



# COMPETENCY STANDARD

## ELECTRICIAN (BUILDING) LEVEL-I

### ELECTRICAL & ELECTRONICS SECTOR



In collaboration with



**NGO FORUM  
FOR PUBLIC HEALTH**



In partnership with

**Canada**

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## Foreword

UN High Commissioner for Refugees (UNHCR), in collaboration with International Organization for Migration (IOM), BRAC, Center for Natural Resource Studies (CNRS), and NGO Forum for Public Health, is implementing a skills development project as part of a joint Initiative by International Labour Organization (ILO), UNHCR and BRAC with financial support from Global Affairs Canada (GAC) in the refugee camps of Cox's Bazar and on Bhasan Char.

The project has a target to reach a total of 8,000 refugee youth (18-24) participants for accredited vocational skills training which will be selected across the camps considering the demand of the refugee youths and labour market needs of Rakhine state of Myanmar so that the acquired skills can be utilised after their repatriation. To assess the skills needs of the refugee youths, UNHCR, in collaboration with UCEP Bangladesh, a national pioneer organisation in the vocational skills sector in Bangladesh, commissioned a Skills Needs Assessment in all refugee camps in Cox's Bazar and on Bhasan Char. In alignment with the Skills Needs Assessment findings and commitment, the project developed Competency Standards by adopting Myanmar National Qualification Framework (MNQF) or ASEAN Qualification Reference Framework (AQRF).

Following the requirement of the Myanmar National Qualification Framework (MNQF) or ASEAN Qualification Framework (AQRF), analysing the context of the camps, compatible aptitude and utilisation opportunities for the refugee youth and their educational qualifications, the pool of TVET experts of UCEP Bangladesh has developed course outline of the following ten occupations. Consequently, those ten course outlines have been translated into Competency Standards.

1. Sewing Machine Operation
2. Community Health Worker
3. Concreter
4. Small Engine Mechanic
5. Caregiving
6. Solar (PV) System Installation and Maintenance
7. Electrician (Building)
8. Plumbing
9. Agricultural Crops Production
10. Bakery and Pastry Staff

The following Competency Standard for **Electrician (Building) Level-I** is adapted from the "Training Regulations - Electrical Installation and Maintenance NC II – Electrical & Electronics Sector" developed by the Technical Education and Skills Development Authority of the Philippines. Competency standards are benchmarks defining the skills, knowledge and attributes people need to perform a work role.

## Qualification Framework Description (Certification System)

To attain the Electrician (Building) Level-I, the candidate must demonstrate competence through assessment covering all the units listed in Section 1. Successful candidates shall be awarded a Certificate of Participation issued jointly by UNHCR and ILO. The qualification of Electrician (Building) Level-I may be attained through the accumulation of Certificates of Competency (COCs) in the following areas:

1. Perform Channel Wiring
2. Install electrical protective devices for distribution, power, lighting, auxiliary, lightning protection and grounding systems
3. Install wiring devices of floor and wall mounted outlets, lighting fixtures/switches, and auxiliary outlets

Successful candidates shall be awarded a Certificate of Participation. Accumulating and submitting all COCs acquired for the relevant units of competency comprising a qualification, an individual shall be issued a Certificate of Participation jointly by UNHCR and ILO to demonstrate the accumulated competencies. The Certificate of Participation may help the person attain the Recognition of Prior Learning (RPL) test in the country of origin or any other third country. Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.

## General Guidelines for the Assessment

**In general, for the competency standard**

<b>Method of Assessment:</b>	<ol style="list-style-type: none"><li>1. Interviews/questioning</li><li>2. Observation</li><li>3. Demonstration</li><li>4. Oral/written examination</li></ol>
<b>Context of Assessment:</b>	<ol style="list-style-type: none"><li>1. Training is delivered from camp-based non-registered training centre</li><li>2. Training materials and the curriculum modules are adopted from MNQF or AQRF</li><li>3. Training programs are endorsed by the <i>Government of Bangladesh – United Nations Framework on Skills Development for Rohingya Refugee/FDMNs and Host Communities</i></li></ol>
<b>Information about development and characteristics of the Standard</b>	<p>Course Title: Electrician (Building) Level: I Nominal Training Duration: 360 Hours</p> <p>This course is designed to enhance the knowledge, desirable skills and attitudes of Electrician (Building) Level-I in accordance with industry standards. It covers Basic, Common and Core Competencies.</p>

