National Technical and Vocational Qualifications Framework

NTVQF

Competency-Based Curriculum

Electrical Installation and Maintenance, Level – I

Sector: Construction.

Bangladesh Technical Education Board (BTEB)
Agargaon, Sher-E-Bangla Nagar, Dhaka-1207

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This Competency – Based Curriculum is a document that describes the content of a particular program which is developed based on the national competency standards and provides an overview of the competency- based curriculum and its approach.

this document is to be used as a key reference point by the curriculum developers/ teachers/ trainer/ assessors as a base on which to build instructional activities.

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February, 2022

Competency Based Training (CBT) Curriculum

Electrical Installation and Maintenance –
National Skill Certificate Level – I

Contents

Preface

Education and training for productive employment is vital for economic and social development in Bangladesh. Technical and Vocational Education and Training (TVET) is tools for productivity enhancement and poverty reduction. TVET sector ensures quality, relevance and access of skills training which meets industry demand and fulfill the requirements of individual for opting gainful and productive employment.

Competency- based curriculum provides overall course guidelines in relation to teaching and learning and act as the key instrument in supporting standarised formal, non-formal and informal training. it is expected that competency-based training curriculum will serve the purpose of standardising the training course development activities of Industry Skills Council (ISCs), Bangladesh Technical Education Board and other Quality Assurance body recognized by Government of the People's Republic of Bangladesh resulting properly implementation of Technical and Vocational Education and Training (TVET) in Bangladesh. It is agreed that any reform in TEVET system in Bangladesh should be in line with international trends so as to make graduates from the qualification nationally and internationally competent.

The Competency- based curriculum for Electrical Installation and Maintenance was developed by the Technical Sub Committee (TSC) that was established under Construction Industry skill council**.** The financial support was provided by Best Project. The technical experts are primarily from industry nominated by Construction Industry Skills Council with representatives from the Bangladesh Technical Education Board (BTEB). The Standards and Curriculum Development Committee (SCDC) of BTEB reviewed this document.

Chairman
Bangladesh Technical Education Board

Bangladesh Technical Education Board (BTEB)

Standard and Curriculum Development Committee

Competency Based Curriculum

for

Electrical Installation and Maintenance, Level – I, II, III & IV for

Construction Sector

Meeting held on 23.02.2022, 9.30 AM

SL No.	Name & Designation of Members	Address and Contract number	Designation of (SCDC)	Signature	Remarks
01.	Engr. Anisuzzaman Bhuiyan Rana,	Chairperson, Curriculum Development & Training Support Standing Committee, Dhaka,	Chairperson		
02.	Mr. Zahurul Haque,	Safe Electrical Ltd, 1-C/10-1, Mirpur, Dhaka-1216.	Member		
03.	Mr. Harun Rashid,	Engineering, Inspection Services of Bangladesh Limited (EISB) Savar Dhaka	Member		
04.	Mr. Jahangir Hossain,	Deputy Director, Bureau of Manpower, Employment and Training (BMET), Dhaka.	Member		CBC Approved
07.	Engr. B.M. Mofizur	Rahman, Curriculum Development & Training Exceutive, Construction Industry Skills Council, H-396, R-29, New DOHS, Mohakhali, Dhaka.	Member		
08.	Mr. Md. Babul Hossain,	Jr. Instructor (Electrical), Dhaka Polytechnic Institute, Dhaka	Member		
9	Mr. Kazi Md. Elieas	, Instructor, Electrical, BKTTC, Chattogram	Member		
10	Engr. Md. Nazrul Islam,	Ex Principal, BKTTC , Chittagong.	Member		
11	Dr. Md. Shah Alam Majumder,	Specialist (C.A), BTEB, Dhaka.	Member		
12	Mrs. Humyra Maisur,	Quality Assurance Officer, BTEB	Member	Humyra	

Curriculum Structure

Occupational title	Electrical Installation and Maintenance
Duration	360 hours
Qualification Level	National Skill Certificate (NSC) - I
Unit of Competency	1. GN1001A2 - Apply Basic Mathematics for Measurement and Calculation 2. GN1002A2 - Practice Occupational Safety and Health (OSH) Procedures 3. GN1003A2 - Work in a Team Environment 4. CONSS1001A2 - Work in the Construction Sector 5. CONEIM1001A1 - Use Tools for Electrical Works 6. CONEIM1002A2 - Apply Fundamental Skills for Electrical Works 7. CONEIM1003A2 – Perform Wire and Cable Joints 8. CONEIM1004A2 - Perform Circuits Connection 9. CONEIM1005A2 - Perform Installation of Electrical Circuits 10. CONEIM1006A2 - Perform Installation of Electrical Fittings 11. CONEIM1007A2 - Perform Channel Wiring 12. CONEIM1008A2 - Install Fan
Description	This is a competency based training curriculum designed for unemployed and underemployed workforce of Bangladesh to enhance desired knowledge, skills and attitudes for an Electrical Installation and Maintenance occupation meeting the industry standards. The curriculum covers various competencies such as using tools for electrical works, performing wire and cable joints, circuits connection, installation of electrical circuits, installation of electrical circuits, installation of electrical fittings, channel wiring and installing fan
Outcomes	After completion of the training trainee will be able to: - Apply Basic Mathematics for Measurement and Calculation

	- Practice Occupational Safety and Health (OSH) Procedures - Work in a Team Environment - Work in the Construction Sector - Use Tools for Electrical Works - Apply Fundamental Skills for Electrical Works - Perform Wire and Cable Joints - Perform Circuits Connection - Perform Installation of Electrical Circuits - Perform Installation of Electrical Fittings - Perform Channel Wiring - Install Fan
Entry Requirements	JSC or evidence of equivalent achievement completed (please refer to the Course Accreditation Document)
Suggestions for course delivery/instruction	• At least 80% time of the course will be allocated for practical purpose • Maximum 20% time of the course will be allocated for theoretical purpose • Follow the safety rules • Create friendly learning environment • Arrange adequate materials, tools and equipment for enough practice opportunities for the students • Focus on learning and not on teaching (learner centered training) • Arrange question and answer (Q&A) sessions • Make session plans for classroom / workshop instructions
Training methods	A wide variety of methods can be applied depending on the competencies and students learning capacity. Instructors should select appropriate methods to transfer skills to the students. Some of the common methods used during the skills training are: • Demonstration • Guided practice • Independent practice • Project work • Problem solving • Coaching • Illustrated talk • Role play • Discussion • Brainstorming • Participatory method.

<table>
<tr><td></td><td></td></tr>
<tr><td>Statistic of the modules</td><td>This table reflects number of modules developed for each unit of competency
<table>
<tr><th>Unit of Competency (UoC)</th><th>Number of modules</th></tr>
<tr><td>UoC 1: Apply Basic Mathematics for Measurement and Calculation</td><td>1</td></tr>
<tr><td>UoC 2: Practice Occupational Safety and Health (OSH) Procedures</td><td>1</td></tr>
<tr><td>UoC 3: Work in a Team Environment</td><td>1</td></tr>
<tr><td>UoC 4: Work in the Construction Sector</td><td>1</td></tr>
<tr><td>UoC 5: Use Tools for Electrical Works</td><td></td></tr>
<tr><td>UoC 6: Apply Fundamental Skills for Electrical Works</td><td>1</td></tr>
<tr><td>UoC 7: Perform Wire and Cable Joints</td><td>1</td></tr>
<tr><td>UoC 8: Perform Circuits Connection</td><td>1</td></tr>
<tr><td>UoC 9: Perform Installation of Electrical Circuits</td><td>1</td></tr>
<tr><td>UoC 10: Perform Installation of Electrical Fittings</td><td>1</td></tr>
<tr><td>UoC 11: Perform Channel Wiring</td><td>1</td></tr>
<tr><td>UoC 12: Install Fan</td><td>1</td></tr>
</table></td></tr>
<tr><td>Assessment method</td><td>Following assessment methods can be used to collect evidence for learning but not limited to:
• Written test
• Demonstration
• Oral questioning</td></tr>
<tr><td>Resources</td><td>Please refer to Course Accreditation Document for the list of required tools, equipment and materials to implement the training course.</td></tr>
<tr><td>Qualification of Instructors</td><td>Please refer to Quality Assurance System Manual for minimum requirements of the instructors.</td></tr>
</table>

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit title	Apply Basic Mathematics for Measurement and Calculation
Unit code	GN1003A2
Module title	**Module -1: Applying Basic Mathematics for Measurement and Calculation**
Module descriptor	This module covers the knowledge, skills and attitudes required to apply basic mathematics for measurement and calculation. It includes identifying calculation requirements in the workplace, selecting appropriate mathematical methods for calculation and performing basic workplace calculations
Nominal duration	40 hours
Certificate level	National Skill Certificate Level – I
Prerequisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of the module, trainees will be able to: LO 1. Identify calculation requirements in the workplace LO 2. Select appropriate mathematical methods for calculation LO 3. Perform basic workplace calculations
Learning outcome -1: Identify calculation requirements in the workplace	
Assessment criteria	1. Calculation requirements are identified from workplace documents. 2. Relevant information is interpreted from the workplace documents.
Performance guide	**Steps:** 1. Identify calculation requirements from workplace documents. 2. Interpret relevant information from the workplace documents.
Contents	1. Calculation requirements 1.1 Area of simple shapes ▪ Triangle ▪ Square ▪ Rectangle ▪ Circle 1.2 Volume 1.3 Diameter 1.4 Radius

	1.5 Unit conversion 2. Workplace documents 2.1 Technical drawing 2.2 Working drawing 2.3 Charts 2.4 Tables 3. Relevant information 3.1 Dimensions ▪ Length ▪ Width ▪ Height ▪ Depth ▪ Angle 3.2 Unit of measurement 3.3 System of unit 3.4 Tolerances 3.5 Shapes of object
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ necessary materials; ▪ relevant books, manual; ▪ geometrical instrument; ▪ pen, pencil and khata; ▪ computer; ▪ calculator; and ▪ module/reference/chart.
Learning outcome -2: Select appropriate mathematical methods for calculation	
Assessment criteria	1. Appropriate mathematical methods are selected to carry out the calculation. 2. System of units and parameters of measuring units to be used are determined.
Performance guide	**Steps:** 1. Select appropriate mathematical methods to carry out the calculation. 2. Determine system of units and parameters of measuring units to be used
Content	1. Basic mathematical methods. 2. System of units and parameters 3. Unit of measurement.

