Skills for Employment Investment Program (SEIP)

COMPETENCY STANDARD

FOR

ELECTRICAL AND NAVIGATIONAL EQUIPMENT INSTALLATION

(SHIPBUILDING SECTOR)

Finance Division, Ministry of Finance
Government of the People's Republic of Bangladesh

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Introduction

The Skills for Employment Investment Program (SEIP) Project of the Finance Division of the Ministry of Finance has embarked on a project which aims to qualitatively and quantitatively expand the skilling capacity of identified public and private training providers by establishing and operationalising a responsive skill ecosystem and delivery mechanism through a combination of well-defined set of funding triggers and targeted capacity support.

Among the many components of the project, one is to promote a Market Responsive Inclusive Skills Training Delivery programme. Key priority economic growth sectors identified by the government have been targeted by the project to improve current job skills along with up-skilling of the existing workforce to ensure 'required skills to industry standards'. Training providers are encouraged and supported to work with industry to address identified skills and knowledge to enable industry growth and increased employment through the provision of market responsive inclusive skills training programmes. Priority sectors were identified to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

This document is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements.

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

Overview

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

The purpose of a competency standards is to:

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

Competency standards are developed by a working group comprised of national and international subject-matter experts, SEIP, BTEB, ISC, and industry experts to identify the competencies required of an occupation in a particular sector.

Competency standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. Competency standards acknowledge that people can achieve technical and vocational competency in many ways by emphasising what the learner can do, not how or where they learned to do it.

With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.

Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

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

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

Together, all the parts of a unit of competency:

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

Identification and validation of units of competency and elements for this occupation were made by experts within this sector. A series of meetings were held to accurately capture industry and employer needs and expectations, and develop the competency framework that would help to enhance the employability of the

youth trained. This process started on 7 January 2017 and concluded with a validation workshop with working group on 23 May 2017, and was reviewed and revised on 16 May 2018.

Experts Involved

Industry and subject-matter experts who provided their valuable inputs to develop this competency standard [January 2017 – May 2017]:

Name	Organisation	Designation
Md. Sakhawat Hossain	Western Marine Shipyard Limited	Managing Director
Abu Md. Fazle Rashid	Western Marine Shipyard Limited	Director
Capt. Mohd. Habibur Rahman	AEOSIB-SEIP Training Program - Chittagong	Chief Coordinator
Md. Shahadat Hossain Talukder	AEOSIB-SEIP Training Program - Chittagong	Coordinator - M & E
Capt. Jafor Ullah Chowdhury	Western Marine Shipyard Limited	Director
Nazrul Islam	BKTTC - Chittagong	Principal
Shorifa Khatun	BIMT - Narayanganj	Principal
Idris Ali	Highspeed Shipbuilding & Engineering Company Limited	General Manager (Engineering)
Gias Uddin Ahmed Chowdhury	Highspeed Shipbuilding & Engineering Company Limited	Director
Md. Touhidul Islam	Ananda Shipyard and Slipways Limited	Deputy General Manager
Syed Khorshedul Alam	Western Maritime Institute	Principal
Md. Hanif	SEIP - WMSL	Coordinator
Abdul Karim Bhuiyan	Western Marine Shipyard Limited	Trainer
Gananesh Chandra Sarker	Western Marine Shipyard Limited	Supervisor
Md. Abdus Salam	Western Marine Shipyard Limited	Supervisor
Md. Rashedul Islam	Western Marine Shipyard Limited	Senior Electrician (Supervisor)
Md. Ayub Hossain	Ocean Electrical Limited	Trainer (ENEI)

Name	Organisation	Designation
Abul Kalam Azad	OEL	Trainer (Electrical)
Abishek Barua	OEL	Assistant Engineer (Supervisor)
Md Reazul Islam	OEL	Senior Electrician
David King	British Council - SD03	Team Leader
Tozammel Hossain Khan	British Council - SD03	National Subject Matter Consultant - Shipbuilding Sector

Development Workshop

Working group formation and competency standard development workshop participants [7 May 2017]:

Name	Organisation	Designation
Abu Md. Fazle Rashid	Western Marine Shipyard Limited	Director
Capt.Mohd. Habibur Rahman	AEOSIB-SEIP	Chief Coordinator
Md. Shahadat Hossain Talukder	AEOSIB-SEIP	Coordinator - M & E
Md. Anis Uddin Khosru	Western Marine Shipyard Limited	Director
Md. Abdul Karim Bhuiyan	Western Marine Shipyard Limited	Trainer (Electrical)
Md. Shorfuddin	BKTTC	Instructor (Electrical)
Abul Kalam Azad	OEL	Trainer (Electrical)
Md. Ayub Hossain	OEL	Trainer (ENEI)
Mohammad Hanif	Western Marine Shipyard Limited	Coordinator – SEIP Shipyard
Md. Osman Gani	Western Marine Shipyard Limited	Supervisor
Rashmi Mehra	British Council - SD03	Acting Team Leader and International Consultant CBLM
Tozammel Hossain Khan	British Council - SD03	National Subject Matter Consultant - Shipbuilding Sector

Validation Workshop

Competency standard validation workshop participants [23 May 2017]:

Name	Organisation	Designation
Rupak Kanti Biswas	BTEB	Quality Assurance Officer
Abu Md. Fazle Rashid	Western Marine Shipyard Limited	Director
Capt. Mohd. Habibur Rahman	AEOSIB-SEIP Training Program	Chief Coordinator
Md. Shahadat Hossain Talukder	AEOSIB-SEIP Training Program	Coordinator - M & E
Md. Abdul Karim Bhuiyan	Western Marine Shipyard Limited	Trainer (Electrical)
Abul Kalam Azad	OEL	Trainer (Electrical)
Mahbub Ul Huda	British Council - SD03	Consultant
Tozammel Hossain Khan	British Council - SD03	National Subject Matter Consultant - Shipbuilding Sector

