COMPETENCY STANDARD

Consumer Electronics

Level: 1

(Light Engineering Sector)

Competency Standard Code: CS-LE-CE-L1-EN-V2

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

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

This document has been validated by NSDA in association with Light Engineering Sector, industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this standard for activities benefitting Bangladesh.

Introduction

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

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

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills Training. Trainees who successfully pass the assessment will receive a qualification in the Bangladesh National Qualification Framework (BNQF) and will be listed on the NSDA's online portal.

This competency standard is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements. A series of stakeholder consultations, workshops were held to develop this document.

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

Overview

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

The purpose of a competency standards is to:

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

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

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

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

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

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

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

Together, all the parts of a unit of competency:

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

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

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

Competency Standards for National Skill Certificate, Level-1 in Consumer Electronics in Light Engineering Sector

Level Descriptors of BNQF 1-6

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

List of Abbreviations

CS	Competency Standard
ISC	Industry Skills Council
NSDA	National Skills Development Authority
BNQF	Bangladesh National Qualifications Framework
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
SCVC	Standards and Curriculum Validation Committee
STP	Skills Training Provider
SOP	Standard Operating Procedure
UoC	Unit of Competency
ISO	International Organization for Standardization
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
SOP	Standard Operating Procedures

Approved by

38th Authority Meeting of NSDA

Held on 26.11.2024

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Competency Standards for National Skill Certificate, Level- 1 in Motorcycle Servicing in Light Engineering Sector

Course Structure

SL No	Unit code and Title		UOC Level	Nominal (hours)
Generic Units of Competencies				
1.	GU-01-L2-V1	Perform Computations Using Basic Mathematical Concepts	2	15
2.	GU-02-L2-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	2	15
Sub Total				**30**
Sector Specific Units of Competencies				
3.	SU-LE-02-L1-V1	Interpret drawing and specifications	1	20
4.	SU-LE-03-L1-V1	Identify hand tools and power tools	1	20
Sub Total				**40**
Occupation Specific Units of Competencies				
5.	OU-LE-CE-01-L1-V2	Apply fundamentals skills for electrical works	1	40
6.	OU-LE-CE-02-L1-V2	Use equipment and measuring instrument in the workplace	1	40
7.	OU-LE-CE-03-L1-V2	Identify and test electronics components	1	30
8.	OU-LE-CE-04-L1-V2	Assemble Electronics Devices and Components	1	50
9.	OU-LE-CE-05-L1-V2	Repair and service basic home appliances	1	80
10.	OU-LE-CE-06-L1-V2	Assemble and repair LED bulbs and LED tube light	1	20
11.	OU-LE-CE-07-L1-V2	Identify major parts of LED/smart TV	1	30
Sub Total				**290**
Total Duration				**360**

Units & Elements at Glance

Generic Competencies

Code	Unit of competency	Elements of competency	Duration (hours)
GU-01-L2-V1	Perform Computations Using Basic Mathematical Concepts	1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods for the calculation. 3. Use tool/instrument to perform calculations	15
GU-02-L2-V1	Apply Occupational Safety and Health (OSH) procedure In the Workplace	1. Identify OSH policies and procedures 2. Follow OSH procedure 3. Report hazards and risks 4. Respond to emergencies 5. Maintain personal well-being	15
		Total hours	**30**

Sector specific competencies

Code	Unit of competency	Elements of competency	Duration (hours)
SU-LE-02-L1-V1	Interpret Drawings and Specifications	1. Identify information from manuals 2. Identify drawings and specifications 3. Interpret drawings and specifications 4. Store manuals	20
SU-LE-03-L1-V1	Identify hand tools and power tools	1. Follow OSH (Occupational safety and health) practices 2. Prepare for using hand and power tools 3. Use hand tools 4. Use power tools 5. Clean and store hand and power tools	20
		Total hours	**40**