	4. Unit conversion methods. 5. List of units of measurement. 6. Apply unit conversion chart
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ necessary materials; ▪ relevant books, manual; ▪ geometrical instrument; ▪ pen, pencil and khata; ▪ computer; ▪ calculator; and ▪ module/reference/chart.
Learning outcome -3: Perform basic workplace calculations	
Assessment criteria	1. Appropriate measuring instruments are selected as per requirement. 2. Measurements of solid and liquid are taken using measuring instrument. 3. Calculations are completed using appropriate methods.
Performance guide	**Steps:** 1. Select appropriate measuring instruments as per requirement. 2. Take measurements of solid and liquid using measuring instrument. 3. Complete calculations using appropriate methods.
Content	1. Procedure of taking measurements of solid and liquid 2. Generic measuring instruments and equipment required for calculation. 3. Mathematical language, symbols and terminology. 4. Application of units. 5. Use arithmetic processes to find solutions of simple mathematical problem
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ necessary materials; ▪ relevant books, manual; ▪ geometrical instrument; ▪ pen, pencil and khata; ▪ computer; ▪ calculator; and ▪ module/reference/chart.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit title	Practice Occupational Safety and Health (OSH) Procedures
Unit code	GN1002A2
Module title	**Module -2: Practicing Occupational Safety and Health (OSH) Procedures**
Module descriptor	This module covers the knowledge, skills and attitudes required to practice Occupational Safety and Health (OSH) procedures. It includes interpreting OSH policies and procedures, applying personal health and safety practices, identifying and reporting OSH hazards and risks, following emergency response procedures, and maintaining and improving safety and health hygiene in the workplace.
Nominal duration	30 hours
Certificate level	National Skill Certificate Level – I
Prerequisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of the module, trainees will be able to: LO 1. Interpret OSH policies and procedures LO 2. Apply personal health and safety practices LO 3. Identify and report OSH hazards and risks LO 4. Follow emergency response procedures
Learning outcome -1: Interpret OSH policies and procedures	
Assessment criteria	1. Occupational Safety and Health (OSH) policies are clarified. 2. Safe operating procedures are followed. 3. Safety signs and symbols are identified and followed 4. Workplace safety conditions are regularly reported to designated authority
Performance guide	**Step:** 1. Clarify Occupational Safety and Health (OSH) policies are clarified. 2. Follow safe operating procedures are followed. 3. Identify and follow safety signs and symbols 4. Regularly report workplace safety conditions to designated authority
Contents	1. Occupational Safety and Health (OSH) 2. Hazard 3. Types of hazards 4. Control hazard 5. Importance of Occupational Safety and Health (OSH).

	6. OSH workplace policies and procedures. 7. Safe operating procedures 8. Safety signs and symbols 9. Reporting procedure
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ personal protective equipment; ▪ necessary equipment and materials; ▪ relevant books, manual; and ▪ module/Reference.
Learning outcome -2: Apply personal health and safety practices	
Assessment criteria	1. Personal health and hygiene are interpreted. 2. Personal Health and hygiene are maintained according to health and hygiene procedures. 3. Personal Protective Equipment (PPE) are worn correctly and stored after use. 4. Clean and tidy workplace is maintained. 5. OSH equipment is maintained to keep them operational and compliant with OSH regulations.
Performance guide	**Steps:** 1. Interpret personal health and hygiene are interpreted. 2. Maintain personal Health and hygiene according to health and hygiene procedures. 3. Wear personal Protective Equipment (PPE) correctly and stored after use. 4. Maintain clean and tidy workplace. 5. Maintain OSH equipment to keep them operational and compliant with OSH regulations.
Content	1. Personal health and hygiene 2. health and hygiene procedures 3. Personal Protective Equipment (PPE) and their uses 4. 5S of housekeeping 5. Maintaining principles of OSH equipment 6. OSH regulations 7. Maintain clean and tidy workplace
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ personal protective equipment; ▪ necessary equipment and materials; ▪ relevant books, manual; and ▪ module/Reference.

Learning outcome -3: Identify and report OSH hazards and risks	
Assessment criteria	1. Immediate work area is routinely checked for OSH hazards prior to commencing and during work 2. Hazards and risks are identified. 3. Corrective actions are taken to mitigate hazards and risks within the level of responsibilities. 4. OSH hazards and risk are reported to authorized personnel according to workplace procedures. 5. Incidents arising from hazards and risks are reported to designated authority. 6. Details of incidents are recorded accurately and clearly.
Performance guide	**Steps:** 1. Check immediate work area for OSH hazards prior to commencing and during work 2. Identify hazards and risks. 3. Take corrective actions to mitigate hazards and risks within the level of responsibilities. 4. Report OSH hazards and risk to authorized personnel according to workplace procedures. 5. Report incidents arising from hazards and risks to designated authority. 6. Record details of incidents accurately and clearly. 7. Identify hazard 8. Measure risk using matrix 9. Apply hazard inspection check list 10. Report hazard and risk using report format
Content	1. Process of checking immediate work area for OSH hazards prior to commencing and during work 2. Procedure of Identifying hazards and risks. 3. Reporting process according to workplace procedures. 4. Report process of incidents arising from hazards and risks 5. Importance of recording details of incidents. 6. Hazard 7. Types of hazards 8. Control hazard 9. Risk 10. Risk measurement 11. Incident and intensity of incident 12. Types of incidents
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ personal protective equipment;

	▪ necessary equipment and materials; ▪ relevant books, manual; and ▪ module/Reference.
Learning outcome -4: Follow emergency response procedures	
Assessment criteria	1. Emergency situations are identified and reported according to workplace requirements. 2. Workplace emergency procedures are followed as appropriate to the nature of the emergency and according to workplace procedures. 3. Workplace procedures for dealing with accidents, fires and emergencies are followed. 4. Emergency response plans and procedures are implemented.
Performance guide	**Steps:** 1. Identify and report emergency situations according to workplace requirements. 2. Follow workplace emergency procedures according to workplace procedures. 3. Follow workplace procedures for dealing with accidents, fires and emergencies. 4. Implemented emergency response plans and procedures 5. Follow the procedure for accidents, fires and emergencies
Content	1. OSH policies, SOP, workplace emergency procedures. 2. Emergency situations 3. Elements of Emergency situations 4. Workplace emergency procedures 5. Emergency response plans
Condition	Students/trainees must be provided with the following: ▪ CBLM related with the learning outcome; ▪ instructions, job sheets; ▪ personal protective equipment; ▪ necessary equipment and materials; ▪ relevant books, manual; and ▪ module/Reference.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit title	Work in a team environment
Unit code	GN1003A2
Module title	**Module - 3: Working in a Team Environment.**
Module descriptor	This module covers the knowledge, skills and attitudes required to work in a team environment. It includes interpreting team objectives and work processes, defining team role and scope, working as a team member, and communicating and cooperating with team members.
Nominal duration	20 hours
Certificate level	National Skill Certificate Level – II
Prerequisite qualification	Complete JSC or equivalent with National Skill Certificate Level – I in Machine Shop Practice
Learning outcomes	After completion of this module, trainees will be able to: LO 1. Interpret team objectives and work processes LO 2. Define team role and scope LO 3. Work as a team member LO 4. Communicate and cooperate with team members
Learning outcome – 1 : Interpret team objectives and work processes	
Assessment criteria	1. Objectives of team are defined from available sources of information. 2. Work plan is interpreted. 3. Working processes are clearly interpreted.
Performance guide	**Steps:** 1. Define Objectives of team from available sources of information. 2. Interpret Work plan. 3. Interpret Working processes.
Contents	1. Standard Operating Procedures (SOP) 2. Job description 3. Objectives of team. 4. Interpreted work plan 5. Interpreted working processes. 6. Source of information.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ safety signs and warnings;

	▪ relevant measuring instrument and equipment; ▪ CBLM related with the learning outcome; ▪ computer ▪ internet modem ▪ instructions, job sheets, activity sheet ▪ relevant books, manual ▪ module/reference ▪ different model of listening VCD
Learning outcome – 2 : Define team role and scope	
Assessment criteria	1. Team structure and reporting relationship within the team are identified and interpreted. 2. Role and responsibilities of team members are defined according to job description. 3. Scopes of jobs for team members are identified and interpreted according to job requirements.
Performance guide	**Steps:** 3. Identify and interpret Team structure and reporting relationship within the team are identified and interpreted. 4. Define Role and responsibilities of team members according to job description. 5. Interpret and identify Scopes of jobs for team members a according to job requirements.
Content	1. Team structure. 2. Reporting relationship 3. Team objectives 4. Role and responsibilities of team members 5. Scope of jobs 6. Job requirements 7. Individual deliverables in a team 8. Documenting process 9. Participate in team discussion.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ safety signs and warnings; ▪ relevant measuring instrument and equipment; ▪ CBLM related with the learning outcome; ▪ computer; ▪ internet modem; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; ▪ module/reference; and ▪ different model of listening VCD