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

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

Competency Chart

Units of Competency	Elements		
A. Generic (basic) Competencies (44 hours)			
Use basic mathematical concepts SEIP-SBD-ENI-01-G	Identify calculation requirements in the workplace	Select appropriate mathematical methods/concepts for the calculation	Use tools and instruments to perform calculations
Apply occupational health and safety (OHS) practice in the workplace SEIP-SBD-ENI-02-G	Identify OHS policies and procedures	Apply personal health and safety practices	Report hazards and risks
	Respond to emergencies		
Carry out workplace interaction SEIP-SBD-ENI-03-G	Interpret workplace communication and etiquette	Read and understand workplace documents	Participate in workplace meetings and discussions
	Practice professional ethics at work		
Operate in a team environment SEIP-SBD-ENI-04-G	Identify team goals and work processes	Identify own role and responsibilities within team	Communicate and co-operate with team members
	Practice problem solving within the team		
Apply basic IT skills SEIP-SBD-ENI-05-G	Identify and use most commonly used IT tools	Understand use of computer	Work with word processing application
	Work with spreadsheets	Access email and search the internet	

B. Sector-specific (common) Competencies (36 hours)

Explore history of Shipbuilding Sector SEIP-SBD-ENI-01-S	Examine the background of shipbuilding sector	Identify and locate main machines on a ship
Use hand and power tools SEIP-SBD-ENI-02-S	Identify and inspect hand and power tools	Use hand tools properly and safely Operate power tools properly and safely
	Clean and maintain hand and power tools	

C. Occupation-specific (core) Competencies (280 hours)

Understand basic electrical works SEIP-SBD-ENI-01-O	Identify roles and responsibilities	Identify basic principles of electricity	Set-up electrical circuits
Apply knowledge of electrical and navigational equipment installation SEIP-SBD-ENI-02-O	Explain electrical and navigational equipment installation	Identify electrical equipment	Identify navigational equipment
Carry out cable laying for electrical equipment SEIP-SBD-ENI-03-O	Identify cables and joints	Set and lay cables on cable tray	Perform panel board connection
	Perform accommodation wiring	Perform final connections	
Carry out cable laying for navigational equipment SEIP-SBD-ENI-04-O	Perform cable laying	Perform final connections	

Units and Elements Table

A. Generic (basic) Competencies

Code	Unit of Competency	Elements of Competency	Duration (hours)
SEIP-SBD-ENI-01-G	Use basic mathematical concepts	**1.** Identify calculation requirements in the workplace. **2.** Select appropriate mathematical methods/concepts for the calculation. **3.** Use tools and instruments to perform calculations.	4
SEIP-SBD-ENI-02-G	Apply occupational health and safety (OHS) practice in the workplace	**1.** Identify OHS policies and procedures. **2.** Apply personal health and safety practices. **3.** Report hazards and risks. **4.** Respond to emergencies.	8
SEIP-SBD-ENI-03-G	Carry out workplace interaction	**1.** Interpret workplace communication and etiquette. **2.** Read and understand workplace documents. **3.** Participate in workplace meetings and discussions. **4.** Practice professional ethics at work.	8
SEIP-SBD-ENI-04-G	Operate in a team environment	**1.** Identify team goals and work processes. **2.** Identify own role and responsibilities within team. **3.** Communicate and co-operate with team members. **4.** Practice problem solving within the team.	8
SEIP-SBD-ENI-05-G	Apply basic IT skills	**1.** Identify and use most commonly used IT tools. **2.** Understand use of computer. **3.** Work with word processing application. **4.** Work with spreadsheets. **5.** Access email and search the internet.	16
Total Hours			**44**

B. Sector-specific (common) Competencies

Code	Unit of Competency	Elements of Competency	Duration (hours)
SEIP-SBD-ENI-01-S	Explore the history of Shipbuilding Sector	1. Examine the background of shipbuilding sector. 2. Identify and locate main machines on a ship.	12
SEIP-SBD-ENI-02-S	Use hand and power tools	1. Identify and inspect hand and power tools. 2. Use hand tools properly and safely. 3. Operate power tools properly and safely. 4. Clean and maintain hand and power tools.	24
Total Hours			**36**

C. Occupation-specific (core) Competencies

Code	Unit of Competency	Elements of Competency	Duration (hours)
SEIP-SBD-ENI-01-O	Understand basic electrical works	1. Roles and responsibilities of electrician are identified. 2. Identify basic principles of electricity. 3. Set-up electrical circuits.	56
SEIP-SBD-ENI-02-O	Apply knowledge of electrical and navigational equipment installation	1. Explain electrical and navigational equipment installation. 2. Identify electrical equipment. 3. Identify navigational equipment.	24
SEIP-SBD-ENI-03-O	Carry out cable laying for electrical equipment	1. Identify cables and joints. 2. Set and lay cables on cable tray. 3. Perform panel board connection. 4. Perform accommodation wiring. 5. Perform final connections.	120
SEIP-SBD-ENI-04-O	Carry out cable laying for navigational equipment	1. Perform cable laying. 2. Perform final connections.	80
Total Hours			**280**

Competency Standard

A: Generic (basic) Competencies

Unit of Competency:	Nominal Duration:	Unit Code:
Use basic mathematical concepts	4 hours	SEIP-SBD-ENI-01-G

