work practice** are followed throughout the work process; 1.2 The workplace is cleaned and cleared of rubbish and unwanted materials; 1.3 **Hand tools** and **power tools** are selected and collected; 1.4 **Applications** of tools are defined; 1.5 Hand tools and power tools are prepared for use; 1.6 Sources of power supply for power tools recognized.
2. Use hand tools	2.1 Appropriate tool is used as required; 2.2 Hand tools are checked for functioning; 2.3 Proper hand and eye coordination is applied in the use of hand tools; 2.4 Unsafe or faulty tools are identified and marked for repair.
3. Use power tools	3.1 Power supply connection is established in accordance with workplace safety requirements; 3.2 Power tools are used in proper sequence as per workplace requirements; 3.3 Unsafe or faulty tools are identified and marked for repair.
4. Perform basic preventive maintenance	4.1 Tools and equipment are cleaned; 4.2 Tools and equipment are lubricated; 4.3 Measuring instruments are checked and calibrated; 4.4 Defective instruments, equipment and accessories are inspected and corrected or replaced.
5. Clean workplace and store tools	5.1. The workplace is cleaned; 5.2. Waste materials are disposed; 5.3. Inventory of tools are conducted; 5.4. Tools are cleaned and stored safely in appropriate location; 5.5. Hazardous materials are identified for separately store.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Safe work practices	1.1 Use PPE

	1.2 Use fire extinguisher 1.3 Response emergency situation 1.4 Identify hazard 1.5 Control hazards 1.6 Measure risk 1.7 Use first aid 1.8 Report uncontrolled hazards
2. PPE	2.1 Dust mask 2.2 Safety glasses/Goggles 2.3 Hand Gloves 2.4 Safety shoes/boots 2.5 Apron 2.6 Safety Helmet 2.7 Safety Belt 2.8 Ear Plug
3. Hand tools	3.1 Adjustable wrench 3.2 Bench vise 3.3 Chisels 3.4 Flat File 3.5 Wire Gauge 3.6 Hacksaw 3.7 Hammer 3.8 Hand drill machine 3.9 Measuring Tape 3.10 Pliers 3.11 Water level 3.12 Scarpers 3.13 Screw driver 3.14 Sledge Hammer 3.15 Spanner 3.16 Electrician Knife 3.17 Try square 3.18 Vice grip 3.19 Wire stripper
4. Power Tools	4.1 Electrical Hand Drill Machine 4.2 Soldering Iron 4.3 Power Screw drivers
5. Applications	5.1 Adjusting 5.2 Aligning 5.3 Assembling 5.4 Clamping 5.5 Cleaning 5.6 Cutting 5.7 Dismantling

	5.8 Finishing 5.9 Hand sharpening 5.10 Lubricating 5.11 Scraping 5.12 Simple Tool Repairs 5.13 Threading 5.14 Tightening
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 followed OSH as per job requirement 1.2 identified appropriate tools 1.3 used hand tools with appropriate method 1.4 used power tools with appropriate SOP 1.5 performed preventive maintenance.
2. Underpinning knowledge	2.1 Define tools 2.2 Classify tools 2.3 Define equipment 2.4 Standard procedure of the use of hand tools and power tools 2.5 Application of hand tools and power tools 2.6 Basic preventive maintenance of tools.
3. Underpinning skills	3.1 Identifying appropriate tools 3.2 Handling tools and equipment with appropriate method 3.3 Identifying power sources 3.4 Using power tools with appropriate SOP 3.5 Identifying preventive maintenance.
4. Required attitudes	4.1 Commitment to occupational safety and health 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Eagerness to learn 4.5 Tidiness and timeliness 4.6 Environmental concerns 4.7 Respect for rights of peers and seniors at workplace 4.8 Communicate with peers and seniors at workplace.
5. Resource implications	The following resources must be provided 5.1 Standard workplaces 5.2 Tools required as per job requirements 5.3 Operating Manuals, Codes, Standards and reference materials 5.4 Materials to perform work activities.