## Course Structure

### Electrician (Building) Level-I

Code	Unit of Competencies	Total Guided Hours		
		Th.	Pr.	Total
<b>Basic Competencies (2 UoCs Required)</b>				
ISEC-EE-EL-01-B	Receive and respond to workplace communication	06	14	20
ISEC-EE-EL-02-B	Follow basic housekeeping procedures	08	22	30
<b>Total in Basic Competencies</b>		<b>14</b>	<b>36</b>	<b>50</b>
<b>Industry Competencies (3 UoCs Required)</b>				
ISEC-EE-EL-01-I	Follow the safety and health procedure	06	24	30
ISEC-EE-EL-02-I	Use Hand and Power Tools for Electrical Works	03	12	15
ISEC-EE-EL-03-I	Terminate and Connect Electrical Wiring	06	24	30
<b>Total in Industry Competencies</b>		<b>15</b>	<b>60</b>	<b>75</b>
<b>Technical Competencies (3 UoCs Required)</b>				
ISEC-EE-EL-01-T	Perform Channel Wiring	16	64	80
ISEC-EE-EL-02-T	Install electrical protective devices for distribution, power, lighting, auxiliary, lightning protection and grounding systems	16	64	80
ISEC-EE-EL-03-T	Install wiring devices of floor and wall mounted outlets, lighting fixtures/switches, and auxiliary outlets	15	60	75
<b>Total in Technical Competencies</b>		<b>47</b>	<b>188</b>	<b>235</b>
<b>Total Nominal Hours</b>		<b>76</b>	<b>284</b>	<b>360</b>

## BASIC COMPETENCIES

- UNIT OF COMPETENCY** : **Receive and respond to workplace communication**  
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to receive, respond and act on verbal and written communication.  
**NOMINAL DURATION** : **20 Hours**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Follow routine spoken messages	1.1 Required information is gathered by listening attentively and correctly interpreting or understanding information/instructions 1.2 Instructions/information are properly recorded 1.3 Instructions are acted upon immediately in accordance with information received 1.4 Clarification is sought from workplace supervisor on all occasions when any instruction/information is not clear
2. Perform workplace duties following written notices	2.1 <b>Written notices and instructions</b> are read and interpreted correctly in accordance with <b>organizational guidelines</b> 2.2 Routine written instruction are followed in sequence 2.3 Feedback is given to workplace supervisor based on the instructions/information received

**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Written notices and instructions	1.1. Handwritten and printed material 1.2. Internal memos 1.3. External communications 1.4. Briefing notes 1.5. General correspondence 1.6. Marketing materials 1.7. Journal articles
2. Organizational Guidelines	2.1 Information documentation procedures 2.2 Company policies and procedures 2.3 Organization manuals 2.4 Service manual

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Knowledge of organizational policies/guidelines in regard to processing internal/external information</li> <li>• Ethical work practices in handling communications</li> <li>• Communication process</li> </ul>	1. Conciseness in receiving and clarifying messages/information/communication 2. Accuracy in recording messages/information
<b>Required major tools and equipment for the UoC:</b> <ol style="list-style-type: none"> <li>1. Pens</li> <li>2. Note pads</li> </ol>	



**Competency Standard: Electrician (Building) Level-I**

**UNIT OF COMPETENCY** : **Follow basic housekeeping procedures**  
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to apply the basic housekeeping procedures.  
**NOMINAL DURATION** : **30 Hours**

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> 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 <b>Unnecessary items</b> 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 <b>identification marks</b> 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 <b>Minor repairs</b> 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 procedures	4.1 Materials for common use are maintained in designated area based on procedures 4.2 Work is performed according to standard work procedures 4.3 Abnormal incidents are reported to immediate supervisor
5. Follow occupational health, safety and environmental requirements	5.1 Work is performed as per instruction 5.2 Company and office <b>decorum</b> are followed and complied with 5.3 Work is performed in accordance with occupational health and safety (OHS) requirements

**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Unnecessary items	1.1. Non-recyclable materials 1.2. Unserviceable tools and equipment 1.3. Pictures, posters and other materials not related to work activity 1.4. Waste materials
2. Identification marks	2.1 Labels 2.2 Tags 2.3 Colour coding
3. Decorum	3.1 Company/ office rules and regulations 3.2 Company/ office uniform 3.3 Behaviour
4. Minor repair	4.1 Replacement of parts 4.2 Application of lubricants 4.3 Sharpening of tools 4.4 Tightening of nuts, bolts and screws