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to perform computations using basic mathematical concepts in the workplace. It specifically includes identifying general calculation requirements, selecting appropriate mathematical method/concept, and forming and solving mathematical problems in the workplace using appropriate tools and instruments.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify calculation requirements in the workplace	**1.1.** **Calculation requirements** are identified from **workplace information.** **1.2.** Mathematical problems are constructed from workplace information.
2. Select appropriate mathematical methods/concepts for the calculation	**2.1.** **Appropriate method** is selected to carry out calculation requirements. **2.2.** Constructed mathematical problems are solved with appropriate method.
3. Use tools and instruments to perform calculations	**3.1.** **Tools and instruments** required for computation are identified. **3.2.** Calculation is performed using appropriate tools and instruments accurately.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Calculation requirements	**1.1.** Unit **1.2.** Area **1.3.** Height/ length/ breadth/ thickness **1.4.** Diameter **1.5.** Weight **1.6.** Capacity **1.7.** Time **1.8.** Temperature **1.9.** Material/data usage **1.10.** Speed **1.11.** Costing **1.12.** Density

Variable	Range *(may include but not limited to)*
2. Workplace information	**2.1.** Floor environment **2.2.** Design sheet **2.3.** Specification sheet **2.4.** Working chart/drawing **2.5.** Standard operating procedure (SOP) **2.6.** Job order
3. Appropriate method	**3.1.** Addition **3.2.** Subtraction **3.3.** Division **3.4.** Multiplication **3.5.** Conversion **3.6.** Percentage and ratio calculation **3.7.** Simple equation
4. Tools and instruments	**4.1.** Calculator **4.2.** Cell phone **4.3.** Computer **4.4.** Ruler

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Numerical concepts **1.2.** Basic mathematical methods such as addition, subtraction, multiplication, division and percentage **1.3.** Mathematical language, symbols and terminology **1.1.** Measuring units
2. Underpinning skills	**2.1.** Constructing simple problems from workplace information **2.2.** Solving problems using appropriate method, tools and instruments **2.3.** Using appropriate tools and instruments
3. Underpinning attitudes	**3.1.** Prompt in carrying out activities **3.2.** Tidy and punctual **3.3.** Respectful of peers, subordinates and seniors in the workplace **3.4.** Safely use tools and equipment **3.1** Sincere and honest concerning duties

Curricula Content Guide	
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Calculator **4.3.** Cell phone **4.4.** Computer/laptop/notebook **4.5.** Measuring tape **4.6.** Ruler **4.7.** Projector **4.8.** Stationary **4.9.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified calculation requirements from workplace information **1.2.** selected appropriate method to carry out the calculation requirements **1.3.** completed calculations using appropriate tools and instruments
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency:	Nominal Duration:	Unit Code:
Apply occupational health and safety (OHS) practice in the workplace	8 hours	SEIP-SBD-ENI-02-G

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to apply occupational health and safety (OHS) practices in the workplace. It specifically includes identifying OHS policies and procedures, applying personal health and safety practices, reporting hazards and risks, and responding to emergencies.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify OHS policies and procedures	**1.1.** **OHS policies** and safe operating procedures are interpreted. **1.2.** Safety signs and symbols are identified and followed. **1.3.** Response, evacuation procedures and other contingency measures are interpreted correctly.
2. Apply personal health and safety practices	**2.1.** OHS policies and procedures are applied in the workplace including personal protective equipment (PPE). **2.2.** Common health issues are recognised. **2.3.** Common safety issues are identified.
3. Report hazards and risks	**3.1.** Hazards and risks are identified. **3.2.** Hazards and risks assessment and controls are interpreted.
4. Respond to emergencies	**4.1.** Respond to alarms and warning devices. **4.2.** **Emergency response plans and procedures** are responded to. **4.3.** **First aid procedures** during emergency situations are identified.

Range of Variables

Variable	Range *(may include but not limited to)*
1. OHS policies	**1.1.** Organisational OHS polices **1.2.** International OHS requirements **1.3.** Fire safety rules and regulations
2. Emergency response plans and procedures	**2.1.** Firefighting procedures **2.2.** Earthquake response procedures **2.3.** Emergency response plans and procedures **2.4.** Medical and first aid

Variable	Range *(may include but not limited to)*
3. First aid procedure	**3.1.** Washing of open wound **3.2.** Washing chemically infected area **3.3.** Applying bandage **3.4.** Taking appropriate medicine
4. Personal protective equipment	**4.1.** Safety glasses **4.2.** Ear plugs **4.3.** Gloves **4.4.** Apron **4.5.** Helmet **4.6.** Mask **4.7.** Safety shoes

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Workplace OHS policies and procedures **1.2.** Work safety procedures **1.3.** Emergency response procedures: **1.3.1.** Firefighting **1.3.2.** Earthquake response **1.3.3.** Accident response **1.4.** Types of hazards (biological, chemical and physical) and their effects **1.5.** OHS awareness **1.6.** Personal protective equipment (PPE)
2. Underpinning skills	**2.1.** Identifying OHS policies and procedures **2.2.** Applying personal health and safety practices **2.3.** Reporting hazards and risks **2.4.** Responding to emergencies
3. Underpinning attitudes	**3.1.** Committed to occupational health and safety practices **3.2.** Communicates well with peers, subordinates and seniors in workplace **3.3.** Prompt in carrying out activities **3.4.** Tidy and punctual **3.5.** Sincere and honest concerning duties **3.6.** Responsible during emergencies

Curricula Content Guide	
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Personal protective equipment (PPE) **4.3.** Firefighting equipment **4.4.** Emergency response manual **4.5.** First aid kits **4.6.** Stationary **4.7.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified OHS policies and procedures **1.2.** applied personal health and safety practices (including PPE) **1.3.** reported hazards and risks **1.4.** responded to emergencies
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency:	Nominal Duration:	Unit Code:
Carry out workplace interaction	8 hours	SEIP-SBD-ENI-03-G