6.Methods of assessment	Assessment methods may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by a NSDA certified/nominated assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code and Title	OU-CON-EIM-02-L1-V1: Apply Fundamental Skills for Electrical Works
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to apply fundamental skills for electrical works. It specifically includes the tasks of preparing for work, interpreting basic electrical concept, identifying the elements of electrical circuit, applying electrical formulas, performing measurement of electrical quantities and maintaining workplace, tools, equipment and materials
Nominal Hours	**40 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Prepare for works	1.1. **Safe work practices** are followed throughout the work process; 1.2. PPE is collected and worn as per job requirement; 1.3. Workplace is prepared as per job requirement; 1.4. **Tools, equipment and accessories** are selected and collected as per job requirement.
2. Interpret basic electrical concept	2.1 Concept of Electricity is interpreted; 2.2 Sources of Electrical Energy are identified; 2.3 Difference between AC and DC is interpreted; 2.4 **Electrical quantities** are interpreted.
3. Identify the elements of electrical circuit	3.1 **Elements of electrical circuit** are interpreted; 3.2 **Types of electrical circuit** are interpreted; 3.3 Controlling devices for electrical circuit are identified; 3.4 Protective devices for electrical circuit are identified; 3.5 Electrical symbols are identified.
4. Apply electrical formulas	4.1 Ohms Laws is interpreted ; 4.2 Current is calculated for specific load; 4.3 Cable size is identified based on load; 4.4 Power is calculated for specific load; 4.5 Electrical energy is calculated for a specific time and load.
5. Perform measurement of electrical quantities	6.1 Current is measured as per standard procedure using clip on meter; 6.2 Voltage is measured as per standard procedure using multimeter; 6.3 Resistance is measured as per standard procedure using multimeter; 6.4 Capacitance is measured as per standard procedure using multimeter.
6. Maintain workplace, tools, equipment and	7.1 Tools, equipment and materials are cleaned as per SOP, 7.2 Defective tools and equipment are identified, separated and

materials	reported to the designated person, 7.3 Tools, equipment and materials are stored as per workplace procedure, 7.4 Workplace is cleaned as per SOP, 7.5 Waste materials are disposed in the designated place.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Safe work practices	1.1 Use PPE 1.2 Use fire extinguisher 1.3 Response emergency situation 1.4 Identify hazard 1.5 Control hazards 1.6 Measure risk 1.7 Use first aid 1.8 Report uncontrolled hazards
2. Tools	2.1 Wire Striper 2.2 Neon Tester 2.3 Multi Meter 2.4 Clip on meter 2.5 Measuring tape
3. Electrical Quantities	3.1 Current 3.2 Voltage 3.3 Resistance 3.4 Electrical Power 3.5 Electrical energy 3.6 Frequency 3.7 Capacitance
4. Elements of electrical circuit	4.1 Load 4.2 Controlling device 4.3 Protective device 4.4 Source 4.5 conductor
5. Types of electrical circuits	4.6 Series 4.7 Parallel 4.8 Combined
6. Symbols	4.7 Electrical Symbols ▪ Switches ▪ Outlets ▪ Lighting fixtures ▪ Circuit lines ▪ Panel boards and breakers
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	

1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 Identified the elements of electrical circuit 1.2 applied electrical formulas 1.3 Identified Electrical Symbols 1.4 measured electrical quantities 1.5 cleaned tools, equipment and materials 1.6 disposed waste materials in designated place.
2. Underpinning knowledge	2.1 Electrical symbols and their uses 2.2 Electrical Quantities 2.3 Elements of electrical circuit 2.4 Electricity 2.5 Difference between AC and DC 2.6 Controlling device 2.7 Protective device 2.8 Ohms Laws is interpreted 2.9 Cable size 2.10 Power 2.11 Electrical energy 2.12 Series circuit 2.13 Parallel circuit 2.14 Measurement of current 2.15 Measurement voltage 2.16 Functions and safety precaution of tools.
3. Underpinning Skills	3.1 Using PPE 3.2 Using Tools, Equipment and Materials 3.3 Selecting appropriate Tools, Equipment and fittings 3.4 Checking specifications 3.5 Locating and marking points 3.6 Handling of measuring instruments 3.7 Applying the techniques to measures electrical quantities.
4. Underpinning attitudes	4.1 Commitment to occupational safety and health 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Eagerness to learn 4.5 Tidiness and timeliness 4.6 Environmental concerns 4.7 Respect for rights of peers and seniors at workplace. 4.8 Communicate with peers and seniors at workplace.
5. Resource implications	The following resources must be provided: 5.1 Workplace location 5.2 Tools and equipment are available 5.3 Materials relevant to work activity 5.4 Drawing and specifications relevant to the task.
6. Methods of assessment	Assessment methods may include but not limited to:

	6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by a NSDA certified/nominated assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code &Title	**OU-CON-EIM-03-L1-V1: Perform Installation of Electrical Fittings**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform installation of electrical fittings. It includes preparing for works, fixing-up cut-outs / fuses / indicator with switch board, performing fixing of batten holder, performing fixing of batten holder, fixing of ceiling rose and maintaining workplace, tools, equipment and materials.
Nominal Hours	20 Hours
Elements of Competency	Performance Criteria Bold & Underlined terms are elaborated in the Range of Variables
1. Prepare for works	1.1 **Safe work practices** are followed throughout the work process; 1.2 **Personal Protective Equipment (PPE)** is collected and worn as per job requirement; 1.3 Workplace is prepared as per job requirement; 1.4 Tools, equipment and materials are selected and collected as per job requirement.
2. Fix-up switch board, channel and junction box	2.1 the location of switch board is identified for installation; 2.2 Switch board base is fixed on the wall as per location; 2.3 Bottom part of channel is fixed as per SOP; 2.4 the location of junction box is identified for installation; 2.5 Junction box base is fixed on the wall as per location.
3. Perform fixing of batten holder	3.1 The junction box is identified for fixing batten holder; 3.2 Bottom part of holder is fitted on the junction box; 3.3 Upper part is fitted on the bottom part.
4. Perform fixing of ceiling rose	4.1 Junction box is identified for fixing ceiling rose; 4.2 Bottom part of ceiling rose is fitted on the junction box; 4.3 Upper part of ceiling rose is fitted on the bottom part.
5. Maintain workplace, tools, equipment and materials	5.1 Work area is cleaned in accordance with workplace procedures; 5.2 Unused materials are stored for re-use or disposed following workplace procedures; 5.3 Waste and scrap materials are disposed with following workplace procedures; 5.4 Inventory of tools equipment are conducted and recorded as per checklist; 5.5 Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location.
Range of Variables	
Variable	**Range** (may include but not limited to):

1. Safe work practices	1.1 Use PPE 1.2 Use fire extinguisher 1.3 Response emergency situation 1.4 Identify hazard 1.5 Control hazards 1.6 Measure risk 1.7 Use first aid 1.8 Report uncontrolled hazards
2. Personal Protective Equipment (PPE)	2.1 Helmet 2.2 Safety goggles 2.3 Mask 2.4 Apron 2.5 Hand gloves 2.6 Safety shoe 2.7 Safety belt
3. Tools	3.1 Hammer 3.2 Cutting pliers 3.3 Combination pliers 3.4 Wire striper 3.5 Neon tester 3.6 Screw driver (flat, star and connecting) 3.7 Electrician knife
4. Equipment	4.1 Ladder 4.2 Working bench
5. Materials	5.1 Ceiling rose 5.2 Batten Holder 5.3 Socket base, 5.4 Junction box

Evidence Guide

The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.

1. Critical aspect of competency	Assessment required evidences that the candidate: 1.1 identified types of board, fuse, switch, indicator, socket, holder, ceiling rose 1.2 fixed-up switch board, fuse, switch, indicator, socket, junction box, joint box 1.3 performed fixing of batten holder 1.4 performed fixing of ceiling rose 1.5 maintained workplace, tools, equipment and materials.
2. Underpinning knowledge	2.1 Function and types of board, holder, ceiling rose 2.2 Connection and connecting point with the load 2.3 Specification and limit of load of board, batten holder, ceiling rose,