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Principles of 5S</li> <li>• Work process and procedures</li> <li>• Safety signs and symbols</li> <li>• General OH&amp;S principles and legislation</li> <li>• Environmental requirements relative to work safety</li> <li>• Accident/Hazard reporting procedures</li> </ul>	<ol style="list-style-type: none"> <li>1. Basic communication skills</li> <li>2. Interpersonal skills</li> <li>3. Reading skills required to interpret instructions</li> <li>4. Reporting/recording accidents and potential hazards</li> </ol>
<p><b>Required major tools and equipment for the UoC:</b></p> <ol style="list-style-type: none"> <li>1. Pens</li> <li>2. Note pads</li> <li>3. Marker</li> <li>4. Colour pens</li> </ol>	

## INDUSTRY COMPETENCIES

- UNIT OF COMPETENCY** : **Follow the safety and health procedure**  
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to perform safety measures effectively and efficiently. It includes identifying areas, tools, materials, time and place in performing safety measures.  
**NOMINAL DURATION** : **30 Hours**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Follow safe work practices	1.1 <b>Safety regulations</b> and <b>workplace</b> safety and hazard control practices and procedures based on organization procedures are followed. 1.2 <b>Hazards/ risk</b> in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3 <b>Contingency measures</b> during the events of workplace accidents, fire and other emergencies are complied with in accordance with organization procedures
2. Identify hazards and risks	2.1 Maximum tolerable limits of contaminants based on threshold limit values (TLV) which when exceeded will result in harm or damage to health are identified 2.2 Effects of the hazards are determined. 2.3 OHS issues or concerns and identified workplace hazards are reported to designated personnel in accordance with workplace requirements and relevant OHS legislation
3. Follow emergency procedures	3.1 Follow consistently Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed. 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies 3.3 Personal Protective Equipment (PPE) are correctly used in accordance with organization's OHS procedures and.

**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Safety regulations	1.1. Waste Disposable 1.2. Electrical and Fire Safety precaution 1.3. Signs
2. Hazards	2.1. Chemical 2.2. Electrical 2.3. Falls
3. Risks	3.1. Precaution hazards (use sharp tools) 3.2. Lifeline 3.3. Barricade 3.4. PPE (Masks, Gloves, Boots, Apron, Hat, Eye goggles) 3.5. Signs 3.6. Mask
4. Contingency measures	4.1. Location of first aid kit 4.2. Evacuation 4.3. Agencies contract 4.4. Farm emergency procedures

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<p><b>Safety Practices</b></p> <ul style="list-style-type: none"> <li>• Implementation of regulatory controls and policies relative to treatment of area and application of chemicals</li> <li>• Proper disposal of waste materials</li> </ul> <p><b>Codes and Regulations</b></p> <ul style="list-style-type: none"> <li>• Hazard identification</li> <li>• Emergency procedures</li> </ul> <p><b>Tools &amp; Equipment: Uses and Specification</b></p> <ul style="list-style-type: none"> <li>• Masks, gloves, boots, overall coats for health protection</li> </ul> <p><b>Maintenance</b></p> <ul style="list-style-type: none"> <li>• Regular check-up and repair of tools, materials and outfit before and after use</li> </ul>	<ol style="list-style-type: none"> <li>1. Ability to recognize effective tools, materials, and outfit</li> <li>2. Ready skills required to read labels, manuals, and other basic safety information</li> </ol>
<p><b>Required major tools and equipment for the UoC:</b></p> <ol style="list-style-type: none"> <li>1. Tools, equipment, and outfits appropriate in applying safety measures</li> </ol>	

**Competency Standard: Electrician (Building) Level-I**

- UNIT OF COMPETENCY** : **Use Hand and Power Tools for Electrical Works**  
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to use hand and power tools for electrical works. It specifically includes – inspect hand tools and power tools for usability; use hand tools; operate power tools; and maintain hand tools and power tools after use.  
**NOMINAL DURATION** : **15 Hours**