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to carry out workplace interaction. It specifically includes workplace communication, etiquette, understanding workplace documents, workplace meetings and discussions, and professional ethics at work.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Interpret workplace communication and etiquette	**1.1.** Workplace codes of conduct are interpreted as per organisational guidelines. **1.2.** Appropriate lines of communication are maintained with supervisors and colleagues. **1.3.** Workplace interactions are conducted in a **courteous manner** to gather and convey information. **1.4.** **Workplace procedures and matters** are comprehended.
2. Read and understand workplace documents	**2.1.** Workplace documents are interpreted correctly. **2.2.** Visual information/symbols/signage are understood correctly and followed. **2.3.** Specific and relevant information are accessed from **appropriate sources.** **2.4.** Appropriate medium is used to transfer information and ideas.
3. Participate in workplace meetings and discussions	**3.1.** Team meetings are attended on time. **3.2.** Meeting procedures and etiquette are followed. **3.3.** Active participation is ensured, opinions are expressed and heard. **3.4.** Inputs are provided and interpreted in line with the meeting purpose.
4. Practice professional ethics at work	**4.1.** Responsibilities as a team member are performed. **4.2.** Tasks are performed in accordance with workplace procedures. **4.3.** Confidentiality is maintained. **4.4.** Inappropriate and conflicting situations are avoided.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Courteous manner	**1.1.** Effective questioning **1.2.** Active listening **1.3.** Speaking skills **1.4.** Writing skill **1.5.** Email etiquette

Variable	Range *(may include but not limited to)*
2. Workplace procedures and matters	**2.1.** Notes **2.2.** Arranging a meeting **2.3.** Agenda **2.4.** Simple reports such as progress and incident reports **2.5.** Job sheets **2.6.** Operational manuals **2.7.** Brochures and promotional material **2.8.** Visual and graphic materials **2.9.** Standards **2.10.** OHS information **2.11.** Signs
3. Appropriate sources	**3.1.** Human Resources (HR) Department **3.2.** Managers **3.3.** Supervisors **3.4.** Management Information System (MIS)

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Workplace communication and etiquette **1.2.** Workplace documents, signs and symbols **1.3.** Meeting procedure and etiquette **1.4.** Professional ethics
2. Underpinning skills	**2.1.** Demonstrating workplace communication and etiquette **2.2.** Interpreting workplace instructions and symbols **2.3.** Demonstrating active participation in workplace meeting **2.4.** Applying professional ethics at work
3. Underpinning attitudes	**3.1.** Prompt in carrying out activities **3.2.** Tidy and punctual **3.3.** Respectful of peers, subordinates and seniors in the workplace **3.4.** Concerned about the work environment **3.5.** Sincere and honest concerning duties

Curricula Content Guide	
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Workplace procedures **4.3.** Standard operating procedure **4.4.** Workplace documents, signs and symbols **4.5.** Codes of conduct **4.6.** Projector **4.7.** Stationary **4.8.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** interpreted workplace communication and etiquette **1.2.** interpreted workplace instructions and symbols **1.3.** performed active participation in workplace meetings
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency:	Nominal Duration:	Unit Code:
Operate in a team environment	8 hours	SEIP-SBD-ENI-04-G

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to operate in a team environment. It specifically includes team goals and work processes, roles and responsibilities, team communication and problem solving within the team.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify team goals and work processes	**1.1.** Roles and objectives of the team are identified and interpreted. **1.2.** Roles and responsibilities of team members are identified and interpreted.
2. Identify own role and responsibilities within team	**2.1.** Personal role and responsibilities are identified within the team environment. **2.2.** Reporting relationships are interpreted within team and external to team.
3. Communicate and co-operate with team members	**3.1.** Other teammates' tasks are identified and support provided when requested. **3.2.** The team is encouraged through **sharing information** or expertise, working together to solve problems, and putting team success first. **3.3.** Views and opinions of other team members are interpreted and respected.
4. Practice problem solving within the team	**4.1.** Problems faced at the individual and team level are identified and showed insight into the root-causes of the problems. **4.2.** A range of solutions and courses of action are identified together with benefits, costs, and risks associated with each. **4.3.** The good ideas of others to help develop solutions are recognised and advice sought from those who have solved similar problems. **4.4.** It is looked beyond the obvious and not stopped at the first answers.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Sharing information	**1.1.** Agenda **1.2.** Minutes **1.3.** Progress and incident reports **1.4.** Operational manuals **1.5.** Visual and graphic materials **1.6.** Emails and SMS **1.7.** Phone directory **1.8.** Policy, procedure and standards **1.9.** OHS information

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Team goals and work processes **1.2.** Roles and responsibilities **1.3.** Finding problems and solving them
2. Underpinning skills	**2.1.** Identifying own role and responsibilities within team **2.2.** Communicating and co-operating with team members **2.3.** Demonstrating problem solving within the team
3. Underpinning attitudes	**3.1.** Active on teamwork **3.2.** Prompt in carrying out activities **3.3.** Tidy and punctual **3.4.** Respectful of peers, subordinates and seniors in the workplace **3.5.** Sincere and honest concerning duties
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Projector **4.3.** Stationary **4.4.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified own role and responsibilities within team **1.2.** communicated and co-operated with team members **1.3.** demonstrated problem solving within the team

Assessment Evidence Guide	
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency: Apply basic IT skills	Nominal Duration: 16 hours	Unit Code: SEIP-SBD-ENI-05-G