	2.4 Fixing procedure of board, batten holder, ceiling rose, 2.5 Disposal of Waste and scrap materials 2.6 Inventory of tools equipment
3. Underpinning skills	3.1 Installing switch board, fuse, switch, socket, holder and ceiling rose 3.2 Connecting loads and power. 3.3 Checking circuit. 3.4 testing circuit.
4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for rights of peers and seniors at workplace. 4.8 Communicate with peers and seniors at workplace.
5. Resource implication	The following resources must be available: 5.1 workplace (actual or simulated) 5.2 tools and equipment appropriate to joint 5.3 accessibility to the work place 5.4 quality materials availability.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio.
7. Context of Assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by a NSDA certified/nominated assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code & Title	**OU-CON-EIM-04-L1-V1: Perform Circuit Connection**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform circuit connection. It includes preparing for works, performing series circuit connection, performing parallel circuit connection, performing series and parallel (mixed) circuit connection and maintaining workplace, tools, equipment and materials.
Nominal Hours	**40 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for works	1.1 **Safe work practices** are followed throughout the work process; 1.2 **Personal Protective Equipment (PPE)** is collected and worn as per job requirement; 1.3 Workplace is prepared as per job requirement; 1.4 **Tools, materials** and drawing are collected as per job requirement.
2. Perform series circuit connection	2.1 Circuit materials are placed on the board; 2.2 Circuit accessories are fitted and connected as per drawing; 2.3 Circuit connection is performed according to the drawing; 2.4 Circuit connection is checked; 2.5 Series circuit is tested.
3. Perform parallel circuit connection	3.1 Circuit materials are placed on the board; 3.2 Circuit accessories are fitted and connected as per drawing; 3.3 Circuit connection is performed according to the drawing; 3.4 Circuit connection is checked; 3.5 Parallel circuit is tested.
4. Perform series and parallel (mixed) circuit connection	4.1 Circuit materials are placed on the board. 4.2 Circuit accessories are fitted and connected as per drawing; 4.3 Circuit connection is performed according to the drawing; 4.4 Circuit connection is checked; 4.5 Prepared circuit is tested.

5. Maintain workplace, tools, equipment and materials	5.1 Work area is cleaned in accordance with workplace procedures; 5.2 Unused materials are stored for re-use or disposed following workplace procedures; 5.3 Waste and scrap materials are disposed with following workplace procedures; 5.4 Inventory of tools equipment are conducted and recorded as per checklist; 5.5 Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Safe work practices	1.1 Use PPE 1.2 Use fire extinguisher 1.3 Response emergency situation 1.4 Identify hazard 1.5 Control hazards 1.6 Measure risk 1.7 Use first aid 1.8 Report uncontrolled hazards
2. Personal Protective Equipment (PPE)	2.1 Helmet 2.2 Safety goggles 2.3 Mask 2.4 Apron 2.5 Hand gloves 2.6 Safety shoe
3. Tools	3.1 Hammer 3.2 Cutting pliers 3.3 Combination pliers 3.4 Wire striper 3.5 Neon tester 3.6 Screw driver (flat, star and connecting) 3.7 Electrician knife 3.8 Hack saw blade 3.9 Tri-Square 3.10 Multi meter 3.11 Series lamp
4. Accessories / materials	4.1 Bulb / load 4.2 Fuse 4.3 Switch 4.4 Wire 4.5 Cables

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 identified circuit diagram and materials 1.2 performed series circuit connection 1.3 performed parallel circuit connection 1.4 performed series and parallel (mixed) circuit connection 1.5 checked and tested all circuit connections 1.6 maintained workplace, tools, equipment and materials.
2. Underpinning knowledge	2.1 Definition, types and properties of circuit 2.2 Quality of materials and circuit diagram 2.3 series, parallel and combined circuit 2.4 making procedure of the circuit 2.5 Necessity of circuit test.
3. Underpinning skills	3.1 Interpreting the drawing of series and parallel circuit 3.2 Interpreting the drawing of combined circuit 3.3 Installing bulb, fuse switches and other accessories. 3.4 Testing the circuit.
4. Required attitudes	4.1 Commitment to occupational safety and health 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Eagerness to learn 4.5 Tidiness and timeliness 4.6 Environmental concerns 4.7 Respect to peers and seniors at workplace 4.8 Communicate with peers and seniors at workplace.
5. Resource implication	The following resources must be provided: 5.1 workplace (actual or simulated) 5.2 tools and equipment appropriate to joint 5.3 accessibility to the work place 5.4 materials and accessories appropriate for the proposed activities 5.5 quality materials availability.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio.