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Inspect hand tools and power tools for usability	1.1 Hand tools are identified 1.2 Application of tools to job requirement is interpreted 1.3 Usability of tools are checked and verified 1.4 <b>Hand tools</b> and <b>power tools</b> are prepared 1.5 Sources of power supply for power tools are identified
2. Use hand tools	2.1 Appropriate hand tool for the job is used 2.2 Proper and safe use and operation of hand tools are applied 2.3 <b>Safety precautions</b> is observed when using hand tools 2.4 Unsafe or faulty tools are identified and marked for repair
3. Operate power tools	3.1 Power supply outlet and electrical cord are inspected and confirmed safe for use in accordance with established workplace safety requirements 3.2 Proper sequence of operation is applied in using power tools 3.3 Power tools are used safely in accordance to manufacturer's operating specification
4. Clean and maintain hand tools and power tools after use	4.1 Dust and foreign matters are removed from power tools in accordance to workplace standard 4.2 Condition of tools is checked after use 4.3 Appropriate lubricant is applied after use and prior to storage 4.4 <b>Measuring tools</b> are checked and calibrated 4.5 Defective tools, instruments, power tools and accessories are inspected and corrected or replaced

**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Hand tools	1.1. Ball peen hammer 1.2. Cross peen hammer 1.3. Straight peen hammer 1.4. Mallet / soft hammer 1.5. Bench vise 1.6. Soft jaw 1.7. Rough file 1.8. Medium file 1.9. Smooth file 1.10. Punches 1.11. Chisels 1.12. Wrenches 1.13. Pliers 1.14. Scriber 1.15. Scraper 1.16. Screw drivers 1.17. Dividers 1.18. Trammels 1.19. Surface plate 1.20. Marking table 1.21. Height gauge 1.22. Layout tools 1.23. Tap sets 1.24. Die sets 1.25. Tap handle 1.26. Die handle 1.27. Hacksaw 1.28. Paint brushes 1.29. Drill bits 1.30. Tap extruder 1.31. Screw Extruder 1.32. Hacksaw frame 1.33. Hacksaw blade 1.34. Rivet Gun 1.35. Sledgehammers 1.36. Sockets 1.37. Spanners 1.38. Vice grip 1.39. Wire Cutters 1.40. Wood Planners 1.41. Hand drill machine 1.42. Hand grinding machine 1.43. Pedestal drill 1.44. Powered screwdriver 1.45. Hand shear 1.46. Clamps 1.47. Jacks 1.48. Soldering iron 1.49. Allen wrenches 1.50. Draft punches
2. Power Tools	2.1. Power drills 2.2. Power rivet gun

**Competency Standard: Electrician (Building) Level-I**

	2.3. Hand grinders 2.4. Pneumatic wrenches 2.5. Press machine 2.6. Jack hammer 2.7. Planers 2.8. Pedestal drills
3. Safety precautions	3.1. Use of appropriate PPEs 3.2. Proper hand, feet and eye coordination 3.3. Safe condition of electrical outlets, cords and lamps 3.4. Working environment 3.5. Safe operating condition of hand tools and power tools 3.6. Awareness to OHS requirements
4. Measuring Tools	4.1. Measuring tape 4.2. Steel rule 4.3. Meter rule 4.4. Outside & inside caliper 4.5. Protractors' 4.6. Tri-square 4.7. Sprit level 4.8. Vernier clliper 4.9. Micrometre 4.10. Simple protractor 4.11. Vernier protractor 4.12. Limit gauges 4.13. Snap gauges

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Types of hand tools and their proper uses</li> <li>• Types of power tools, their uses and safe handling method</li> <li>• Procedures in the use of hand tools and power tools</li> <li>• Policies and procedures for occupational health and safety</li> <li>• Use of PPE</li> <li>• Reporting and documentation</li> <li>• Preventive maintenance methods and techniques</li> <li>• Storage procedures</li> </ul>	<ol style="list-style-type: none"> <li>1. Using hand tools</li> <li>2. Maintaining tools</li> <li>3. Maintaining safety precaution for using hand &amp; power tools</li> <li>4. Maintaining operation procedure of power tools</li> <li>5. Applying proper sequence of operation</li> </ol>
<b>Required major tools and equipment for the UoC:</b> <ol style="list-style-type: none"> <li>1. Workplace (simulated or actual)</li> <li>2. Different types of hand tools and power tools</li> <li>3. Workbooks</li> <li>4. Hand tools and power tools operating and maintenance manuals</li> </ol>	