Occupation specific competencies

Code	Unit of competency	Elements of competency	Duration (hours)
OU-LE-CE-01-L1-V2	Apply basic concepts of electricity	1. Interpret electricity 2. Apply the basic concept of electrical parameters 3. Identify conductor, semiconductor and insulator. 4. Identify cables and wires 5. Perform connection of electrical circuits	**40**
OU-LE-CE-02-L1-V2	Use equipment and measuring instrument in the workplace	1. Follow OSH practices 2. Identify equipment and measuring instrument 3. Perform soldering 4. De-solder components 5. Use SMD rework station (Hot gun) 6. Prepare for measurement 7. Take measurement 8. Store the materials and clean the workplace	40
OU-LE-CE-03-L1-V2	Identify and Test Electronics Components	1. Prepare for test and measurement 2. Identify the components 3. Test components 4. Clean and store measuring and testing equipment	30
OU-LE-CE-04-L1-V2	Assemble Electronics Devices and Components	1. Prepare for assemble 2. Prepare circuit on breadboard 3. Mount and solder components 4. Identify and test SMD components 5. Install SMD components 6. Clean and store tools and equipment	50

OU-LE-CE-05-L1-V2	Repair and service basic home appliances	1. Prepare appliances, tools, equipment and workplace 2. Services Cooker (Rice, Carry. Induction, Infra-red) 3. Services Blender and Juicer 4. Service Microwave Oven 5. Service Electric Iron and Kettle 6. Service rechargeable fan 7. Clean and store tools and equipment	80
OU-LE-CE-06-L1-V2	Assemble and repair LED bulbs	1. Prepare for assemble and repair 2. Assemble LED bulb and tube light 3. Repair LED bulb and tube light 4. Clean and store tools and equipment	20
OU-LE-CE-07-L1-V2	Identify major parts of LED TV	1. Follow OSH Practice 2. Identify the sections 3. Identify the components 4. Clean tools and equipment	30
		Total Hours	**290**

Generic Units of Competencies

Unit Code and Title	**GU-01-L2-V1: Perform Computations Using Basic Mathematical Concepts**
Unit Descriptor	This unit of competency requires the knowledge, skills and attitude to perform computations using basic mathematical concepts in the workplace. It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical method/concept for the calculation and using appropriate instruments tools to perform calculation.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables Training Components
1. Identify calculation requirements in the workplace	1.1 Job requirements are identified 1.2 **Measurements** are selected in accordance with job requirement 1.3 Calculation requirements are identified from **workplace information**
2. Select appropriate mathematical methods for the calculation.	2.1 Mathematical methods are identified 2.2 **Appropriate method** is selected to carry out the calculation r equirements 2.3 Tolerance and clearance limits are identified and adjusted according to the job requirements
3. Use tool/instrument to perform calculations	3.1 Work instructions are confirmed and applied to the job in hand 3.2 Materials to be measured are identified as per job specification 3.3 Appropriate **tool/ instrument** is selected based on materials to be measured
Range of Variables	
Variable	**Range** (may include but not limited to)
1. Measurements	1.1 Length 1.2 Width 1.3 Weight 1.4 Tolerance
2. workplace information	2.1 Job Order 2.2 Design 2.3 Working drawing 2.4 Verbal instructions 2.5 Written Instruction
3. Appropriate method	3.1 Addition 3.2 Subtraction 3.3 Division

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

6. Methods of Assessment	6.1. Written Test 6.2. Demonstration 6.3. Oral Questioning 6.4. Portfolio
7. Context of Assessment	7.1. Competency assessment must be done in a NSDA accredited assessment center 7.2. Assessment should be done by an NSDA certified/ nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code and Title	**GU-02-L2-V1: Apply Occupational Safety and Health (OSH) Procedure in the Workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to apply occupational safety and health (OSH) procedure in the workplace. It specifically includes the task of identifying OSH policies and procedures, following OSH procedure, reporting hazards and risks, responding to emergencies and maintaining personal well-being.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures	1.1. **OSH policies** and **safe operating procedures** are accessed and stated 1.2. **Safety signs and symbols** are identified and followed 1.3. Emergency response, evacuation procedures and other contingency measures are determined according to workplace requirements
2. Follow OSH procedure	2.1 **Personal protective equipment (PPE)** is selected and collected as required 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OSH procedures and practices 2.3 A clear and tidy workplace is maintained as per workplace standard 2.4 PPE is maintained to keep them operational and compliant with OSH regulations
3. Report hazards and risks	3.1 **Hazards** and risks are identified, assessed and controlled 3.2 Incidents arising from hazards and risks are reported to designated authority
4. Respond to emergencies	4.1 Alarms and warning devices are responded 4.2 Workplace **emergency procedures** are followed 4.3 **Contingency measures** during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures 4.4 First aid procedures are applied during emergency situations
5. Maintain personal well-being	5.1 OSH policies and procedures are adhered to OSH awareness programs are participated in as per workplace guidelines and procedures.