7. Context of Assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by a NSDA certified/nominated assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code & Title	OU-CON-EIM-05-L1-V: Perform Wire and Cable Joints
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform wire and cable joints. It includes preparing for works, preparing cable for joint, making pigtail joint, making western union joint, making T-joint, making married joint and maintaining workplace, tools, equipment and materials
Nominal Hours	**30 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for works	1.1 **Safe work practices** are followed throughout the work process; 1.2 **Personal Protective Equipment (PPE)** is collected and worn as per job requirement; 1.3 Workplace is prepared as per job requirement; 1.4 **Tools** and equipment are selected and collected as per job requirement.
2. Prepare cable for joint	2.1 Cables are identified as per requirement; 2.2 Cables are collected as per work requirement; 2.3 Size of collected Cable is checked for joint as per specification.
3. Make pigtail joint	3.1 Insulation of cable is removed as required from cable terminal using knife or wire stripper; 3.2 Conductor surface is scraped by using emery paper/electrician knife; 3.3 Conductors of cables are twisted as per requirement of pigtail joint; 3.4 Soldering is performed on conductor as per requirement; 3.5 joint is insulated using **insulation material.**
4. Make western union joint	4.1 Insulation of cable is removed as required from cable terminal using knife or wire stripper; 4.2 Conductor surface is scraped by using emery paper/electrician knife; 4.3 Conductors of cables are twisted as per requirement of western union joint; 4.4 Soldering is performed on conductor as per requirement; 4.5 joint is insulated using insulation material.

5. Make T-Joint	5.1 Insulation of cable is removed as required from cable terminal using knife or wire stripper; 5.2 Conductor surface is scraped by using emery paper/electrician knife; 5.3 Conductors of cables are twisted as per requirement of T-Joint; 5.4 Soldering is performed on conductor as per requirement; 5.5 joint is insulated using insulation material;
6. Make married joint	6.1 Insulation of cable is removed as required from cable terminal using knife or wire stripper; 6.2 Conductor surface is scraped by using emery paper/electrician knife; 6.3 Conductors of cables are twisted as per requirement of Joint; 6.4 Soldering is performed on conductor as per requirement; 6.5 joint is insulated using insulation material;
7. Maintain workplace, tools, equipment and materials	7.1 Work area is cleaned in accordance with workplace procedures; 7.2 Unused materials are stored for re-use or disposed following workplace procedures; 7.3 Waste and scrap materials are disposed with following workplace procedures; 7.4 Inventory of tools equipment are conducted and recorded as per checklist; 7.5 Tools and equipment are cleaned and stored as per manufacturer'srecommendationinappropriate location.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Safe work practices	1.1 Use PPE 1.2 Use fire extinguisher 1.3 Response emergency situation 1.4 Identify hazard 1.5 Control hazards 1.6 Measure risk 1.7 Use first aid 1.8 Report uncontrolled hazards

2. Personal Protective Equipment (PPE)	2.1 Helmet 2.2 Safety goggles 2.3 Mask 2.4 Apron 2.5 Hand gloves 2.6 Safety shoes
3. Tools	3.1 Hammer 3.2 Cutting pliers 3.3 Combination pliers 3.4 Wire striper 3.5 Neon tester 3.6 Screw driver (fat, star and connecting) 3.7 Electrician knife 3.8 Soldering iron 3.9 Nose pliers
4. Wire and cables	4.1 PVC Cable ▪ BYA ▪ BYM ▪ NYY
5. Cable sizes	4.1 1.0 re 4.2 1.5 rm 4.3 2.5 rm 4.4 3.0 rm 4.5 4.0 rm 4.6 Flexible cable (0.4 rm, 0.5 rm, 0.65 rm)
6. insulation material	4.7 PVC Tape 4.8 Heat sink tube

Evidence Guide

The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.

1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 selected proper cables size with proper specification 1.2 removed insulation of cable 1.3 used knife or wire stripper 1.4 scraped conductor surface by using emery paper/electrician knife 1.5 twisted conductors of cables 1.6 perform soldering on conductor 1.7 insulated joint.