Learning outcome - 3: Work as a team member	
Assessment criteria	1. Individual duties, responsibilities, authorities are clarified. 2. Tasks of team members are identified as per workplace standards. 3. Effective forms of communication are used to interact with team members. 4. Communication channels are maintained as per workplace context.
Performance guide	**Steps:** 1. Clarify individual duties, responsibilities, authorities. 2. Identify tasks of team members as per workplace standards. 3. Use effective forms of communication to interact with team members. 4. Maintain communication channels as per workplace context.
Content	1. Individual duties and responsibilities. 2. Individual authorities 3. Tasks of team members 4. Effective forms of communication with team member 5. Communication channel 6. National Laws and Statutes 7. Workplace Rules and Regulations 8. Maintain communication channel.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ safety signs and warnings; ▪ relevant measuring instrument and equipment; ▪ CBLM related with the learning outcome; ▪ computer; ▪ internet modem; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; ▪ module/reference; and ▪ different model of listening VCD
Learning outcome - 4: Communicate and cooperate with team members	
Assessment criteria	1. Effective interpersonal skills are applied to interact with team members. 2. Views and opinions of other team members are respected and reflected accurately. 3. Appropriate workplace terminology is used for effective communication.

	4. Ideas related to team plans are contributed and recommendations for improving team work are move forward.
Performance guide	**Steps:** 1. Apply effective interpersonal skills are applied to interact with team members. 2. Respected and reflected views and opinions of other team members are respected and reflected accurately. 3. Use appropriate workplace terminology is used for effective communication. 4. Contribute ideas related to team plans and recommendations for improving team work are move forward.
Content	1. Listening skills 2. Effective interpersonal skills 3. Views and opinions of other team members 4. Appropriate workplace terminology 5. Team plans 6. Negotiation skills 7. Problem-solving skills 8. Procedure to improving team work 9. Apply team plan in workplace
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ safety signs and warnings; ▪ relevant measuring instrument and equipment; ▪ CBLM related with the learning outcome; ▪ computer; ▪ internet modem; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; ▪ module/reference; and ▪ different model of listening VCD

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit title	Work in the Construction Sector
Unit code	CONSS1001A2
Module title	**Module – 4: Working in the Construction Sector**
Module descriptor	This module covers the knowledge, skills and attitude required to work in the construction sector. It includes identifying organizational structure within the sector, identifying processes and procedures, identifying workplace requirement and organizing own workload.
Nominal duration	30 hours
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of the module, trainees will be able to: LO 1. Identify organizational structure withinthe sector LO 2. Identify processes andprocedures LO 3. Identify workplace requirements LO 4. Organize ownworkload
Learning outcome -1: Identify organizational structure within the sector	
Assessment criteria	1. Profile of the construction sector of Bangladesh is explained. 2. Scope, nature and major fields of the construction sector are identified. 3. Occupations or trade names of the construction sector are identified. 4. Changes in the trends and technologies relevant to the sector are explained. 5. Employment conditions are identified in line withthe construction sector of Bangladesh. 6. Relevant policies and guidelines are identified and interpreted.
Performance guide	**Steps:** 1. Explain profile of the construction sector of Bangladesh. 2. Identify scope, nature and major fields of the constructionsector. 3. Identify occupations or trade names of the constructionsector. 4. Explain changes in the trends and technologies

	relevant tothe sector. 5. Identify employment conditions in line withthe construction sector of Bangladesh. 6. Identify and interpret relevant policies and guidelines.
Contents	1. Profile of the construction sector. 2. Scope, nature and major fields of the construction sector. 3. Occupations or trade names of the construction sector. 4. Changes in the trends and technologies relevant to the sector. 5. Employment conditions in line withthe construction sector. 6. Relevant policies and guidelines.
Condition	Students/trainees must be provided with the following: ▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -2: Identify processes and procedures	
Assessment criteria	1. Instructions as to procedures in achieving quality are obtained, understood, and clarified. 2. Construction processes are identified, described and explained. 3. Work activities are correctly identified.
Performance guide	**Steps:** 1. Obtain, understand and clarify instructions as to procedures in achieving quality. 2. Identify, describe and explain construction processes. 3. Identify work activities correctly.
Content	1. Instructions as to procedures in achieving quality. 2. Construction processes. 3. Work activities.

	4. Scope and major fields of the construction sector of Bangladesh 5. Relevant policies and guidelines for the construction sector
Condition	Students/trainees must be provided with the following: ▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -3: Identify workplace requirements	
Assessment criteria	1. Workplace requirements are identified and clarified. 2. Role, responsibilities and duties are identified and related to jobs and career paths. 3. Workplace's practices are identified. 4. Problem-solving strategies are used to address bottlenecks, inconsistencies and other concerns.
Performance guide	Steps: 1. Identify and clarify workplace requirements. 2. Identify role, responsibilities and duties andrelated to jobs and career paths. 3. Identify workplace's practices. 4. Use problem-solving strategies to addressbottle necks, inconsistencies and other concerns.
Content	1. Workplace requirements. 2. Role, responsibilities and duties related to jobs and career paths. 3. Workplace's practices. 4. Problem-solving strategies 5. bottlenecks 6. Inconsistencies. 7. Manuals used in the construction sector
Condition	Students/trainees must be provided with the following: ▪ workplace (actual / simulated);

	▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -4: Organize own workload	
Assessment criteria	1. Own work activities are planned and progress of work is communicated to relevant staff. 2. Work activities are completed. 3. Difficulties and bottlenecks are identified, and solutions are put forwarded. 4. Own work is monitored against workplace standards and areas for improvement identified and acted upon.
Performance guide	**Steps:** 1. Plan own work activities and communicate progress of workis to relevant staff. 2. Complete work activities. 3. Identify difficulties and bottlenecks, and put forwardsolutions. 4. Monitor own work against workplace standards 5. Identify and act upon areas for improvement. 6. Relevant terminologies and acronyms 7. Workplace practices and requirements.
Content	1. Own work activities 2. Progress of workis 3. Relevant staff. 4. Work activities. 5. Difficulties and bottlenecks 6. Areas for improvement.
Condition	Students/trainees must be provided with the following: ▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings;

	▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Use Tools for Electrical Works
Unit Code	CONEIM1001A1
Module title	**Module – 5: Using Tools for Electrical Works**
Module descriptor	This module covers the knowledge, skills and attitudes required to use tools for electrical works. It includes identifying tools, using hand tools and power tools, performing basic preventive maintenance and maintaining workplace and storing tools and equipment
Nominal duration	50 hours
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1. Identify tools used in electrical works. LO 2. Use hand tools in electrical works. LO 3. Use power tools in electrical works. LO 4. Perform basic preventive maintenance. LO 5. Maintain workplace and store tools and equipment**.**
Learning outcome -1: Identify tools used in electrical works	
Assessment criteria	1. Hand tools, their functions are identified and selected. 2. Power tools, their functions are identified and selected. 3. Applications of tools are defined.
Performance guide	**Steps:** 1. Identify hand tools. 2. Select hand tools used in electrical works. 3. Identify power tools. 4. Select power tools used in electrical works. 5. interpret the function of hand tools. 6. interpret the function of power tools.
Contents	1. List of hand tools. 2. Functions of hand tools. 3. List of power tools. 4. Functions of power tools. 5. Usages of hand and power tools. 6. Difference between hand and power tools
Condition	Students/trainees must be provided with the following:

	▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -2: Use hand tools in electrical works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is used. 2. Hand tools are prepared for works according to workplace procedures. 3. Proper hand-eye coordination is applied when using hand tools. 4. Safety requirements are complied with before, during and after use. 5. Unsafe or faulty tools are identified and marked for repair according to workplace procedures.
Performance guide	**Steps:** 1. Select and use Personal Protective Equipment (PPE). 2. Prepare hand tools for works according to workplace procedures. 3. Apply proper hand-eye coordination when using hand tools. 4. Comply safety requirements with before, during and after use. 5. Identify unsafe or faulty tools 6. Mark unsafe and faulty tools for repair according to workplace procedures.
Content	1. Personal Protective Equipment (PPE) 2. Hazard 3. Types of hazards 4. Hazard control 5. Risk Measurement 6. Principles of Electrical hazards and safely requirement 7. Preparing hand tools for Electrical works. 8. Active and inactive tools 9. Workplace environment.
Condition	Students/trainees must be provided with the following:

	▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome- 3: Use power tools in electrical works.	
Assessment criteria	1. Power sources are recognized. 2. Power tools are prepared according to workplace procedures. 3. Route for power supply established in accordance with work safety requirements. 4. Power tools are used as per job requirement following Standard Operating Procedure (SOP).
Performance guide	**Steps:** 1. Recognize power sources 2. Prepare power tools according to workplace procedures. 3. Establish route for power supply in accordance with work safety requirements. 4. Use power tools as per job requirement following Standard Operating Procedure (SOP).
Content	1. Power tools. 2. Preparation of power tools. 3. Procedure of using of power tools. 4. Power sources. 5. safety precaution requirement during the use of power tools
Condition	Students/trainees must be provided with the following: ▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual;

	▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome - 4: Perform basic preventive maintenance.	
Assessment criteria	1. Tools are inspected and reported to supervisor as per work place procedure. 2. Tools and equipment are cleaned according to workplace instructions. 3. Appropriate lubricants are identified. 4. Tools and equipment are lubricated as per manufacturer's instruction.
Performance guide	**Steps:** 1. Inspect tools 2. Report to supervisor as per work place procedure. 3. Clean tools and equipment according to workplace instructions. 4. Identify appropriate lubricants. 5. Lubricate tools and equipment as per manufacturer's instruction
Content	1. Define maintenance 2. Types of maintenance 3. Preventive maintenance. 4. Procedure of preventive maintenance. 5. Lubricants and its properties 6. Maintenance materials.
Condition	Students/trainees must be provided with the following: ▪ workplace (actual / simulated); ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -5: Maintain workplace and store tools and equipment.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures.