**Competency Standard: Electrician (Building) Level-I**

**UNIT OF COMPETENCY** : **Terminate and Connect Electrical Wiring**  
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills, (and) attitudes and values needed to terminate and connect electrical wiring and electronic circuits.  
**NOMINAL DURATION** : **30 Hours**

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b> <i>Italicized terms</i> are elaborated in the Range of Variables
1. Plan and prepare for termination/connection of electrical wiring	1.1 <b>Materials</b> are checked according to specifications and tasks 1.2 Appropriate <b>tools and equipment</b> are selected according to tasks requirements 1.3 Task is planned to ensure OHS guidelines and procedures are followed 1.4 Electrical wiring/electronic circuits are correctly prepared for connecting/termination in accordance with instructions and work site procedures
2. Terminate/connect electrical wiring	2.1 Safety procedures in using tools are always observed and appropriate <b>personal protective equipment</b> are used 2.2 Work is undertaken safely in accordance with the workplace and standard procedures 2.3 Appropriate range of <b>methods</b> in termination/connection are used according to specifications, manufacturer's requirements, and safety 2.4 Correct sequence of operation is followed 2.5 <b>Accessories</b> used are adjusted, if necessary 2.6 Confirmed termination/connection is undertaken successfully in accordance with job specification
3. Test termination/connections of electrical wiring	3.1 Testing of all completed termination/ connections of electric wiring/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment 3.2 Wiring and circuits are checked using specified testing procedures 3.3 Unplanned events or conditions are responded to in accordance with established procedures



**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Materials	1.1. Soldering lead 1.2. Cables 1.3. Wires
2. Tools and equipment	2.1. Tools for measuring, cutting, drilling, assembling/disassembling 2.1.1. Pliers 2.1.2. Cutters 2.1.3. Screw drivers 2.2. Equipment 2.2.1. Soldering gun 2.2.2. Multi-tester
3. Personal protective equipment	3.1. Goggles 3.2. Gloves 3.3. Apron/overall
4. Methods	4.1. Clamping 4.2. Pin connection 4.3. Soldered joints 4.4. Plugs
5. Accessories	5.1. Brackets 5.2. Clamps

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Wiring techniques</li> <li>• OHS principles</li> <li>• Use of lead-free soldering technology</li> <li>• Surface mount soldering techniques</li> <li>• Specifications and methods for terminating different materials</li> <li>• AC and DC power supplies</li> <li>• Uses of diagnostic equipment</li> <li>• Tests for wiring and connections</li> <li>• Wiring support techniques and alternatives</li> </ul>	<ol style="list-style-type: none"> <li>1. Communication skills</li> <li>2. Marking, tagging, and labelling requirements for cables, wires, conductors and connections</li> <li>3. Soldering techniques</li> <li>4. Adjusting and fixing wiring supports</li> <li>5. Electronic assembly functional and quality testing</li> <li>6. Testing of wiring and connections for conformance to specification</li> </ol>
<p><b>Required major tools and equipment for the UoC:</b></p> <ol style="list-style-type: none"> <li>1. Screw drivers</li> <li>2. Pliers</li> <li>3. Cutters</li> </ol>	

## TECHNICAL COMPETENCIES

- UNIT OF COMPETENCY** : **Perform Channel Wiring**
- UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to perform channel wiring. It specifically includes – interpret drawings and specifications; draw the layout, set channels and cables; install boards and set all other accessories of wiring; and perform circuit operation as per diagram and layout.
- NOMINAL DURATION** : **80 Hours**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Interpret drawings and specifications	1.1 Drawings are collected and interpreted 1.2 Sign and symbols are identified 1.3 Terms and abbreviations are identified 1.4 Specifications are interpreted
2. Collect tools, equipment and materials	2.1 <b>Tools, equipment</b> and <b>materials</b> are collected 2.2 Tools, equipment and materials are <b>checked</b> for usability
3. Draw the layout, set channels and cables	3.1 <b>Personal protective equipment</b> is collected and used 3.2 Wiring layout is drawn according to supplied drawing 3.3 Rowel plug points are located, drilled and inserted as per procedure 3.4 Bottom parts of the channels are installed and screwed 3.5 Cables with ECC are laid on the bottom part of the channel
4. Install boards and set all other accessories of wiring	4.1 <b>Boards</b> are collected and fitted as per wiring diagram 4.2 Switches, sockets, fan regulator and Ballast are fitted on the board with screw 4.3 Switches, sockets, and fan regulator are connected to the circuits 4.4 Ceiling rose and different types of holders are fitted on the board 4.5 Those fixtures are connected to the circuit 4.6 <b>MCB</b> , and <b>MCCB</b> are connected and fitted on the board
5. Perform circuit operation as per diagram and layout	5.1 Bottom parts of the channels are placed and set according to drawing on the board 5.2 Cables are drawn through the bottom part of the channels 5.3 Circuit materials required for the specified circuit are placed on the board 5.4 Other accessories are connected and fitted 5.5 The bottom parts of the channels are covered with upper part of the channel