2. Underpinning knowledge	2.1 Different type of the cables. 2.2 Function, procedure and uses of the pigtail, T-joint, western union, straight wire and marred joint 2.3 different types of tools and equipment used for making joint. 2.4 Procedure of the making joint 2.5 Wire and cables 2.6 Cable sizes 2.7 insulation material.
3. Underpinning skills	3.1 Using cable and making joint 3.2 Removing insulation 3.3 Insulating conductors to ensure safety 3.4 Tapping twisted cable without lose fittings. 3.5 Jointing the circuit as per diagram.
4. Required attitudes	4.1 Commitment to occupational safety and health 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities. 4.4 Eagerness to learn 4.5 Tidiness and timeliness 4.6 Environmental concerns 4.7 Respect of peers and seniors at workplace 4.8 Communicate with peers and seniors at workplace.
5. Resource implication	The following resources must be provided: 5.1 workplace (actual or simulated) 5.2 tools and equipment appropriate to joint 5.3 accessibility to the workplace 5.4 quality materials availability.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 written test 6.2 demonstration 6.3 oral questioning 6.4 portfolio.
7. Context of Assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre; 7.2 Assessment should be done by a NSDA certified/nominated assessor.

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	OU-CON-EIM-06-L1-V1: Perform Installation of Electrical Circuit
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to Perform installation of Electrical circuit. It specifically includes the tasks of preparing for works, controlling one lamp by SPST and SPDT switch, controlling one calling bell from two point, preparing and install the circuit of tube light, installing Ceiling Fan with regulator and maintaining workplace, tools, equipment and materials
Nominal Hours	**60 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Prepare for works	1.1 **Safe work practices** are followed throughout the work process; 1.2 **PPE** is collected and used as per job requirement; 1.3 Workplace is prepared as per job requirement; 1.4 **Tools, equipment** and **materials** are collected as per job requirement.
2. Control lamp by SPST and SPDT switch	2.1 Circuit layout is drawn as per drawing; 2.2 **Circuit materials** are placed as per drawing; 2.3 **Fittings and fixtures** are installed as per drawing; 2.4 lamp is controlled by SPST switch; 2.5 lamp is controlled by SPDT switch from two points; 2.6 Circuit **Test** is performed as per SOP.
3. Control calling bell from two point	3.1 Circuit layout is drawn as per drawing; 3.2 Circuit materials are placed as per drawing; 3.3 Fittings are installed as per drawing; 3.4 Calling bell circuit is installed as per drawing; 3.5 Circuit connection is checked according to the drawing; 3.6 Circuit is tested as per SOP.
4. Install tube light circuit	4.1 Circuit layout is drawn as per drawing; 4.2 Circuit materials are placed as per drawing; 4.3 Fittings and fixtures are installed as per drawing; 4.4 Circuit and tube light are installed as per drawing; 4.5 Circuit connection is checked according to the drawing; 4.6 Circuit is tested as per SOP.
5. Install Ceiling Fan with regulator	5.1 Circuit layout is drawn as per drawing; 5.2 Circuit materials are placed as per drawing; 5.3 Fittings and fixtures are installed as per drawing; 5.4 Ceiling fan circuit is installed as per drawing; 5.5 Circuit connection is checked according to the drawing;

	5.6 Circuit is tested as per SOP.
6. Maintain Workplace, Tools, Equipment and Materials	6.1 Tools, equipment and materials are cleaned as per manufacturer instruction; 6.2 Defective tools and equipment are identified and separated and reported to the designated person; 6.3 Tools, equipment and materials are restored as per workplace procedure; 6.4 Workplace is cleaned as per company procedure; 6.5 Waste materials are disposed in the designated place.
Range of Variables	
Variable	**Range** (may include but not limited to):
1. Safe work practices	1.1. Use PPE 1.2. Use fire extinguisher 1.3. Response emergency situation 1.4. Identify hazard 1.5. Control hazards 1.6. Measure risk 1.7. Use first aid 1.8. Report uncontrolled hazards
2. Personal protective equipment (PPE)	2.1 Helmet 2.2 Safety Goggles 2.3 Mask 2.4 Apron 2.5 Hand Gloves 2.6 Safety Shoe
3. Tools and equipment	3.1 Ball peen hammer 3.2 Cutting Pliers 3.3 Combination Pliers 3.4 Wire striper 3.5 Neon tester 3.6 Screw driver (Flat, Philips and connecting) 3.7 Electrician knife 3.8 Electric hand drill 3.9 Multimeter
4. Circuit Materials	4.1 Cable 4.2 Bracket 4.3 Rowel plug 4.4 Screw 4.5 Cable tie 4.6 Flexible conduit 4.7 Electric soldering lead 4.8 PVC tape
5. Fitting and fixtures	5.1 Switch boards