	2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location.
Performance guide	**Steps:** 1. Store unused material 2. Segregate waste materials in according to the environmental policy. 3. Dispose waste materials in accordance with workplace requirements. 4. Perform cleaning of equipment in accordance with standard procedure. 5. Store tools and equipment safely in appropriate location 6. Maintain 5S of housekeeping
Content	1. Cleaning process. 2. Disposing procedure of waste Materials. 3. Basic inventory 4. 5S of housekeeping 5. Cleaning procedure of work place 6. Storage system
Condition	Students/trainees must be provided with the following: ▪ hand tools; ▪ SST; ▪ service manuals; ▪ periodic maintenance data; ▪ staff rules/policies and procedures; ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ necessary equipment and materials; ▪ video clips; ▪ video (CD); and ▪ LCD projector.

Module of Instructions	
Sector	**Construction Sector**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Apply Fundamental Skills for Electrical Works.
Unit Code	CONEIM1002A2
Module title	**Module – 6: Applying Fundamental Skills for Electrical Works.**
Module descriptor	This module covers the knowledge, skills and attitudes required to apply fundamental skills for electrical works. It includes identifying materials and fitting used in electrical works, interpreting electrical sign, symbols and specifications from drawing plan, measuring current, measuring voltage and maintaining workplace, tools, equipment and materials.
Nominal duration	30 hours
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1: Identify materials and fittings used in electrical works LO 2: Interpret electrical sign, symbols and specifications from drawing plan LO 3: Measure current LO 4: Measure voltage. LO 5: Maintain workplace, tools, equipment and materials.
Learning outcome -1: Identify materials and fittings used in electrical works	
Assessment criteria	1. Materials and fittings are collected and kept on table separately. 2. Materials and fittings are identified and tagged with the name. 3. Function and properties of materials and fittings are described.
Performance guide	**Steps:** 1. Collect materials and fittings. 2. Keep materials and fittings on table separately. 3. Identify materials and fittings and tag with the name. 4. Interpret the functions of materials and fittings.
Contents	1. Functions of different types of materials and fittings. 2. Specification of materials and fittings. 3. Occupational safety and health procedures.
Condition	Students/trainees must be provided with the following:

	▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ maintenance materials; ▪ complete set of electrical hand & power tools; ▪ safety signs and warnings; ▪ Personal Protective Equipment; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -2: Interpret electrical sign, symbols and specifications from drawing plan	
Assessment criteria	1. Relevant drawings are correctly identified as per requirement. 2. All specifications are interpreted from the relevant drawing. 3. All terms and abbreviations are interpreted from the relevant drawing. 4. Sign and symbols are identified as per drawing.
Performance guide	**Steps:** 1. Identify drawings correctly as per requirement. 2. Interpret specifications from the relevant drawing. 3. Interpret all terms and abbreviations from the relevant drawing. 4. Identify sign and symbol as per drawing.
Content	1. Electrical sign & symbols. 2. Electrical drawing. 3. Specifications from the relevant drawing. 4. Terms and abbreviations from the relevant drawing
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen and pencil; ▪ paper; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and

	▪ LCD projector.
Learning outcome 3: Measure current	
Assessment criteria	1. Insulation of cable terminal is removed using knife or wire stripper as required. 2. Range of ammeter is set as per job requirement. 3. The ampere meter is connected in series with load as per circuit diagram. 4. Power supply switch is kept on as maintaining Occupational Safety and Health (OSH). 5. Deflection of the ampere meter pointer is observed and taken reading as required. 6. Selector knob is adjusted of clip-on meter as required. 7. Phase cable is inserted into the ring of the clip-on meter. 8. Deflection of the clip-on meter pointer is observed and recorded as per workplace standard. 9. Clip-on meter is disconnected from the phase line as required.
Performance guide	**Steps:** 1. Collect and wear Personal Protective Equipment (PPE). 2. Select and collect tools and equipment. 3. Remove insulation of cable terminal using knife or wire stripper as required. 4. Set the range of ammeter as per job requirement. 5. Connect the ampere meter in series with load as per circuit diagram. 6. Keep power supply switch on as maintaining Occupational Safety and Health (OSH). 7. Observe the deflection/ reading of the ampere meter pointer and taken reading as required. 8. Adjust selector knob of clip-on meter as required. 9. Insert phase cable into the ring of the clip-on meter. 10. Observe deflection of the clip-on meter pointer and record as per workplace standard. 11. Disconnect clip-on meter from the phase line as required.
Content	1. Personal Protective Equipment (PPE). 2. Power tools. 3. Prepare power tools. 4. Procedure of using of power tools. 5. Power sources. 6. Electrical circuit 7. Current measuring instrument
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome;

	▪ electrical power source; ▪ a set of electrical power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome - 4: Measure voltage.	
Assessment criteria	1. Insulation of cable terminal is removed using knife or wire stripper as required. 2. Range of voltmeter is set as per job requirement 3. Voltmeter is connected in parallel with the load as per circuit diagram. 4. Power supply is switched ON as required. 5. Deflection of the voltmeter pointer is observed and recorded as per workplace standard. 6. AVO-meter pointer / scale is adjusted in zero position as required. 7. Selector switch of AVO-meter is kept in AC voltage range as required. 8. AVO-meter is connected to proof / test cord with supply line (phase to phase or phase to neutral) as per circuit diagram. 9. Deflection of the AVO meter pointer is observed and recorded as per workplace standard. 10. Power supply is disconnected as required
Performance guide	**Steps:** 1. Collect and wear Personal Protective Equipment (PPE). 2. Select and collect tools and equipment. 3. Remove insulation of cable terminal using knife or wire stripper as required. 4. set the range of voltmeter as per job requirement 5. Connect voltmeter in parallel with the load as per circuit diagram. 6. Switch ON power supply as required. 7. Observe deflection / reading of the voltmeter pointer and record as per workplace standard. 8. Adjust AVO-meter pointer/scale in zero position as required. 9. Keep selector switch of AVO-meter in AC voltage range as required.

	10. Connect AVO-meter to proof /test cord with supply line (phase to phase or phase to neutral) as per circuit diagram. 11. Observe deflection / reading of the AVO meter pointer and record as per workplace standard. 12. Disconnect power supply as required
Content	1. Voltmeter and its classification. 2. Connection method of Voltmeter/AVO meter. 3. Electrical wire and cables 4. Electrical circuit. 5. Electrical power source 6. Connection procedure of Voltmeter in a particular circuit and measuring voltage. 7. Measuring procedure of voltage
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen, pencil and paper; ▪ circuit materials & equipment such as- CB/ fuse, switch, voltmeter, load & connecting cables; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector
Learning outcome -5: Maintain workplace and store tools and equipment.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location.
Performance guide	**Steps:** 1. Store unused material 2. Segregate waste materials in according to the environmental policy.

	3. Dispose waste materials in accordance with workplace requirements. 4. Perform cleaning of equipment in accordance with standard procedure. 5. Store tools and equipment safely in appropriate location 6. Maintain 5S of housekeeping
Content	1. Cleaning process. 2. Disposing procedure of waste Materials. 3. Basic inventory 4. 5S of housekeeping 5. Cleaning procedure of work place 6. Storage system
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ service manuals; ▪ Storage checklist; ▪ periodic maintenance data; ▪ staff rules/policies and procedures; ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; and ▪ necessary equipment and materials.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Perform Wire and Cable Joints.
Unit Code	CONEIM1003A2
Module title	**Module – 7: Performing Wire and Cable Joints**
Module descriptor	This module covers the knowledge, skills and attitudes required to perform wire and cable joints. It includes preparing for works, identifying different sizes and capacity of wires and cables, making pigtail joint, western union joint-joint, married joint and maintaining workplace, tools, equipment and materials.
Nominal duration	30 hours
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1: Prepare for works. LO 2: Identify different sizes and capacity of wires and cables. LO 3: Make pigtail joint. LO 4: Make western union joint. LO 5: Make T-Joint. LO 6: Make married joint. LO 7: Maintain workplace, tools, equipment and materials.
Learning outcome -1: Prepare for works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is collected and worn as per job requirement. 2. Workplace is prepared as per job requirement. 3. Tools, equipment and materials are selected and collected as per job requirement.
Performance guide	**Steps:** 1. collect and wear Personal Protective Equipment (PPE) 2. identify hazard 3. control hazard 4. prepare workplace 5. select and collect tools, equipment and material
Contents	1. Personal Protective Equipment (PPE) Selection as per job requirement. 2. Hazard 3. Hazard control

	4. Preparing procedure of workplace 5. Tools, equipment and materials as per job requirement.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ electrical power source; ▪ a set of electrical power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome -2: Identify different sizes and capacity of wires and cables.	
Assessment criteria	1. Wire and cable are placed separately in the working table in sequence. 2. Wires and cables are listed & tagged as per different sizes. 3. Size of the cable is compared with the cable specification as per specific load. 4. Proper diameter/gauge of conductor is measured using SWG/micro meter. 5. Cable sizes are compared with capacity of wire and cables.
Performance guide	**Steps:** 1. Place wire and cable separately in the working table in sequence. 2. List wires and cables & tag as per different sizes. 3. Compare size of the cable with the cable specification as per specific load. 4. Measure proper diameter/gauge of conductor using SWG/micro meter. 5. Compare cable sizes with capacity of wire and cables.
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Workplace preparation as per job requirement. 3. Proper cables size selection with proper specification. 4. Current carrying capacity of wire & cables. 5. Tools and materials selection as per job requirement. 6. Determining different type of cables size and current carrying capacity.