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to apply basic IT skills in the workplace. It specifically includes identifying common IT tools, using computer, using word processing and spreadsheet applications, emailing and searching on internet.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify and use most commonly used IT tools	**1.1.** History of information technology (IT) is identified and summarised. **1.2.** Commonly used **IT tools** are identified and described.
2. Understand use of computer	**2.1.** Basic parts of a computer are identified. **2.2.** Turning on and off technique of a computer is performed. **2.3.** Working environment, functions and features of operating system is interpreted. **2.4.** Simple trouble-shooting techniques are applied.
3. Work with word processing application	**3.1.** Word processing application appropriate to perform activity is operated. **3.2.** Basic typing technique to document is applied. **3.3.** Word processing techniques to document are employed. **3.4.** Personal CV writing using suitable word processing techniques is practiced. **3.5.** Saving and retrieving technique of a document is used.
4. Work with spreadsheets	**4.1.** Spreadsheet working environment, functions and features are identified and interpreted. **4.2.** Data entry on spreadsheet appropriate to perform activity is performed. **4.3.** **Data manipulation techniques** to spreadsheet document are applied. **4.4.** Spreadsheet document is created and saved.
5. Access email and search the internet	**5.1.** Use of email account in online environment is explained. **5.2.** Writing and sending of workplace emails is completed. **5.3.** Different **browsers** to work online are identified and selected. **5.4.** Browse different web portals and apply proper search techniques.

Range of Variables

Variable	Range *(may include but not limited to)*
1. IT tools	**1.1.** Cell phone **1.2.** Tablets **1.3.** Computers, laptops, notebooks **1.4.** Internet **1.5.** Software **1.6.** Satellite
2. Data manipulation techniques	**2.1.** Sum **2.2.** Average **2.3.** Count **2.4.** Max **2.5.** Min **2.6.** If **2.7.** Sort **2.8.** Fill **2.9.** Header **2.10.** Footer **2.11.** Print
3. Browsers	**3.1.** Internet Explorer **3.2.** Firefox **3.3.** Google Chrome **3.4.** Opera **3.5.** Safari **3.6.** Omni Web **3.7.** Microsoft Edge

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** IT and IT tools **1.2.** Computer trouble-shooting **1.3.** Techniques to access internet
2. Underpinning skills	**2.1.** Demonstrating simple trouble-shooting with computer **2.2.** Demonstrating typing on word processing software **2.3.** Demonstrating data entry with spreadsheet **2.4.** Opening email account and using it for different purposes

Curricula Content Guide	
3. Underpinning attitudes	**3.1.** Active on teamwork **3.2.** Prompt in carrying out activities **3.3.** Tidy and punctual **3.4.** Respectful of peers, subordinates and seniors in the workplace **3.5.** Sincere and honest concerning duties
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** IT tools **4.3.** Computer/Laptop **4.4.** Word processing software **4.5.** Internet connection **4.6.** Stationary **4.7.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified commonly used IT tools **1.2.** performed simple trouble-shooting with computer **1.3.** performed typing on word processing software, saved and retrieved documents **1.4.** performed data entry with spreadsheet **1.5.** used email account for different online purposes
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

B: Sector-specific (common) Competencies

Unit of Competency:	Nominal Duration:	Unit Code:
Explore the history of Shipbuilding Sector	12 hours	SEIP-SBD-ENI-01-S

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to understand the shipbuilding sector in Bangladesh. It specifically includes examining the history of shipbuilding sector, and identifying and locating main machines on a ship.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Examine the background of shipbuilding sector	**1.1.** Historical background of shipbuilding sector is examined and described. **1.2.** Drawings and plans of ships layout are interpreted. **1.3.** **Key parts** of ship are clearly identified. **1.4.** Standard maritime guidelines, codes, conventions and classifications are identified and interpreted.
2. Identify and locate main machines on a ship	**2.1.** **Main machines** installed on a ship are identified and located. **2.2.** Function of main machines are briefly described.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Key parts	**1.1.** Bridge **1.2.** Hull **1.3.** Engine room **1.4.** Cargo hold **1.5.** Deep tank **1.6.** Double bottom tank **1.7.** Bulbous bow **1.8.** Forecastle **1.9.** Poop **1.10.** Weather deck **1.11.** Tween deck **1.12.** Bulkhead **1.13.** Collision bulkhead

Variable	Range *(may include but not limited to)*
2. Main machines	**2.1.** Diesel engine **2.2.** Panel board **2.3.** Generator **2.4.** Transformer **2.5.** Air compressor **2.6.** Life boat **2.7.** Heat exchange **2.8.** Motor **2.9.** Radar **2.10.** Echo sounder **2.11.** Gyro compass **2.12.** Magnetic compass **2.13.** Steam boiler **2.14.** Steering gear **2.15.** Pumps **2.16.** Winch **2.17.** Crane **2.18.** Air conditioner **2.19.** Refrigeration plant **2.20.** Purifier **2.21.** Laundry unit

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** History of shipbuilding sector **1.2.** Key parts of ship **1.3.** Main machines installed on ship **1.4.** Maritime guidelines, codes, conventions and classifications
2. Underpinning skills	**2.1.** Describing the history of shipbuilding sector **2.2.** Identifying key parts of ship from drawings and plans **2.3.** Identifying and locating main machines installed on ship
3. Underpinning attitudes	**3.1.** Eager to learn **3.2.** Considerate of personal grooming **3.3.** Patient and attentive **3.4.** Active on team work **3.5.** Tidy and punctual **3.6.** Sincere and honest concerning duties

Curricula Content Guide	
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Map/globe **4.3.** Drawings and plans **4.4.** Projector **4.5.** Stationary **4.6.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** illustrated history of shipbuilding sector **1.2.** identified key parts of ship **1.3.** identified and located main machines installed on ship
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency:	Nominal Duration:	Unit Code:
Use hand and power tools	24 hours	SEIP-SBD-ENI-02-S