	5.2 Switches 5.3 Sockets 5.4 Fuses 5.5 MCB 5.6 Fan regulator 5.7 Bracket holder 5.8 Batten holder 5.9 Ceiling rose
6. Test	6.1 Continuity test 6.2 Polarity test
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1. Installed fittings in to circuit 1.2. controlled lamp by SPST switch 1.3. controlled lamp by SPDT switch from two points 1.4. installed circuit of calling bell 1.5. installed circuit of tube light 1.6. installed ceiling fan circuit 1.7. checked installed circuits 1.8. performed circuit test.
2. Underpinning Knowledge	2.1 Safe use of Tools equipment and materials 2.2 Circuit Materials 2.3 Fitting and fixtures 2.4 SPST and SPDT switch 2.5 Different types of circuit diagram and materials 2.6 Quality & materials 2.7 Continuity test 2.8 Polarity test.
3. Underpinning Skills	3.1. Interpreting drawing & symbols 3.2. Connecting loads and power 3.3. Handling tools & instruments 3.4. Preparing different circuit 3.5. Installing electrical fittings and circuits 3.6. Applying circuit testing procedure.
4. Underpinning attitudes	4.1. Commitment to occupational safety and health 4.2. Promptness in carrying out activities 4.3. Sincere and honest to duties 4.4. Eagerness to learn

	4.5. Tidiness and timeliness 4.6. Environmental concerns 4.7. Respect for rights of peers and seniors at workplace 4.8. Communicate with peers and seniors at workplace.
5. Resource implications	The following resources must be provided: 5.1. Adequate workplace 5.2. Tools and equipment appropriate to work activities 5.3. Materials relevant to the proposed activity 5.4. Drawings and specifications relevant to the task.
6. Methods of assessment	Assessment methods may include but not limited to: 6.1. Oral questioning 6.2. Written test 6.3. Demonstration 6.4. Portfolio.
7. Context of assessment	7.1. Competency assessment must be done in NSDA accredited assessment centre; 7.2. Assessment should be done by a NSDA certified/nominated assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code and Title	OU-CON-EIM-07-L1-V1: Perform Channel Wiring
Unit Descriptor	This unit covers the knowledge, skills and attitudes to perform channel wiring. It specifically includes the tasks of preparing for works, installing channel, installing accessories of wiring, installing electrical circuit, testing the wiring and maintaining workplace, tools and materials
Nominal Hours	**70 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Prepare for works	1.1 **Safe work practices** are followed throughout the work process; 1.2 **PPE** is collected and worn as per job requirement; 1.3 Workplace is prepared as per job requirement; 1.4 **Tools, equipment** and **materials** are collected as per job requirement; 1.5 Drawings are collected and interpreted.
2. Install Channel	2.1 Layout is drawn as per drawing; 2.2 Channel size is identified, selected and collected as per the number and size of cables to be embedded inside; 2.3 Collected channels are cut as per drawing; 2.4 channels are installed as per requirement.
3. Install accessories of wiring	3.1 Fuse, switches, sockets, fan regulator are fitted on appropriate fittings; 3.2 fuse, Switches, sockets and fan regulator are connected to the circuits; 3.3 Ceiling rose and different types of holders are fitted; 3.4 DP MCB is installed in appropriate location.
4. Install electrical circuit	4.1 PVC cable is laid into the channel as per the diagram; 4.2 Upper part of channel is set as per SOP; 4.3 cables are connected among the fuse, switches, sockets, fan regulator, loads and distribution board terminals as per the circuit diagram; 4.4 proper connectors and insulation are used where needed.
5. Test the wiring	5.1 Verify that all connections are secure and correct; 5.2 Check the continuity and polarity of the circuit using multimeter or series lamp; 5.3 Connect all the loads to the circuit; 5.4 Turn on the main supply; 5.5 Test all points for proper functionality.