	7. Micro meter and Vernier calipers 8. Use the measuring tool
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ electrical power source; ▪ a set of electrical power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome - 3: Make pigtail joint.	
Assessment criteria	1. Insulation of cable is removed as required from cable terminal using knife or wire stripper. 2. Conductor surface is scraped by using emery paper/electrician knife. 3. Two insulated cables are wrapped according to the requirement of pigtail joint. 4. Wrapped wire is bent and tapped as per drawing.
Performance guide	**Steps:** 1. Select proper cables size with proper specification. 2. Remove insulation of cable as required from cable terminal using knife or wire stripper. 3. Scrape conductor surface using emery paper/electrician knife. 4. Wrap two insulated cables according to the requirement of pigtail joint. 5. Bent wrapped wire as per drawing. 6. Perform soldering 7. Perform tapping
Content	1. Cable joint 2. Types of joint 3. Use of pig-tail joint. 4. Relevant tools and materials 5. Procedure of the making joint.
Condition	Students/trainees must be provided with the following: ▪ workplace;

	▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ electrical power source; ▪ a set of electrical power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome - 4: Make western union joint.	
Assessment criteria	1. Insulation of cable is removed two or three inches from cable terminal using knife or wire stripper. 2. Conductor surface is scraped by using emery paper/electrician knife. 3. Two insulated cables are wrapped according to the requirement of western union joint. 4. Wrapped wire is bent and tapped as per drawing.
Performance guide	**Steps:** 1. Select proper cables size with proper specification. 2. Remove insulation of cable as required from cable terminal using knife or wire stripper. 3. Scrape conductor surface by using emery paper/electrician knife. 4. Wrap two insulated cables according to the requirement of western union joint. 5. Bent wrapped wire as per drawing. 6. perform soldering 7. perform tapping
Content	1. Use of western union joint. 2. relevant tools and materials selection as per job requirement. 3. Procedure of making western union joint as per smooth conduction.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen, pencil and paper; ▪ relevant tools and equipment; ▪ Personal protective equipment;

	▪ safety signs and warnings; ▪ electrical materials, tools & equipment; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome - 5: Make T-Joint.	
Assessment criteria	1. Insulation of cable is removed as required from cable terminal using knife or wire striper. 2. Conductor surface is scraped by using emery paper / electrician knife 3. Two insulated cables are wrapped according to the requirement of T-joint. 4. Wrapped wire is bent and tapped as per drawing
Performance guide	**Steps:** 1. Select proper cables size with proper specification. 2. Remove insulation of cable as required from cable terminal using knife or wire stripper. 3. Scrape conductor surface by using emery paper/electrician knife. 4. Wrap two insulated cables according to the requirement of Tee-joint. 5. Bent wrapped wire as per drawing. 6. Perform soldering 7. Perform tapping
Content	8. Use of Tee-joint. 9. relevant tools and materials selection as per job requirement. 10. Procedure of the making T- joint as per smooth conduction.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen, pencil and paper; ▪ relevant tools and equipment; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ electrical materials, tools & equipment; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system;

	▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome - 6: Make married joint	
Assessment criteria	1. Insulation of cable is removed as required from cable terminal using knife or wire striper. 2. Conductor surface is scraped by using emery paper / electrician knife 3. Two insulated cables are wrapped according to the requirement of married joint. 4. Wrapped wire is bent and tapped as per drawing
Performance guide	**Steps:** 1. Select proper cables size with proper specification. 2. Remove insulation of cable as required from cable terminal using knife or wire stripper. 3. Scrape conductor surface by using emery paper/electrician knife. 4. Wrap two insulated cables according to the requirement of married joint. 5. Bent wrapped wire as per drawing. 6. perform soldering 7. perform tapping
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Workplace preparation as per job requirement. 3. Proper cables size selection with proper specification. 4. Use of married joint. 5. relevant tools and materials selection as per job requirement. 6. Procedure of the making married joint.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen, pencil and paper; ▪ relevant tools and equipment; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ electrical materials, tools & equipment; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual;

	▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome -7: Maintain workplace, tools, equipment and materials.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location
Performance guide	**Steps:** 1. Clean work area in accordance with workplace procedures. 2. Store unused materials for re-use or dispose following workplace procedures. 3. Dispose waste and scrap materials with following workplace procedures. 4. Conduct Inventory of tools equipment and record as per checklist. 5. Clean tools and equipment and store as per manufacturer's recommendation in appropriate location.
Content	1. Basic principles of cleaning process. 2. Procedure of cleaning tools & equipment. 3. Disposing procedure of waste Materials. 4. Basic inventory 5. 5S of housekeeping 6. Work place. 7. Storing tools and equipment. 8. Cleaning procedure of work place 9. Storage system
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ service manuals; ▪ Storage checklist; ▪ periodic maintenance data; ▪ staff rules/policies and procedures; ▪ CBLM related to the learning outcome; ▪ complete set of electrical hand & power tools; ▪ Personal protective equipment; ▪ safety signs and warnings;

	▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; and ▪ necessary equipment and materials.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Perform Circuits Connection
Unit Code	CONEIM1004A2
Module title	**Module -8: Performing Circuits Connection**
Module descriptor	This module covers the knowledge, skills and attitudes required to perform circuit connection. It includes preparing for works, practicing series circuit connection, practicing parallel circuit connection, practicing series and parallel (mixed) circuit connection and maintaining workplace, tools, equipment and materials.
Nominal duration	20 hours
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1: Prepare for works. LO 2: Practice series circuit connection. LO 3: Practice parallel circuit connection. LO 4: Practice series and parallel (Mixed) circuit connection. LO 5: Maintain workplace, tools, equipment and materials
Learning outcome -1: Prepare for works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is collected and worn as per job requirement. 2. Workplace is prepared as per job requirement. 3. Tools, equipment and materials are selected and collected as per job requirement.
Performance guide	**Steps:** 1. Collect materials and fittings. 2. Keep materials and fittings on table separately. 3. Identify materials and fittings and tag with the name. 4. Describe function and properties of materials and fittings
Contents	1. Personal Protective Equipment (PPE) selection as per job requirement. 2. Preparing workplace as per job requirement. 3. Hazard 4. Hazard control 5. Tools, equipment and materials as per job requirement.
Condition	Students/trainees must be provided with the following: ▪ workplace;

	▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ electrical power source; ▪ a set of Electrical power tools; ▪ Personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; ▪ module/reference; ▪ video clips; ▪ video (CD); and ▪ LCD projector.
Learning outcome -2: Practice series circuit connection.	
Assessment criteria	1. Circuit materials are placed on the board. 2. Circuit accessories are fitted and connected using flexible wire as per drawing. 3. Circuit connection is checked according to the drawing. 4. Electrical circuit connection is checked using lamp. 5. Series circuit is tested with connected power supply
Performance guide	**Steps:** 1. Place circuit materials on the board. 2. Fit circuit accessories and connect using flexible wire as per drawing. 3. Check circuit connection according to the drawing. 4. Check electrical circuit connection using lamp. 5. Test series circuit with connecting power supply.
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Workplace preparation as per job requirement. 3. Proper cables size selection with proper specification. 4. Electrical circuit and its classification. 5. Ideal electrical circuit and its components. 6. Series circuit and its connection procedures. 7. Properties of ‘Series circuit.’ 8. Circuit materials and accessories. 9. Tools and equipment selection as per job requirement
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ relevant tools and equipment; ▪ personal protective equipment;

	▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome 3: Practice parallel circuit connection.	
Assessment criteria	1. Circuit materials are placed on the board. 2. Circuit accessories are fitted and connected using flexible wire as per drawing. 3. Circuit connection is checked according to the drawing. 4. Electrical circuit connection is checked using lamp. 5. Parallel circuit is tested with connected power supply
Performance guide	**Steps:** 1. Place circuit materials on the board. 2. Fit circuit accessories and connect using flexible wire as per drawing. 3. Check circuit connection according to the drawing. 4. Check electrical circuit connection using lamp. 5. Test parallel circuit with connecting power supply.
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Workplace preparation as per job requirement. 3. Proper cables size selection with proper specification. 4. Parallel circuit and its connection procedures. 5. Properties of 'Parallel circuit.' 6. Circuit materials and accessories. 7. Tools and equipment selection as per job requirement. 8. Procedure of making parallel circuit.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ relevant tools and equipment; ▪ personal protective equipment; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 4: Practice series and parallel (mixed) circuit connection.	
Assessment criteria	1. Circuit materials are placed on the board. 2. Circuit accessories are fitted and connected using flexible wire as per drawing. 3. Circuit connection is checked according to the drawing. 4. Electrical circuit connection is checked using lamp. 5. Series and parallel(Mixed) circuit is tested with connected power supply

Performance guide	**Steps:** 1. Place circuit materials on the board. 2. Fit circuit accessories and connect using flexible wire as per drawing. 3. Check circuit connection according to the drawing. 4. Check electrical circuit connection using lamp. 5. Test mixed circuit with connecting power supply.
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Workplace preparation as per job requirement. 3. Proper cables size selection with proper specification. 4. Mixed circuit and its connection procedures. 5. Properties of 'mixed circuit.' 6. Circuit materials and accessories. 7. Tools and equipment selection as per job requirement. 8. Procedure of 'Mixed' circuit connection and testing.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ relevant tools and equipment; ▪ personal protective equipment; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 5: Maintain workplace, tools, equipment and materials.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location
Performance guide	**Steps:** 1. Clean work area in accordance with workplace procedures. 2. Store unused materials for re-use or dispose following workplace procedures. 3. Dispose waste and scrap materials with following workplace procedures. 4. Conduct Inventory of tools equipment and record as per checklist.