	5.2 Corrective actions are implemented to correct unsafe condition in the workplace 5.3 **"Fit to work" records** are updated and maintained according to workplace requirements
Range of Variables	
Variables	**Range** (may include but not limited to):
1. OSH policies	1.1. Bangladesh standards for OSH 1.2. Fire Safety Rules and Regulations 1.3. Code of Practice 1.4. Industry Guidelines
2. Safe operating procedures	2.1 Orientation on emergency exits, fire extinguishers, fire escape, etc. 2.2 Emergency procedures 2.3 First Aid procedures 2.4 Tagging procedures 2.5 Use of PPE 2.6 Safety procedures for hazardous substances
3. Safety signs and symbols	3.1 Direction signs (exit, emergency exit, etc.) 3.2 First aid signs 3.3 Danger Tags 3.4 Hazard signs 3.5 Safety tags 3.6 Warning signs
4. Personal Protective Equipment (PPE)	4.1 Gas Mask 4.2 Gloves 4.3 Safety boots 4.4 Face mask 4.5 Overalls 4.6 Goggles and safety glasses 4.7 Sun block 4.8 Chemical/Gas detectors
5. Hazards	5.1 Chemical hazards 5.2 Biological hazards 5.3 Physical Hazards 5.4 Mechanical and Electrical Hazard 5.5 Mental hazard 5.6 Ergonomic hazard
6. Emergency procedures	6.1 Fire fighting 6.2 Earthquake 6.3 Medical and first aid 6.4 Evacuation

7. Contingency measures	7.1 Evacuation 7.2 Isolation 7.1 Decontamination
8. "Fit to Work" records	8.1 Medical Certificate every year 8.2 Accident reports, if any 8.3 Eye vision certificate
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 stated OSH policies and safe operating procedures 1.2 followed safety signs and symbols 1.3 used personal protective equipment (PPE) 1.4 maintained workplace clear and tidy 1.5 assessed and Controlled hazards 1.6 followed emergency procedures 1.7 followed contingency measures 1.8 implemented corrective actions
2. Underpinning knowledge	2.1 Define OSH 2.2 OSH Workplace Policies and Procedures 2.3 Work safety procedures 2.4 Emergency procedures 2.5 Hazard control procedure 2.6 Different types of hazards 2.7 PPE and there uses 2.8 Personal hygiene practices 2.9 OSH awareness
3. Underpinning skills	3.1 Accessing OSH policies 3.2 Using of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace
5. Resource implications	5.1 Workplace

	5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, equipment, materials and documentation required 5.4 OSH Policies and Procedures
6. Methods of assessment	Competency should be assessed by: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor

Accreditation Requirements

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

Sector Specific Units of Competencies

Unit Code and Title	**OU-LE-CE-01-L1-V1: Interpret Drawings and Specifications**
Unit Descriptor	This unit covers the knowledge, skill and attitude required in interpreting drawings and specifications. It includes the following steps: identifying information, identifying drawings and specifications, interpreting drawings and specifications.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Identify information from manuals	1.1 Appropriate manuals are identified and accessed. 1.2 Version and date of the manual are checked to ensure up-to-date specifications of tools, equipment, materials and procedures.
2. Identify drawings and specifications	2.1 Relevant **drawings** and **specifications** are correctly identified. 2.2 **Terms and abbreviations** are identified. 2.3 **Signs and symbols** are identified
3. Interpret drawings and specifications	3.1 Drawings are interpreted. 3.2 Specifications contained in the drawings are interpreted.
4. Store manuals	4.1. Documents are collected and packed. 4.2. Documents are stored to prevent damage, and ready access and updating of information when required.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Documents	1.1 Manufacturer's Specification Manual 1.2 Repair Manual 1.3 Maintenance Procedure Manual 1.4 Periodic Maintenance Manual 1.5 Quality Manual 1.6 Manual of Instruction
2. Drawings	2.1 Technical Drawings 2.2 Sketch
3. Specifications	3.1 Product specifications 3.2 Performance specifications 3.3 Method specifications
4. Instructions	4.1 Orders 4.2 Special Orders
5. Terms and abbreviations	Refers to all terms and abbreviations associated with the Consumer Electronics occupation
6. Signs and symbols	Include all signs and symbols associated with the Consumer Electronics occupation