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to use hand and power tools in the workplace. It specifically includes identifying and inspecting hand and power tools for usability, using and operating tools properly and safely, and cleaning and maintaining hand and power tools after use.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify and inspect hand and power tools	**1.1.** Appropriate hand and power tools are identified. **1.2.** Application of hand and power tools is recognised. **1.3.** Usability of hand and power tools is checked and verified.
1. Use hand tools properly and safely	**2.1.** Appropriate **hand tools** are selected. **2.2.** Safety precautions are ensured before using hand tools. **2.3.** Unsafe or faulty hand tools are identified and marked for repair. **2.4.** **Measuring tools** are checked and calibrated before use. **2.5.** Use hand tools properly and safely to perform work activity.
3. Operate power tools properly and safely	**3.1.** Appropriate **power tools** are selected. **3.2.** Power supply outlet and electrical cord are inspected and confirmed safe for use in accordance with established workplace safety requirements. **3.3.** Safety precautions are ensured before using power tools in accordance with manufacturer's operating specification. **3.4.** Proper sequence of operation applied for using power tools. **3.5.** Unsafe or faulty power tools are identified and marked for repair. **3.6.** Operate power tools properly and safely to perform work activity.
4. Clean and maintain hand and power tools	**4.1.** Dust and foreign matter is removed from hand and power tools in accordance to workplace standards. **4.2.** Condition of hand and power tools is checked after use and reported. **4.3.** Appropriate lubricant is applied after use and prior to storage. **4.4.** **Measuring tools** are checked and calibrated after use. **4.5.** Defective hand and power tools are inspected and repaired or replaced. **4.6.** Hand and power tools are stored and secured in accordance with workplace requirements.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Hand tools	**1.1.** Hammer **1.2.** Bench vice **1.3.** Files **1.4.** Punches **1.5.** Chisels **1.6.** Wrenches **1.7.** Pliers **1.8.** Scriber **1.9.** Scraper **1.10.** Screwdrivers **1.11.** Dividers **1.12.** Surface plate **1.13.** Gauge **1.14.** Tap sets **1.15.** Die sets **1.16.** Hacksaw **1.17.** Socket spanners **1.18.** Spanners **1.19.** Vice grip **1.20.** Wire cutters **1.21.** Drills **1.22.** Drill buts **1.23.** Grinder **1.24.** Clamps **1.25.** Jacks
2. Power tools	**2.1.** Drills **2.2.** Rivet gun **2.3.** Grinders **2.4.** Pneumatic wrenches **2.5.** Press machine **2.6.** Cutting **2.7.** Saws **2.8.** Soldering iron

Variable	Range *(may include but not limited to)*
3. Measuring tools	**3.1.** Micrometre **3.2.** Testers **3.3.** Megger **3.4.** Measuring tape **3.5.** Hose level **3.6.** Water level **3.7.** Callipers **3.8.** Steel rule **3.9.** Metre rule **3.10.** Spirit level **3.11.** Protractor **3.12.** Tri-square **3.13.** Gauges

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Information on types of hand and power tools, their functions and use **1.2.** Procedures for safely using hand and power tools
2. Underpinning skills	**2.1.** Identifying hand, power and measuring tools **2.2.** Following safety precautions when using hand, power and measuring tools **2.3.** Using hand and measuring tools correctly and safely in accordance with manufacturer's operating specification **2.4.** Operating power tools correctly and safely in accordance with manufacturer's operating specification **2.5.** Cleaning and maintaining hand and power tools after use **2.6.** Applying appropriate lubricant on hand and power tools after use and prior to storing
3. Underpinning attitudes	**3.1.** Commitment to occupational health and safety **3.2.** Promptness in carrying out activities **3.3.** Sincere and honest to duties **3.4.** Environmental concerns **3.5.** Tidiness and timeliness **3.6.** Concerned for proper use of tools

Curricula Content Guide	
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Hand tools **4.3.** Power tools **4.4.** Measuring tools **4.5.** Projector **4.6.** Stationary **4.7.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified and selected appropriate hand and power tools for work to be performed **1.2.** identified and used measuring and testing tools appropriate to work activity **1.3.** followed safety precautions when using hand and power tools **1.4.** operated power tools safely and pursuant to manufacturer's operating specification **1.5.** performed cleaning and maintenance of hand and power tools after use and prior to storing
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

C: Occupation-specific (core) Competencies

Unit of Competency: Understand basic electrical works	**Nominal Duration:** 56 hours	**Unit Code:** SEIP-SBD-ENI-01-O

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to understand basic electrical works. It specifically includes identifying the roles and responsibilities of an electrician, identifying the basic principles of electricity, and setting-up electrical circuits.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify roles and responsibilities	**1.1.** **Roles and responsibilities** of electrician are identified. **1.2.** Occupational hierarchy in the workplace is explained.
2. Identify basic principles of electricity	**2.1.** **Fundamental principles** of electricity are identified and defined. **2.2.** **Technical terms** are identified and interpreted. **2.3.** Occupational health and safety measures specific to working with electricity are identified and demonstrated.
3. Set-up electrical circuits	**3.1.** Wiring and **electrical circuit** are identified and defined. **3.2.** Cable joints, soldering and tapping are identified. **3.3.** **Tools, equipment and materials** required for circuit construction identified. **3.4.** Electrical circuits are set-up as per job requirement and in accordance with OHS practice.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Roles and responsibilities	**1.1.** Perform electrical connections **1.2.** Follow rules and regulations of ISO, classification and maritime conventions under supervision **1.3.** Laying cable **1.4.** Following instructions
2. Fundamental principles	**2.1.** Ohm's Law **2.2.** Law of Conductivity **2.3.** Principles and Theory of AC Circuit **2.4.** Principles and Theory of DC Circuit **2.5.** Series and Parallel Connections