	5. Clean tools and equipment and store as per manufacturer's recommendation in appropriate location.
Content	1. Basic principles of cleaning process. 2. Procedure of cleaning tools & equipment. 3. Disposing procedure of waste materials. 4. Basic inventory 5. 5S of housekeeping 6. Work place. 7. Storing tools and equipment. 8. Cleaning procedure of work place 9. Storage system
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ storage checklist; ▪ maintenance materials; ▪ Personal protective equipment; ▪ service manuals; ▪ periodic maintenance data; ▪ relevant tools and equipment; ▪ instructions, job sheets, activity sheet; and ▪ relevant books, manual; ▪ module/reference.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Perform Installation of Electrical Circuit
Unit Code	CONEIM1005A2
Module title	**Module -9: Performing Installation of Electrical Circuit**
Module descriptor	This module covers the knowledge, skills and attitudes required to perform installation of electrical circuit. It includes preparing for works, performing one lamp control by one-way switch, one lamp control by two-way switch, one calling bell control from two point, operation of fluorescent lamp circuit (tube light), connection of single-phase energy meter and maintaining workplace, tools and materials.
Nominal duration	20 hours.
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1: Prepare for works. LO 2: Perform one lamp control by one-way switch. LO 3: Perform one lamp control by two-way switch. LO 4: Perform one calling bell control from two points. LO 5: Perform operation of fluorescent lamp (tube light) circuit. LO 6: Perform connection of single-phase energy meter LO 7: Maintain workplace, tools, equipment and materials.
Learning outcome -1: Prepare for works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is collected and worn as per job requirement. 2. Workplace is prepared as per job requirement. 3. Tools, equipment and materials are selected and collected as per job requirement.
Performance guide	**Steps:** 1. Collect and wear Personal Protective Equipment (PPE) 2. Control hazard 3. Prepare workplace 4. Select and collect tools, equipment and material 5. Keep materials and fittings on table separately. 6. Identify materials and fittings and tag the name. 7. Describe function and properties of materials and fittings.
Contents	1. Personal Protective Equipment (PPE) Selection as per job requirement.

	2. Hazard 3. Hazard control 4. Preparing procedure of workplace 5. Tools, equipment and materials as per job requirement.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ Personal protective equipment; ▪ service manuals; ▪ relevant tools and equipment; ▪ instructions, job sheets, activity sheet; and ▪ relevant books, manual; ▪ module/reference.
Learning outcome -2: Perform one lamp control by one-way switch.	
Assessment criteria	1. Circuit layout is drawn as per drawing. 2. Circuit materials are placed on the board as per drawing. 3. Fittings are connected and fitted in to circuit as per drawing. 4. Circuit connection is checked according to the drawing. 5. Circuit is tested while connected power supply by following OSH.
Performance guide	**Steps:** 1. Identify circuit diagram and materials 2. Draw the circuit diagram. 3. Place circuit materials on the board/table as per drawing 4. Set and install fuse and circuit breaker and other fittings as per diagram. 5. Perform wiring of one-way circuit. 6. Check circuit connection and continuity 7. Test the circuit functionality maintain OSH procedure .
Content	1. Workplace preparation as per job requirement. 2. Proper cables size selection with proper specification. 3. Electrical circuit diagram and its connection procedures 4. Related circuit materials and accessories 5. Testing procedure
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical materials, tools and equipment; ▪ job sheets/circuit diagram; ▪ safety signs and warnings; ▪ relevant books, manual; and

	▪ module/reference.
Learning outcome 3: Perform one lamp control by two-way switch.	
Assessment criteria	1. Circuit layout is drawn as per drawing. 2. Circuit materials are placed on the board as per drawing. 3. Fittings are connected and fitted in to circuit as per drawing. 4. Circuit connection is checked according to the drawing. 5. Circuit is tested while connected power supply by following OSH.
Performance guide	**Steps** 1. Collect circuit diagram 2. Collect tools, materials & instrument 3. Place collected tools, materials & instrument on appropriate place orderly 4. perform layout on according to the circuit diagram 5. Set and install fuse and circuit breaker and other fittings as per diagram. 6. Perform wiring of two-way circuit. 7. Check circuit connection and continuity 8. Connect power source with circuit 9. Test the circuit functionality maintain OSH procedure.
Content	1. Proper cables size selection with proper specification. 2. Electrical circuit diagram and its connection procedures. 3. Related circuit materials and accessories 4. Testing procedure 5. Tools and equipment selection
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical materials, tools and equipment; ▪ job sheets/circuit diagram; ▪ safety signs and warnings; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 4: Perform one calling bell control from two points.	
Assessment criteria	1. Circuit layout is drawn as per drawing. 2. Circuit materials are placed on the board as per drawing. 3. Fittings are connected and fitted in to circuit as per drawing. 4. Circuit connection is checked according to the drawing. 5. Circuit is tested while connected power supply by following OSH.

Performance guide	**Steps:** 1. Collect circuit diagram 2. Collect tools, materials & instrument 3. Place collected tools, materials & instrument on appropriate place orderly 4. perform layout on according to the circuit diagram 5. Set and install fuse and circuit breaker and other fittings as per diagram. 6. Perform wiring of calling bell circuit. 7. Check circuit connection and continuity 8. connect power source with circuit 9. Test the circuit functionality maintain OSH procedure.
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Proper cables size selection with proper specification. 3. Calling bell circuit diagram and its connection procedures. 4. Related circuit materials and accessories 5. Tools and equipment selection as per job requirement. 6. Testing procedure
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical materials, tools and equipment; ▪ job sheets/circuit diagram; ▪ safety signs and warnings; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 5: Perform operation of fluorescent lamp (tube light) circuit.	
Assessment criteria	1. Circuit layout is drawn as per drawing. 2. Circuit materials are placed on the board as per drawing. 3. Fittings are connected and fitted in to circuit as per drawing. 4. Circuit connection is checked according to the drawing. 5. Circuit is tested while connected power supply by following OSH.
Performance guide	**Steps:** 1. Collect circuit diagram 2. Collect tools, materials & instrument 3. Place collected tools, materials & instrument on appropriate place orderly 4. Perform layout on according to the circuit diagram

	5. Set and install fuse and circuit breaker and other fittings as per diagram. 6. Perform wiring of tube light circuit. 7. Check circuit connection and continuity 8. Connect power source with circuit 9. Test the circuit functionality maintain OSH procedure.
Content	1. Tube light circuit diagram and its connection procedures. 2. Function of starter and choke coil 3. Proper cables size selection with proper specification. 4. Tube light/LED lamp circuit diagram and its connection procedures. 5. Related circuit materials and accessories 6. Tools and equipment selection as per job requirement
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical materials, tools and equipment; ▪ job sheets/circuit diagram; ▪ safety signs and warnings; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 6: Perform connection of single-phase energy meter	
Assessment criteria	1. Circuit layout is drawn as per drawing. 2. Circuit materials are placed on the board as per drawing. 3. Fittings are connected and fitted in to circuit as per drawing. 4. Circuit connection is checked according to the drawing. 5. Circuit is tested while connected power supply by following OSH.
Performance guide	**Steps:** 1. Collect circuit diagram 2. Collect tools, materials & instrument 3. Place collected tools, materials & instrument on appropriate place orderly 4. perform layout on according to the circuit diagram 5. set and connect single phase energy meter as per diagram. 6. Check meter connection and continuity 7. Connect power source with meter 8. Test the meter functionality maintain OSH procedure.
Content	1. Workplace preparation as per job requirement. 2. Proper cables size selection with proper specification.