Evidence Guide

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

1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 interpret drawings and specifications in consumer electronics appliances documents 1.2 satisfying the requirements mentioned in the Performance Criteria and Range of Variables
2. Underpinning knowledge	2.1 Types of appliances manuals 2.2 Identification of signs and symbols 2.3 Drawings and specifications 2.4 Terms and abbreviations used
3. Underpinning skills	3.1 Identifying appropriate manuals 3.2 Identifying drawings and specifications 3.3 Interpreting drawings and specifications 3.4 Storing manuals
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	5.1 Pens 5.2 Telephone 5.3 Computer 5.4 Writing materials 5.5 Online communication 5.6 Manuals 5.7 Drawings and Specifications
6.Methods of assessment	6.1 Workplace observation 6.2 Demonstration 6.3 Oral questioning 6.4 Written test 6.5 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor

Accreditation Requirements

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Unit Code and Title	**SU-LE-03-L1-V1: Identify hand tools and power tools**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to Identify tools, equipment and materials for mobile phone servicing. It specifically includes the tasks of following OSH practices, preparing for using hand and power tools, using hand and power tools.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables.
1. Follow OSH (Occupational safety and health) practices	1.1 Safe work practices followed 1.2 **Personal Protective Equipment** (PPE) is used. 1.3 **Hazards** at workplace is identified and eliminated;
2. Prepare for using hand and power tools	2.1 Job is identified on which the tools will be used; 2.2 **Hand tools** are identified; 2.3 **Power tools** are identified and selected conforming to the task; 2.4 Unsafe or faulty tools are identified and marked for repair /reject before using
3. Use hand tools	3.1 Hand tools are selected according to job requirements; 3.2 Hand tools are used according to the job requirement
4. Use power tools	4.1 Power tools are used for a specific **sequence of operations**; 4.2 Produce desired outcomes conforming to **job specifications**; 4.3 All safety requirements are compiled during and after use; 4.4 **Operational maintenance** of tools is undertaken according to standard procedures;
5. Clean and store hand and power tools	5.1 Hand and power tools are maintained and cleaned as per instruction manual 5.2 Hand and power tools are stored safely in appropriate location according to standard workshop procedures and manufacturers recommendations 5.3 Unsafe or faulty tools are identified and marked for repair after use according to current procedures

Range of Variables	
Variables	**Range** (may include but not limited to):
1. PPE.	1.1 Mask 1.2 Gloves 1.3 Safety shoes 1.4 Apron 1.5 Goggles and safety glasses 1.6 Smoke absorber 1.7 Helmet
2. Tools	**<u>Hand Tools</u>** 2.1 Adjustable wrench 2.2 Wire stripper 2.3 Bolt cutters 2.4 Mallet 2.5 Tweezer 2.6 C-clamp 2.7 Chisels: (a) Wooden, (b) Cold 2.8 Drill bits 2.9 Files: (a) Flat, (b) Round, (c) Half round 2.10 Hacksaw 2.11 Hammers: (a) Ball peen, (b) Claw 2.12 Hand drill 2.13 Measuring Tapes 2.14 Paint Brushes/Rollers 2.15 Pliers: (a) Combination Pliers, (b) cutting Pliers, (c) Diagonal cutting Pliers, (d) Long Nose Pliers, 2.16 Punches 2.17 Screwdrivers: (a) Star, (b) Flat, (c)Connecting 2.18 Try square 2.19 Neon tester 2.20 Wire cutters 2.21 Magnifying glass 2.22 S.W.G. 2.23 Set squares 2.24 Electrician knife 2.25 Ladder. **<u>Power Tools</u>** 2.26 Electric drill machine 2.27 Grinders 2.28 Soldering iron 2.29 Hot gun

3. Equipment	3.1 Meggar 3.2 Calculator 3.3 Multi meter/AVO meter 3.4 Clip On meter 3.5 Earth tester 3.6 Digital weight machine
4. Sequence of operations	4.1 Clamping, 4.2 Alignment and 4.3 Adjustment.
5. Job specifications	5.1 Finish size and 5.2 Shape
6. Operational maintenance	6.1 Cleaning 6.2 Simple tools repairs and 6.3 Adjustments using engineering principles.
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Followed OSH and used PPE 1.2 Followed proper using procedure of manual tools. 1.3 Used hand tools as per workplace requirement. 1.4 Maintained safety precaution for using hand & power tools. 1.5 Maintained operation procedure of power tools. 1.6 Used power tools as per workplace requirement
2. Underpinning knowledge	2.1 Safely use Hand tool & Power tools 2.2 Types of Hand & Power tools 2.3 Working Principles of Hands & Power tools: 2.4 Preventive Maintenance
3. Underpinning skills	3.1 Identifying appropriate Tools 3.2 Using hand & Power tools safely 3.3 Performing Preventive Maintenance 3.4 Practicing OHS 3.5 Following 5S of house keeping
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Tidiness and timeliness 4.6 Concerned for proper use of tools
5. Resource implications	The following resources must be provided 5.1 Workplace (simulated or actual) 5.2 Hand tools 5.3 Power tools