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6. Clean the workplace	6.1 Tools and equipment are prepared for cleaning 6.2 Tools and equipment are stored as per standard 6.3 Waste materials are disposed as per workplace standard
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**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Hand Tools	1.1. Adjustable wrench 1.2. Wire stripper 1.3. Mallet 1.4. C-clamp 1.5. Chisels: (a) Wooden, (b) Cold 1.6. Drill bits 1.7. Files: (a) Flat (b) Round (c) Half round 1.8. Hacksaw 1.9. Hammers: (a) Ball peen, (b) Claw 1.10. Hand drill 1.11. Measuring tape 1.12. Pliers: (a) Combination pliers, (b) Cutting pliers, (c) Diagonal cutting pliers, (d) Long nose pliers 1.13. Punches 1.14. Screwdrivers: (a) Star, (b) Flat, (c) Connecting 1.15. Try square 1.16. Neon tester 1.17. Wire cutters 1.18. S.W.G. 1.19. Set squares 1.20. Electrician knife 1.21. Ladder
2. Power Tools	2.1. Electric drill machine 2.2. Grinders 2.3. Soldering iron
3. Equipment	3.1. Multi meter 3.2. Earth tester 3.3. Digital weight machine
4. Materials	4.1. Channel (1/2", 3/4", 1", 1.25", 1.5" PVC) 4.2. GI Wire 4.3. Elbow 4.4. Bend 4.5. PVC circular box 4.6. Rowel plug 4.7. Saddle 4.8. Screw 4.9. Cable lugs 4.10. Cable tie 4.11. Thread ball 4.12. Insulating clip 4.13. Flexible conduit 4.14. Plastic forma 4.15. Electric soldering lead 4.16. Plastic tape 4.17. Cable (PVC, VIR)
5. Personal protective equipment (PPE)	5.1. Goggles 5.2. Rubber gloves 5.3. Safety shoes 5.4. Leather/ rubber apron 5.5. Hard hat
6. Boards	5.1. Plastic board

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	5.2. Ebonite boards 5.3. Wooden boards
7. Fuses& MCB	7.1. Rewire cable fuse 7.2. Cartridge fuse 7.3. Glass fuse 7.4. HRC fuse 7.5. Single pole MCB 7.6. Double pole MCB 7.7. MCCB 7.8. Earth leakage circuit breaker (ELCB)

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Drawings and specifications</li> <li>• Signs and symbol identification</li> <li>• Terms and abbreviations identification</li> <li>• Drawings interpretation</li> <li>• Different type of fittings and fixtures</li> <li>• Quality of fittings and fixtures use for installing</li> <li>• Different types of tools equipment and machinery used for installing fittings and fixtures</li> <li>• Fittings and fixture installation</li> </ul>	<ol style="list-style-type: none"> <li>1. Using PPE</li> <li>2. Selecting appropriate tools and equipment</li> <li>3. Selecting appropriate materials</li> <li>4. Checking specifications</li> <li>5. Locating points</li> <li>6. Installing channel</li> <li>7. Laying cables</li> <li>8. Selecting appropriate materials as per schedule</li> <li>9. Fitting all switches, sockets, and fixtures</li> <li>10. Installing fittings and fixtures</li> </ol>
<b>Required major tools and equipment for the UoC:</b> <ol style="list-style-type: none"> <li>1. Workplace (actual or simulated)</li> <li>2. Tools and equipment appropriate to joint</li> <li>3. Accessibility to the workplace</li> <li>4. Quality materials availability</li> </ol>	