	3. Energy meter connection diagram and its connection procedures. 4. Related circuit materials and accessories 5. Tools and equipment selection as per job requirement
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical materials, tools and equipment; ▪ job sheets/circuit diagram; ▪ safety signs and warnings; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome -7: Maintain workplace, tools, equipment and materials.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location
Performance guide	**Steps:** 1. Clean work area in accordance with workplace procedures. 2. Store unused materials for re-use or dispose following workplace procedures. 3. Dispose waste and scrap materials with following workplace procedures. 4. Conduct Inventory of tools equipment and record as per checklist. 5. Clean tools and equipment and store as per manufacturer's recommendation in appropriate location.
Content	1. Basic principles of cleaning process. 2. Procedure of cleaning tools & equipment. 3. Disposing procedure of waste Materials. 4. Basic inventory 5. 5S of housekeeping 6. Work place. 7. Storing tools and equipment. 8. Cleaning procedure of work place

	9. Storage system
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ storage checklist; ▪ maintenance materials; ▪ Personal protective equipment; ▪ service manuals; ▪ periodic maintenance data; ▪ relevant tools and equipment; ▪ instructions, job sheets, activity sheet; and ▪ relevant books, manual; ▪ module/reference.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Perform Installation of Electrical Fittings
Unit Code	CONEIM1006A2
Module title	**Module -10: Performing Installation of Electrical Fittings**
Module descriptor	This module 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, fixing of ceiling rose and maintaining workplace, tools, equipment and materials.
Nominal duration	30 hours.
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1. Prepare for works. LO 2. Fix-up cut-outs /fuses, switches and indicator with switch board. LO 3. Perform fixing of batten holder LO 4. Perform fixing of ceiling rose. LO 5. Maintain workplace, tools, equipment and materials
Learning outcome -1: Prepare for works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is collected and worn as per job requirement. 2. Workplace is prepared as per job requirement. 3. Tools, equipment and materials are selected and collected as per job requirement.
Performance guide	**Steps:** 1. Collect and wear Personal Protective Equipment (PPE) 2. Collect materials and fittings. 3. Keep materials and fittings on table separately. 4. Identify materials and fittings and tag with the name. 5. Describe function and properties of materials and fittings.
Contents	1. Personal Protective Equipment (PPE) Selection as per job requirement. 2. Hazard and hazard control 3. Preparing procedure of workplace 4. Tools, equipment and materials as per job requirement.
Condition	Students/trainees must be provided with the following:

	▪ workplace; ▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ personal protective equipment; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference
Learning outcome -2: Fix-up cut-outs /fuses, switches and indicator with switch board.	
Assessment criteria	1. Base part of fuse and cut out is fixed with the switch board / SDB using screw. 2. Cable terminal insulation is removed by using wire striper. 3. One part of the cable is connected with the terminal of base of the fuse / cut out and other part of the cable is connected with the power supply as per circuit diagram. 4. Other part of the cable is connected with the power supply as per circuit diagram. 5. Fusing wire is connected with the fusing bridge as per circuit diagram. 6. Fusing bridge / cut out is fitted with base. 7. Indicator is fixed on the switch board as per diagram. 8. Operation is checked of the fuse and cut out with load.
Performance guide	**Steps:** 1. Fix base part of fuse and cut out with the switch board/SDB using screw. 2. Remove cable terminal insulation by using wire striper. 3. Connect one part of the cable with the terminal of base of the fuse / cut out 4. Connect other part of the cable with the power supply as per circuit diagram. 5. Connect fusing wire with the fusing bridge as per circuit diagram. 6. Fit fusing bridge/cut out with base. 7. Fix indicator on the switch board as per diagram. 8. Check operation of the fuse and cut out with load.
Content	1. Personal Protective Equipment (PPE) 2. Fxing materials (various types of board, switch, socket, holder, ceiling rose, fuse, MCB,) 3. Function and types of board, switch, socket, fuse, MCB 4. Setting procedure of various types of board, switch, socket, fuse, MCB. 5. Connection and connecting point with the load.
Condition	Students/trainees must be provided with the following: ▪ workplace;

	▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical fixing materials & tools; ▪ job sheets/circuit diagram; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome 3: Perform fixing of batten holder.	
Assessment criteria	1. Holder setting point is marked on board. 2. Cable is connected with bottom parts. 3. Bottom part of holder is fitted on the board. 4. Upper part is fitted on the bottom part.
Performance guide	**Steps:** 1. Mark the holder setting point on board. 2. Connect cable with bottom parts. 3. Fit the bottom part of holder on the board. 4. Fit the upper part on the bottom part. 5. Check the circuit connecting power supply following OSH.
Content	1. Holder and its types 2. Proper cables size selection with proper specification. 3. Electrical circuit diagram and its connection procedures. 4. Related circuit materials and accessories 5. Tools and equipment selection.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical fixing materials & tools; ▪ job sheets/circuit diagram; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 4: Perform fixing of ceiling rose.	
Assessment criteria	1. Ceiling rose point is marked on board. 2. Cable is connected with bottom parts. 3. Bottom part of ceiling rose is fitted on the board. 4. Upper part is fitted on the bottom part.
Performance guide	**Steps:** 1. Mark ceiling rose point on board.

	2. Connect cable with bottom parts. 3. Fit the bottom part of ceiling rose on the board. 4. Fit the upper part on the bottom part. 5. Check the connection. 6. Check / test the circuit connecting power supply following OSH.
Content	1. Personal Protective Equipment (PPE). 2. Proper cables size selection with proper specification. 3. Electrical circuit diagram and its connection procedures. 4. Identifying various types of ceiling rose. 5. Use of ceiling rose. 6. Setting procedure of various types of ceiling rose. 7. Related circuit materials and accessories 8. Tools and equipment selection.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ pen pencil and paper; ▪ safety signs and warnings; ▪ personal protective equipment; ▪ cleaning agents; ▪ related electrical fixing materials & tools; ▪ job sheets/circuit diagram; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome -5: Maintain workplace, tools, equipment and materials.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location
Performance guide	**Steps:** 1. Clean work area in accordance with workplace procedures. 2. Store unused materials for re-use or dispose following workplace procedures. 3. Dispose waste and scrap materials with following workplace procedures.

	4. Conduct Inventory of tools equipment and record as per checklist. 5. Clean tools and equipment and store as per manufacturer's recommendation in appropriate location.
Content	1. Basic principles of cleaning process. 2. Procedure of cleaning tools & equipment. 3. Disposing procedure of waste Materials. 4. Basic inventory 5. 5S of housekeeping 6. Work place. 7. Storing tools and equipment. 8. Cleaning procedure of work place 9. Storage system
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ storage checklist; ▪ maintenance materials; ▪ work place; ▪ service manuals; ▪ periodic maintenance data; ▪ relevant tools and equipment; ▪ personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference.

Module of Instructions	
Sector	**Construction**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Perform Channel Wiring
Unit Code	CONEIM1007A2
Module title	**Module – 11: Performing Channel Wiring**
Module descriptor	This module covers the knowledge, skills and attitudes required to perform channel wiring. It includes preparing for works, performing channel wiring and maintaining workplace, tools, equipment and materials.
Nominal duration	30 hours
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes	After completion of this module, the trainees/students must be able to: LO 1. Prepare for works. LO 2. Perform channel wiring. LO 3. Maintain workplace, tools, equipment and materials.
Learning outcome -1: Prepare for works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is collected and worn as per job requirement. 2. Workplace is prepared as per job requirement. 3. Tools, equipment and materials are selected and collected as per job requirement.
Performance guide	**Steps:** 1. Collect and wear Personal Protective Equipment (PPE) 2. Identify hazard and control hazard 3. Prepare workplace 4. Select and collect tools, equipment and material
Contents	1. Personal Protective Equipment (PPE) Selection as per job requirement. 2. Hazard and hazard control 3. Preparing procedure of workplace 4. Tools, equipment and materials as per job requirement.
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ electrical power source; ▪ a set of Electrical power tools; ▪ Personal protective equipment;

	▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ role of self and others within the quality improvement system; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome - 2: Perform channel wiring.	
Assessment criteria	1. Drawing is interpreted with the help of supervisor. 2. Channel size is identified and selected as per the number and size of cables to be embedded inside. 3. Wall is drilled as per marked point according to layout diagram. 4. Rawal plug is fixed into the hole as required by using soft hammer. 5. Lower part of channel is holed using poker. 6. Lower part of channel is fixed into the wall using screw with washer. 7. PVC cable is laid into the channel as per the diagram. 8. Upper part of the channel is fixed with the lower part. 9. Load point is connected with the switch board. 10. SDB is connected with the MDB as per diagram. 11. Connection is checked using meter. 12. Circuit is operated by power supply.
Performance guide	**Steps:** 1. Interpret drawing with the help of supervisor. 2. Identify channel size and select as per the number and size of cables to be embedded inside. 3. Drill wall as per marking point according to layout diagram. 4. Fix rawal plug into the hole as required by using soft hammer. 5. Hole lower part of channel using poker. 6. Fix the lower part of channel into the wall using screw with washer. 7. Lay PVC cable into the channel as per the diagram. 8. Fix the upper part of the channel with the lower part. 9. Connect the load point with the switch board. 10. Connect SDB with the MDB as per diagram. 11. Check connection using meter. 12. Operate circuit by power supply.
Content	1. Electrical house wiring and its types. 2. Cables specification. 3. Proper cables size selection with proper specification. 4. Identifying various types of channel. 5. Use of ceiling rose.

	6. Channel wiring and its materials/accessories, tools & equipment. 7. Electrical circuit diagram with related load points. 8. Channel wiring procedures.
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome; ▪ pen, pencil and paper; ▪ work place; ▪ related electrical materials, tools and equipment; ▪ relevant tools and equipment; ▪ personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference
Learning outcome - 3: Maintain workplace, tools, equipment and materials.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location
Performance guide	**Steps:** 1. Clean work area in accordance with workplace procedures. 2. Store unused materials for re-use or dispose following workplace procedures. 3. Dispose waste and scrap materials with following workplace procedures. 4. Conduct Inventory of tools equipment and record as per checklist. 5. Clean tools and equipment and store as per manufacturer's recommendation in appropriate location.
Content	1. Basic principles of cleaning process. 2. Procedure of cleaning tools & equipment. 3. Disposing procedure of waste materials. 4. Basic inventory 5. 5S of housekeeping 6. Work place. 7. Storing tools and equipment.