Variable	Range *(may include but not limited to)*
3. Technical terms	**3.1.** Current **3.2.** Voltage **3.3.** Resistance **3.4.** Capacitance **3.5.** Conductor **3.6.** Semi-conductor **3.7.** Insulator **3.8.** Power units **3.9.** Energy units **3.10.** Electro-magnetic field **3.11.** Magnetic field
4. Electrical circuit	**4.1.** Series **4.2.** Parallel **4.3.** Switch control unit **4.4.** SPST **4.5.** SPDT **4.6.** DPST **4.7.** DPDT

Variable	Range *(may include but not limited to)*
5. Tools and equipment	**5.1.** Tools and equipment: **5.1.1.** Screwdrivers **5.1.2.** Files **5.1.3.** Hammers **5.1.4.** Electrical knife **5.1.5.** Wire stripper **5.1.6.** Tri-square **5.1.7.** Pocket tape **5.1.8.** Adjustable wrench **5.1.9.** Chisels **5.1.10.** Hacksaw **5.1.11.** Pliers **5.1.12.** Oscilloscope **5.2.** Materials: **5.2.1.** Cables, lugs and ties **5.2.2.** VIR **5.2.3.** Tape (electrical, insulating, masking, PIB) **5.2.4.** Insulating clip **5.2.5.** Cooper sheet and plate **5.2.6.** GI wire **5.2.7.** Brackets and boards **5.2.8.** Elbow and bend **5.2.9.** PVC circular box **5.2.10.** Saddle **5.2.11.** Royal plug **5.2.12.** Screws **5.2.13.** Flexible conduit **5.2.14.** Electrical soldering lead **5.2.15.** Bare cooper conductor **5.2.16.** Wire gauge

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Occupational health and safety (OHS) practice **1.2.** Fundamental principles of electricity **1.3.** Technical terms and their meaning **1.4.** Circuit design and development
2. Underpinning skills	**2.1.** Identifying and explaining principles of electricity **2.2.** Interpreting common technical terms **2.3.** Carrying out set-up of electrical circuits

Curricula Content Guide	
3. Underpinning attitudes	**3.1.** Commitment to occupational health and safety **3.2.** Promptness in carrying out activities **3.3.** Sincere and honest to duties **3.4.** Environmental concerns **3.5.** Tidiness and timeliness **3.6.** Concerned for proper use of tools
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Personal protective equipment (PPE) **4.3.** Tools and equipment **4.4.** Materials **4.5.** Electrical diagrams **4.6.** Projector **4.7.** Stationary **4.8.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified and explained main principles of electricity **1.2.** interpreted common technical terms **1.3.** carried out set-up of electrical circuit
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency: Apply knowledge of electrical and navigational equipment installation	Nominal Duration: 24 hours	Unit Code: SEIP-SBD-ENI-02-O

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to apply knowledge of electrical and navigational equipment installation. It specifically includes explaining electrical and navigational equipment installation, and identifying electrical and navigation equipment.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Explain electrical and navigational equipment installation	**1.1.** Electrical and navigational equipment installation process is explained. **1.2.** Electrical diagrams for installation of equipment are identified and interpreted.
2. Identify electrical equipment	**2.1.** **Electrical equipment** is identified and located. **2.2.** Key functions of electrical equipment is described.
3. Identify navigational equipment	**3.1.** **Navigational equipment** are identified and located. **3.2.** Key functions of navigational equipment is described.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Electrical equipment	**1.1.** Generator **1.2.** Motor **1.3.** Transformer **1.4.** Refrigeration **1.5.** Washing machine **1.6.** Electrical heater

Variable	Range *(may include but not limited to)*
2. Navigational equipment	**2.1.** Radar **2.2.** Gyro compass **2.3.** Navigation lights **2.4.** Echo sounder **2.5.** Magnetic compass **2.6.** Auto pilot **2.7.** ECDIS **2.8.** AIS **2.9.** GPS recorder **2.10.** VHF antenna **2.11.** Ship whistle **2.12.** Rudder angle indicator **2.13.** Voyage data recorder

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Electrical and navigational equipment installation process **1.2.** Electrical diagrams used in installation **1.3.** Key electrical and navigational equipment
2. Underpinning skills	**2.1.** Explaining electrical and navigational equipment installation process **2.2.** Interpreting electrical diagrams **2.3.** Identifying key electrical and navigational equipment
3. Underpinning attitudes	**3.1.** Commitment to occupational health and safety **3.2.** Promptness in carrying out activities **3.3.** Sincere and honest to duties **3.4.** Environmental concerns **3.5.** Tidiness and timeliness **3.6.** Concerned for proper use of tools
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Personal protective equipment (PPE) **4.3.** Electrical diagrams **4.4.** Projector **4.5.** Stationary **4.6.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** explained electrical and navigation equipment installation process **1.2.** identified and interpreted electrical diagrams **1.3.** identified and located key electrical and navigational equipment
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency: Carry out cable laying for electrical equipment	Nominal Duration: 120 hours	Unit Code: SEIP-SBD-ENI-03-O