6. Maintain Workplace, Tools and Materials	6.1 Tools, equipment and materials are cleaned as per standard; 6.2 Defective tools and equipment are identified, separated and reported to the designated person; 6.3 Tools, equipment and materials are stored as per workplace procedure; 6.4 Workplace is cleaned as per workplace procedure; 6.5 Waste materials are disposed in the designated place.
Range of Variables	
Variable	**Range** (may include but not limited to):
1. Safe work practices	1.1. Use PPE 1.2. Use fire extinguisher 1.3. Response emergency situation 1.4. Identify hazard 1.5. Control hazards 1.6. Measure risk 1.7. Use first aid 1.8. Report uncontrolled hazards
2. Personal Protective Equipment (PPE)	2.1 Safety Helmet 2.2 Safety Goggles 2.3 Safety Belt 2.4 Mask 2.5 Apron 2.6 Hand Gloves 2.7 Safety Shoes
3. Tools and equipment	3.1 Calculator 3.2 Multi Meter/AVO Meter 3.3 Series Lamp 3.4 Wire Stripper 3.5 Wooden Chisels 3.6 Drill bits 3.7 Files: (a) Flat, (b) Round, (c) Half round 3.8 Hacksaw 3.9 Hammers: (a) Ball peen, (b) Claw (c) Mallet 3.10 Measuring Tapes 3.11 Pliers: (a) Combination Pliers, (b)Diagonal cutting Pliers, (c) Long Nose Pliers, 3.12 Screwdrivers: (a) Star, (b) Flat, (c) Connecting 3.13 Try square 3.14 Neon Tester 3.15 Wire gauge 3.16 Electrician Knife

	3.17 Ladder 3.18 Hand Drill Machine
4. Materials	3.1 PVC Channel (¾", 1",1.25", 1.5") 3.2 PVC Circular Box 3.3 Rowel plug 3.4 Screw 3.5 Cable tie 3.6 Thread ball & Blue 3.7 Insulation tape 3.8 PVC Cable 3.9 Flexible cable
5. Boards	4.1 Switch board 4.2 Ebonite board
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1. set the channels 1.2. tested the circuit 1.3. connected DP MCB 1.4. connected with loads 1.5. checked polarity 1.6. cleaned workplace 1.7. stored tools & equipment.
2. Underpinning Knowledge	2.1. Process of channel wiring 2.2. Use of fixture and fittings 2.3. Circuit and sub-circuit. 2.4. DP MCB 2.5. Test the circuit 2.6. Continuity test 2.7. Polarity test.
3. Underpinning Skills	3.1. Using PPE 3.2. Selecting appropriate Tools and Equipment 3.3. Selecting appropriate materials 3.4. Using Tools, Equipment and Materials 3.5. Checking specifications 3.6. Locating points & fixtures 3.7. Testing circuit.
4. Underpinning attitudes	4.1. Commitment to occupational safety and health; 4.2. Promptness in carrying out activities; 4.3. Sincere and honest to duties; 4.4. Eagerness to learn.

	4.5. Tidiness and timeliness; 4.6. Environmental concern;. 4.7. Respect for rights of peers and seniors at workplace; 4.8. Communicate with peers and seniors at workplace.
5. Resource implications	The following resources must be provided: 5.1. Adequate workplace 5.2. Tools and equipment appropriate to work activities 5.3. Materials relevant to the proposed activity 5.4. Drawings and specifications relevant to the task.
6. Methods of assessment	Assessment methods may include but not limited to: 6.1. Written test 6.2. Demonstration 6.3. Oral questioning 6.4. Portfolio
7. Context of assessment	7.1. Competency assessment must be done in NSDA accredited assessment centre; 7.2. Assessment should be done by a NSDA certified/nominated assessor.
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

References:

- CS of National Skills Development Authority
- CS of Bangladesh Technical Education Board (BTEB)

Development of Competency Standard

The Competency Standards for National Skills Certificate Level-1 in **Electrical Installation & Maintenance** is Developed by NSDA on 20 May, 2025.

List of Members of the Development Workshop

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Validation of Competency Standard

The Competency Standards for National Skills Certificate Level-1 in **Electrical Installation & Maintenance** is Validated by SCVC on 22 May, 2025.

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