	8. Cleaning procedure of work place 9. Storage system
Condition	Students/trainees must be provided with the following: ▪ workplace; ▪ CBLM relevant to the learning outcome; ▪ storage checklist; ▪ cleaning agents; ▪ maintenance materials; ▪ Personal protective equipment; ▪ work place; ▪ service manuals; ▪ periodic maintenance data; ▪ relevant tools and equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet; ▪ relevant books, manual; and ▪ module/reference.

Module of Instructions	
Sector	**Construction Sector**
Course title	National Skill Certificate in Electrical Installation & Maintenance (EIM) Level - I
Unit Title	Install Fan
Unit Code	CONEIM1008A2
Module title	**Module -12: Installing Fan**
Module descriptor	This module covers the knowledge, skills and attitudes required to install fan. It includes preparing for works, installing exhaust fan, wall mountain fan, ceiling fan and maintaining workplace, tools, equipment and materials.
Nominal duration	30 hours.
Certificate level	National Skill Certificate Level – I
Pre-requisite qualification	Complete JSC or equivalent
Learning outcomes:	After completion of this module, the trainees/students must be able to: LO 1: Prepare for works. LO 2: Install exhaust fan. LO 3: Install wall mounted fan. LO 4: Install ceiling fan. LO 5: Maintain workplace, tools, equipment and materials
Learning outcome -1: Prepare for works.	
Assessment criteria	1. Personal Protective Equipment (PPE) is collected and worn as per job requirement. 2. Workplace is prepared as per job requirement. 3. Tools, equipment and materials are selected and collected as per job requirement.
Performance guide	**Steps:** 1. Collect materials and fittings. 2. Keep materials and fittings on table separately. 3. Identify materials and fittings and tag with the name. 4. Describe function and properties of materials and fittings.
Contents	1. Personal Protective Equipment (PPE). 2. Preparing workplace as per job requirement. 3. Selecting tools, equipment and materials.
Condition	Students/trainees must be provided with the following: ▪ CBLM related to the learning outcome; ▪ electrical materials and fittings; ▪ electrical fans; ▪ relevant tools and equipment; ▪ personal protective equipment; ▪ safety signs and warnings; ▪ instructions, job sheets, activity sheet;

	▪ workplace; ▪ relevant books, manual; and ▪ module/reference.
Learning outcome -2: Install exhaust fan.	
Assessment criteria	1. Screw point is marked as per drawing. 2. Screw points are drilled as per drawing 3. Rawal plug is installed into the hole using soft hammer. 4. Exhaust fan is fixed in the ventilator using screw. 5. Supply cord of fan is connected with power supply line. 6. Connection is checked as per diagram. 7. Performance of fan is checked by switch ON/OFF the power supply.
Performance guide	**Steps:** 1. Mark screw point as per drawing. 2. Drill screw points as per drawing 3. Install rawal plug into the hole using soft hammer. 4. Fix exhaust fan in the ventilator using screw. 5. Connect supply cord of fan with power supply line. 6. Check connection as per diagram. 7. Check performance of fan by switch ON/OFF the power supply.
Content	1. Personal Protective Equipment (PPE) as per job requirement. 2. Exhaust fan and its parts and types. 3. Different uses of exhaust fan. 4. Exhaust fan coil identification and connection. 5. Installing materials, tools and accessories. 6. Installation procedure of exhaust fan .
Condition	Students/trainees must be provided with the following: • CBLM relevant to the learning outcome • pen pencil and paper • related electrical fixing materials & tools. • exhaust fan • personal protective equipment • safety signs and warnings • instructions, job sheets, activity sheet • workplace • relevant books, manual • module/reference
Learning outcome 3: Install wall mountain fan.	
Assessment criteria	1. Screw point is marked as per drawing. 2. Screw points are drilled as per drawing 3. Rawal plug is installed into the hole using soft hammer.

	4. Wall mounted fan is fixed in the ventilator using screw. 5. Supply cord of fan is connected with power supply line. 6. Connection is checked as per diagram. 7. Performance of fan is checked by switch ON/OFF the power supply.
Performance guide	**Steps:** 1. Mark screw point as per drawing. 2. Drill screw points as per drawing 3. Install rawal plug into the hole using soft hammer. 4. Fix wall mounted fan in the ventilator using screw. 5. Connect supply cord of fan with power supply line. 6. Check connection as per diagram. 7. Check performance of fan by switch ON/OFF the power supply.
Content	1. Wall mounted fan and its parts a 2. Different uses of wall mounted fan. 3. Wall fan coil identification and connection. 4. Installing materials, tools and accessories 5. Installation procedure of wall fan.
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome ▪ pen pencil and paper ▪ wall mounted fan ▪ related electrical materials & tools. ▪ relevant tools and equipment ▪ personal protective equipment ▪ safety signs and warnings ▪ instructions, job sheets, activity sheet ▪ workplace ▪ relevant books, manual ▪ module/reference
Learning outcome - 4: Install ceiling fan.	
Assessment criteria	1. Down rod, top and down canopy, fan blade and canopy pin are assembled. 2. Ceiling fan body is hanged with ceiling hook using rubber bush and nut & bolt. 3. Fan is connected with power supply cable followed by OSH. 4. Connection is rechecked as per diagram. 5. Performance of fan is checked by switch ON / OFF the power supply.
Performance guide	**Steps:** 1. Assemble down rod, top and down canopy, fan blade and canopy pin.

	2. Check performance of fan by series board 3. Hang ceiling fan body with ceiling hook using rubber bush and nut & bolt. 4. Re-check setting and connection 5. Check performance of fan by switch ON / OFF the power supply.
Content	1. Personal Protective Equipment 2. Types of ceiling fan and parts. 3. Use of ceiling fan. 4. Fan coil identification and connection. 5. Installing materials, tools and accessories. 6. Installation procedure of ceiling fan.
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome ▪ pen, pencil and paper ▪ ceiling fan & its accessories. ▪ work place. ▪ related electrical materials, tools and equipment. ▪ personal protective equipment ▪ safety signs and warnings ▪ instructions, job sheets, activity sheet ▪ relevant books, manual ▪ module/reference
Learning outcome -5: Maintain workplace, tools, equipment and materials.	
Assessment criteria	1. Work area is cleaned in accordance with workplace procedures. 2. Unused materials are stored for re-use or disposed following workplace procedures. 3. Waste and scrap materials are disposed with following workplace procedures. 4. Inventory of tools equipment are conducted and recorded as per checklist. 5. Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location
Performance guide	**Steps:** 1. Clean work area in accordance with workplace procedures. 2. Store unused materials for re-use or dispose following workplace procedures. 3. Dispose waste and scrap materials with following workplace procedures. 4. Conduct Inventory of tools equipment and record as per checklist. 5. Clean tools and equipment and store as per manufacturer's recommendation in appropriate location.

Content	1. Basic principles of cleaning process. 2. Procedure of cleaning tools & equipment. 3. Disposing procedure of waste Materials. 4. Basic inventory 5. 5S of housekeeping 6. Work place. 7. Storing tools and equipment. 8. Cleaning procedure of workplace 9. Storage system
Condition	Students/trainees must be provided with the following: ▪ CBLM relevant to the learning outcome ▪ storage checklist. ▪ maintenance materials. ▪ personal protective equipment ▪ work place ▪ service manuals ▪ periodic maintenance data ▪ relevant tools and equipment ▪ instructions, job sheets, activity sheet ▪ relevant books, manual ▪ module/reference

Training Schedule:

Unit of Competency	Module	Duration*	Training method (s)**
1. GN1001A2 - Apply Basic Mathematics for Measurement and Calculation	**Module -1:** Applying Basic Mathematics for Measurement and Calculation	40 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
2. GN1002A2 - Practice Occupational Safety and Health (OSH) Procedures	**Module -2:** Practicing Occupational Safety and Health (OSH) Procedures	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
3. GN1003A2 - Work in a Team Environment	**Module -3:** Working in a Team Environment	20 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
4. CONSS1001A2 - Work in the Construction Sector	**Module -4:** Working in the Construction Sector	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
5. CONEIM1001A1 - Use Tools for Electrical Works	**Module - 5:** Using Tools for Electrical Works	50 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching

6. **CONEIM1002A2 - Apply Fundamental Skills for Electrical Works**	**Module -6:** Applying Fundamental Skills for Electrical Works	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
7. **CONEIM1003A2 – Perform Wire and Cable Joints**	**Module - 7:** Performing Wire and Cable Joints	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
8. **CONEIM1004A2 - Perform Circuits Connection**	**Module - 8:** Performing Circuits Connection	20 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
9. **CONEIM1005A2 - Perform Installation of Electrical Circuits**	**Module - 9:** Performing Installation of Electrical Circuits	20 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
10. **CONEIM1006A2 - Perform Installation of Electrical Fittings**	**Module - 10:** Performing Installation of Electrical Fittings	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching
11. **CONEIM1007A2 - Perform Channel Wiring**	**Module - 11:** Performing Channel Wiring	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching

12. CONEIM1008A2 - Install Fan	**Module - 12:** Installing Fan	30 hours	• Presentation • Discussion • Demonstration • Guided practice • Independent practice • Project work • Coaching

* *Duration of each training module is estimated based on the inputs of the experts. Some competencies are complex and critical than others and therefore number of hours may vary for teaching learning process. Instructors have flexibility to judge for proper utilization of estimated duration while teaching individual competency to the trainees.*

***Training method (s) will be determined by the instructor depending upon the capacity and basic skills of the students. More than one method will be required to transfer the skills to the students.*

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