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to carry out cable laying for electrical equipment. It specifically includes identifying cables and joints, setting and laying cables in cable tray, performing panel board connection, accommodation wiring, and final connections.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Identify cables and joints	**1.1.** Types of cables and **joints** are identified. **1.2.** Soldering points are identified. **1.3.** Soldering and tapping is carried out.
2. Set and lay cables on cable tray	**2.1.** Diagram for cable tray is read and interpreted. **2.2.** Signs, symbols and data for electrical work is identified. **2.3.** Tools and equipment are identified and selected as per job requirement. **2.4.** Location of cable tray is identified. **2.5.** Laying of cable is carried out in accordance with OHS practice.
3. Perform panel board connection	**3.1.** Panel board diagram is read and interpreted. **3.2.** Main **switch board elements** are identified. **3.3.** Switch board is set following directions of switch board drawing.
4. Perform accommodation wiring	**4.1.** Electrical diagram for **accommodation wiring** is read and interpreted **4.2.** Estimation of materials is carried out as per job requirements **4.3.** Single and 3 Phase **connections** are carried out. **4.4.** Pipe and plate earthings are carried out and tested. **4.5.** **Wiring tests** are carried out to establish possible faults.
5. Perform final connections	**5.1.** Connection wiring for electrical equipment is prepared as per job requirement. **5.2.** **Control** of 3 Phase induction motor by DOL starter is carried out. **5.3.** Control of 3 Phase motor by forward reverse control is carried out. **5.4.** Control by star-delta starter is carried out. **5.5.** Step down and step up transformers are identified.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Joints	**1.1.** Simple **1.2.** Simple tee **1.3.** Pig-tail **1.4.** Duplex **1.5.** Duplex tee
2. Switch board elements	**2.1.** Line-in from generator **2.2.** Line-in from emergency generator **2.3.** Switches **2.4.** Circuit breaker **2.5.** Change-over switch **2.6.** Line-out to section board **2.7.** Meters **2.8.** Rectifier unit **2.9.** Transformers
3. Accommodation wiring	**3.1.** Lighting **3.2.** Fan **3.3.** Calling bell **3.4.** Refrigeration **3.5.** Air-conditioning **3.6.** Television **3.7.** Heater **3.8.** Gezer
4. Connections	**4.1.** Star **4.2.** Delta **4.3.** Reverse
5. Wiring tests	**5.1.** Continuity **5.2.** Short circuit **5.3.** Open circuit **5.4.** Series
6. Control	**6.1.** Forward-reverse **6.2.** Star-delta **6.3.** Automatic star-delta

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Types of cables and joints **1.2.** Soldering points and soldering technique **1.3.** Electrical diagrams
2. Underpinning skills	**2.1.** Identifying different types of cables and joints **2.2.** Carrying out different types of connections **2.3.** Carrying out earthing connection **2.4.** Conducting wiring tests to establish faults
3. Underpinning attitudes	**3.1.** Commitment to occupational health and safety **3.2.** Promptness in carrying out activities **3.3.** Sincere and honest to duties **3.4.** Environmental concerns **3.5.** Tidiness and timeliness **3.6.** Concerned for proper use of tools
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Personal protective equipment (PPE) **4.3.** Tools and equipment **4.4.** Materials **4.5.** Electrical diagrams **4.6.** Projector **4.7.** Stationary **4.8.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified different types of cables and joints **1.2.** interpreted electrical diagrams **1.3.** carried out 3 Phase connections **1.4.** carried out star-delta connections **1.5.** carried out forward-reverse connections **1.6.** performed out 3 Phase induction motor control **1.7.** performed single phase capacitor motor with DOL starter **1.8.** conducted wiring testing

Assessment Evidence Guide	
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.

Unit of Competency: Carry out cable laying for navigational equipment	Nominal Duration: 80 hours	Unit Code: SEIP-SBD-ENI-04-O

Unit Descriptor:

This unit covers the skills, knowledge and attitudes required to carry out cable laying for navigational equipment. It specifically includes performing cable laying and performing final connections.

Elements and Performance Criteria

Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables.

Elements of Competency	Performance Criteria
1. Perform cable laying	**1.1.** Types of cables used for navigational equipment are identified. **1.2.** Location of navigational equipment is identified. **1.3.** Wiring of navigational equipment is carried out as per job requirement.
2. Perform final connections	**2.1.** Cable connections for **navigational equipment** are identified. **2.2.** Cable connections are carried out.

Range of Variables

Variable	Range *(may include but not limited to)*
1. Navigational equipment	**1.1.** Radar **1.2.** Gyro compass **1.3.** Navigation lights **1.4.** Echo sounder

Curricula Content Guide	
1. Underpinning knowledge	**1.1.** Types of cables **1.2.** Location of navigational equipment **1.3.** Cable connections **1.4.** Electrical drawings
2. Underpinning skills	**2.1.** Identifying different types of cables **2.2.** Identifying cable connections **2.3.** Carrying out wiring of navigational equipment **2.4.** Carrying out cable connections

Curricula Content Guide	
3. Underpinning attitudes	**3.1.** Commitment to occupational health and safety **3.2.** Promptness in carrying out activities **3.3.** Sincere and honest to duties **3.4.** Environmental concerns **3.5.** Tidiness and timeliness **3.6.** Concerned for proper use of tools
4. Resource implications	The following resources must be provided: **4.1.** Workplace (simulated or actual) **4.2.** Personal protective equipment (PPE) **4.3.** Tools and equipment **4.4.** Materials **4.5.** Electrical diagrams **4.6.** Projector **4.7.** Stationary **4.8.** Learning manual

Assessment Evidence Guide	
1. Critical aspects of competency	Assessment must evidence that the candidate: **1.1.** identified different types of cables **1.2.** located navigational equipment **1.3.** carried out wiring of navigational equipment **1.4.** carried out cable connections
2. Methods of assessment	Methods of assessment may include but is not limited to: **2.1.** written test **2.2.** oral test **2.3.** observation **2.4.** demonstration **2.5.** portfolio
3. Context of assessment	**3.1.** Competency assessment must be done in a training institute or an actual or simulated workplace after completion of this unit of competency. **3.2.** Assessment must be done by a suitably qualified/certified assessor.