**Competency Standard: Electrician (Building) Level-I**

- UNIT OF COMPETENCY** : **Install electrical protective devices for distribution, power, lighting, auxiliary, lightning protection and grounding systems**
- UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes on planning and preparing work, installing electrical protective devices, lightning fixture and auxiliary outlet and notifying completion of work for distribution, power, lighting, auxiliary, lightning protection and grounding systems.
- NOMINAL DURATION** : **80 Hours**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Plan and prepare work	1.1 Instructions for the preparation of the work activity are communicated and confirmed to ensure clear understanding 1.2 <b>Tools, equipment,</b> and <b>PPE</b> needed to install electrical wiring are identified, checked to ensure they work correctly as intended and are safe to use in accordance with established procedures 1.3 Materials needed for work are obtained in accordance with established procedures
2. Install electrical protective devices	2.1 <b>Safety procedures</b> are followed in line with job requirements 2.2 Correct procedures for <b>installation of electrical protective devices</b> are performed in line with job requirements and PEC 2.3 Schedule of work is followed to ensure work is completed in an agreed time, to a quality standard and with a minimum waste 2.4 Further instructions are sought from a supervisor if unplanned events or conditions occur 2.5 On-going checks of quality of work are done in accordance with instructions and requirements
3. Install lighting fixture and auxiliary outlet	3.1 Safety procedures are followed 3.2 Correct procedures for installation of <b>lighting fixture</b> and auxiliaries are performed in line with job requirements 3.3 Schedule of work is followed to ensure work is completed in an agreed time, to a quality standard and with a minimum waste 3.4 Further instructions are sought from a supervisor if unplanned events or conditions occur 3.5 On-going checks of quality of work are undertaken in accordance with instructions and requirements
4. Notify completion of work	4.1 Final checks are made to ensure the work conforms with instructions and requirements 4.2 Supervisor is notified upon completion of work

**Competency Standard: Electrician (Building) Level-I**

	<p>4.3 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures</p> <p>4.4 Work area is cleaned and made safe</p>
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**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Tools and equipment	1.1. Pliers 1.2. Screwdrivers 1.3. Wrenches 1.4. Wire splicers 1.5. Electrician knives 1.6. Electric drill 1.7. Ball hammer
2. Personal protective equipment (PPE)	2.1. Working gloves 2.2. Safety shoes 2.3. Hard hat
3. Safety procedures	3.1. Safety standards 3.2. International Electrical Code
4. Installation	4.1. Horizontally and vertically aligned 4.2. Rigidly anchored to wall 4.3. Installed with clearance to wall/other boxes for cover to open freely 4.4. Enough clearance for cover opening for flush mounted
5. Electrical protection system component	5.1. Safety switch 5.2. Earth Leakage Circuit Breaker (ELCB) 5.3. Conventional atmospheric lightning protection 5.4. Grounding system
6. Lighting fixture	6.1. Lamps 6.2. Spotlights 6.3. Track lights 6.4. Perimeter lighting

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Uses of different protective devices                             <ul style="list-style-type: none"> <li>○ Panel board</li> <li>○ Circuit breaker</li> <li>○ Safety switch</li> <li>○ Ground fault current interrupting device (GFCI)</li> <li>○ Conventional atmospheric lightning protection and grounding system</li> </ul> </li> <li>• Types of lighting fixtures and installation technique Ratings of lighting fixture</li> <li>• Processes, Operations, Systems                             <ul style="list-style-type: none"> <li>○ Maintenance of tools</li> <li>○ Storage of tools</li> </ul> </li> <li>• Checking and conforming procedures for installation based on job requirement</li> </ul>	<ol style="list-style-type: none"> <li>1. Interpreting plans and details</li> <li>2. Handling of materials, tools and equipment</li> <li>3. Interpreting product technical brochure</li> <li>4. Applying methods and techniques in installation of various type of lighting fixture and auxiliary outlet</li> <li>5. Skills in continuity test or ohmmeter test of motor terminal</li> <li>6. Commissioning skills</li> <li>7. Documentation and reporting skills</li> </ol>
<p><b>Required major tools and equipment for the UoC:</b></p> <ol style="list-style-type: none"> <li>1. Workplace location</li> <li>2. Tools and equipment appropriate for installation of electrical protection systems</li> <li>3. Materials relevant to the proposed activity</li> <li>4. Drawings and specifications relevant to the task</li> </ol>	



**Competency Standard: Electrician (Building) Level-I**

- UNIT OF COMPETENCY** : **Install wiring devices of floor and wall mounted outlets, lighting fixtures/switches, and auxiliary outlets**
- UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes on selecting and installing wiring devices, installing lighting fixtures/switches and notifying completion of work of floor and wall mounted outlets and auxiliary outlets.
- NOMINAL DURATION** : **75 Hours**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables
1. Select wiring devices	1.1 Drawings are read and interpreted to determine job requirements 1.2 Correct type and quantity of <b>wiring devices and consumable items</b> are identified in line with job requirements 1.3 <b>Tools and equipment</b> are selected in line with job requirements 1.4 Correct <b>Personal protective equipment (PPE)</b> are identified and selected in line with safety requirements
2. Install wiring devices	2.1 Safety procedures are followed based on safety regulations 2.2 Correct procedures for installation of wiring devices are performed in line with job requirements 2.3 Schedule of work is followed based on agreed time, quality standard and minimum wastage 2.4 Further instructions are sought if unplanned events or conditions occur 2.5 On-going checking of quality of work is done in accordance with instructions and requirements
3. Install lighting fixture/switches	3.1 Safety procedures are followed 3.2 Correct procedures for <b>installation of lighting fixtures/switches</b> are performed in line with job requirements 3.3 Schedule of work is followed to ensure work is completed in an agreed time, to a quality standard and with a minimum waste 3.4 Further instructions are sought from a supervisor if unplanned events or conditions occur 3.5 On-going checks of quality of work are undertaken in accordance with instructions and requirements
4. Notify completion of work	4.1 Final checks are made to ensure that work conforms with instructions and to requirements 4.2 Supervisor is notified upon completion of work 4.3 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned,

**Competency Standard: Electrician (Building) Level-I**

	checked and returned to storage in accordance with established procedures 4.4 Work area is cleaned and made safe
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**RANGE OF VARIABLES**

<b>Variable</b>	<b>Range (May include but not limited to)</b>
1. Wiring devices and consumable items	1.1. Wiring devices 1.1.1. Floor outlet 1.1.2. Ground fault current interrupting device 1.1.3. Grounding type convenience outlet 1.1.4. Light switches 1.2. Consumable items 1.2.1. Wire nut 1.2.2. Electrical tape 1.2.3. Rubber tape
2. Tools and equipment	2.1. Pliers 2.2. Screwdrivers 2.3. Wire splicers 2.4. Electrician knives
3. Personal protective equipment (PPE)	3.1. Working gloves 3.2. Safety shoes 3.3. Hard hat
4. Safety procedures	4.1. International Electro-technical Commission (IEC) Regulation 4.2. Safety standards
5. Installation of wiring devices	5.1. Horizontally and vertically aligned 5.2. No gap between plate cover and wall 5.3. Wire cut to requirement 5.4. All bolts tightened for rigid mounting
6. Installation of lighting fixtures/switches	6.1. Lamps 6.1.1. Horizontally aligned against wall 6.1.2. No gap between ceiling and lighting fixture base 6.1.3. Wiring at junction box cut to requirement as required 6.1.4. Lamps securely mounted

<b>Underpinning Knowledge</b> (To be used as training content in the information sheet of CBLM)	<b>Underpinning Skills</b> (to be used as job in the job sheet of CBLM)
<ul style="list-style-type: none"> <li>• Installation procedures of various wiring devices</li> <li>• Types of lighting fixtures and installation technique</li> <li>• Installation procedures of various lighting fixtures/switches</li> <li>• Ratings of lighting fixture</li> <li>• Processes, Operations, Systems                             <ul style="list-style-type: none"> <li>○ Maintenance of tools</li> <li>○ Storage of tools</li> </ul> </li> <li>• Checked and conformed the installation based on job requirement</li> </ul>	<ol style="list-style-type: none"> <li>1. Applying methods and techniques in various type of wiring devices</li> <li>2. Checking and conforming the installation based on job requirement</li> <li>3. Applying methods and techniques in various type of lighting fixtures/switches</li> <li>4. Checking and conforming the installation based on job requirement</li> <li>5. Installing lighting fixture and switches</li> <li>6. Performing commissioning activity</li> </ol>
<p><b>Required major tools and equipment for the UoC:</b></p> <ol style="list-style-type: none"> <li>1. Workplace location</li> <li>2. Tools and equipment appropriate for installation of wiring devices and lighting fixtures/switches</li> <li>3. Materials relevant to the proposed activity</li> <li>4. Drawings and specifications relevant to the task</li> </ol>	

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