	5.4 Measuring tools 5.5 Projector 5.6 Stationary 5.7 Learning manual
6. Methods of assessment	Competency should be assessed by 6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any NSQF qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Occupation Specific Competencies

Unit Code and Title	**OU-LE-CE-01-L1-V2: Apply basic concepts of electricity**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to apply basic concepts of electricity according to workplace requirement. It specifically includes the tasks of applying electrical concept and working principles, interpreting principles of electricity generation, using electrical conductor, semiconductor and nonconductor and
Nominal Hours	**40 hours**
Element of Competency	**Performance Criteria** **Bold and Underlined terms are elaborated in the range of variables**
1. Interpret electricity	1.1 Principles of generate electricity is interpreted; 1.2 Source of electricity is identified; 1.3 Use of electricity is interpreted; 1.4 AC and DC supply system is interpreted;
2. Apply the basic concept of electrical parameters	2.1 PPE is used as per workplace requirements. 2.2 **Electrical measuring units** are interpreted; 2.3 Measurement of voltage, current and resistance with **measuring instrument** are demonstrated; 2.4 Power and energy are interpreted; 2.5 Power and energy of a particular load is calculated; 2.6 Measurement of power and energy with measuring instrument are demonstrated;
3. Identify conductor, semiconductor and insulator.	3.1 Conductor, semiconductor and insulator are interpreted; 3.2 **Electrical conductors** are identified 3.3 **Semiconductors** are identified. 3.4 **Insulators** are identified;
4. Identify cables and wires	4.1 Cables and wires are interpreted; 4.2 Types of cables and wire are identified; 4.3 Function of phase, neutral and earth are interpreted; 4.4 Size of wire and cables are measured by SWG;
5. Perform connection of electrical circuits	5.1 Electrical circuits are interpreted; 5.2 Connection of series, parallel and mixed circuits are demonstrated. 5.3 Connection of series circuit by two lamps controlled by a switch is performed. 5.4 Connection of parallel circuit by two lamps controlled by a switch is performed. 5.5 Connection of series parallel circuit by three lamps controlled by a switch is demonstrated 5.6 Connection of fan with regulator is demonstrated; 5.7 Connection tube light is demonstrated; 5.8 Connection of calling bell is demonstrated;

	5.9 Connection of series testing board is performed;
Range of Variables	
Variable	**Range (may include but not limited to):**
1. Electrical measuring units.	Electrical measuring units may include but not limited to**:** 1.1 Volt (V). 1.2 Ampere (A). 1.3 Watt (W). 1.4 Watt-Hour (Wh) 1.5 Ohm (Ω). 1.6 Micro Farad 1.7 Mili Henry 1.8 Ampere Hour 1.9 Hertz
2. Electrical measuring instruments.	Electrical measuring instruments may include but not limited to**:** 2.1 Ammeters (Analog and Digital). 2.2 Voltmeters (Analog and Digital). 2.3 Wattmeter (Analog and Digital). 2.4 Ohmmeter (Analog and Digital). 2.5 Multimeter (Analog and Digital). 2.6 Clip on meter 2.7 Frequency meter
3. Electrical conductor.	Electrical conductor may include but not limited to: 3.1 Sliver 3.2 Copper. 3.3 Aluminum. 3.4 Tungsten 3.5 Brass. 3.6 Nichrome
4. Semiconductor.	Semiconductor may include but not limited to: 4.1 Germanium 4.2 Silicon 4.3 Carbon. 4.4 Charcoal. 4.5 Wet soil
5. Insulator	Insulator may include but not limited to: 5.1 Cotton. 5.2 Dry wood. 5.3 Stone. 5.4 Porcelain. 5.5 Glass 5.6 Rubber. 5.7 Ebonite. 5.8 Plastic.

Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency.	1.1 Interpreted electrical current and its measuring units. 1.2 Interpreted principle of AC and DC generations. 1.3 Demonstrated use of electricity 1.4 Demonstrated series, parallel and mixed circuit.
2. Required underpinning Knowledge.	2.1 Concept of electrical current and measuring units. 2.2 Difference between AC and DC current. 2.3 Principles of electrical generation for AC and DC 2.4 Conversion principle of AC to DC and vice-versa. 2.5 Conductor, semiconductor and insulator 2.6 Series, parallel and mixed circuit
3. Underpinning skills.	3.1 Using of hand tools. 3.2 Measuring voltage, current, power and energy. 3.3 Preparing series and parallel circuit.
4. Required attitude.	4.1 Commitment to occupational health and safety. 4.2 Environmental concerns. 4.3 Eagerness to learn. 4.4 Tidiness and timeliness. 4.5 Respect for rights of peers, sub-ordinates and seniors in workplace. 4.6 Communication with peers, sub-ordinates and seniors in workplace. 4.7 Sincere and honest to duties.
5. Resource implication.	The following tools, materials and equipment must be provided to train on this unit of competency: 5.1 Electric generator (small size). 5.2 Tester and multimeter. 5.3 Cables / wire and fixing accessories. 5.4 Battery. 5.5 light fixtures 5.6 Hand Tools
6. Method of assessment.	Competencies must be assessed by- . 6.1 Demonstration. 6.2 Written test. 6.3 Oral questioning
7. Context of assessment.	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor.

Accreditation Requirements

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

Unit Code and Unit Title	**OU-LE-CE-02-L1-V2: Use Equipment and Measuring Instrument in the workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to Use equipment and measuring instrument in the workplace. It specifically includes the tasks of following OSH practices; identifying equipment and measuring instrument; using soldering iron; SMD rework station (hot gun); multimeter (analog / digital); setting the multimeter for measuring resistance, AC / DC voltage and current; store the materials and clean workplace.
Nominal Hours	**50 hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the range of variables
1. Follow OSH practices	6.1 Safe work practices are followed 6.2 **Personal Protective Equipment (PPE)** is used 6.3 **Hazards** at workplace is eliminated
2. Identify equipment and measuring instrument	6.1 **Tools** are collected and used as per **instruction** 6.2 **Equipment** is identified and used; 6.3 **Measuring instrument** are identified and used
3. Perform soldering	3.1 Tools, equipment and materials are collected for soldering. 3.2 Wires are cut and insulation removed as per measurement. 3.3 Twisted wires are tinned and joined by soldering. 3.4 Copper strip board is cleaned. 3.5 **Components** are set on PCB as per requirements. 3.6 Components are joined on copper strip board by soldering. 3.7 Soldering is checked as per instruction.
4. De-solder components	4.1 Tools, equipment and materials are collected for de soldering. 4.2 De-soldering tool is applied. 4.3 De-soldering is performed as per instruction. 4.4 Joints are picked up clearly. 4.5 Jumper is picked up from copper strip board.
5. Use SMD rework station (Hot gun)	5.1 SMD rework station (Hot gun) is collected 5.2 Temperature and air pressure of hot gun are set 5.3 Types of nozzles are used
6. Prepare For Measurement	6.1 Job for measurement is identified; 6.2 Measuring instrument and equipment is selected according to job requirements 6.3 Routine adjustments are done for measurement.

7. Take measurement	7.1 **Measurement** is taken with basic calculation according to the job documents. 7.2 Measurement is checked against job requirement. 7.3 Measurements are recorded as per standard
8. Clean and store tools, equipment and materials	8.1. Tools, equipment and measuring instrument are cleaned and stored. 8.2. Components are sorted and stored as per workplace standard; 8.3. The workplace is cleaned as per workplace standard.
Range of Variables	
Variable	**Range** (May include but not limited to):
1. Personal Protective Equipment (PPE)	1.1 Safety helmet 1.2 Safety shoes 1.3 Hand gloves 1.4 Apron 1.5 Goggles
2. Hazard	2.1 Accumulation of waste materials 2.2 Random storage of tools, equipment and furniture 2.3 Storage of rejected wires, cables and structural materials 2.4 Storage of flammable materials 2.5 Congested emergency exit 2.6 Oil spilt floor at workplace
3. Tools	**Hand Tools** 3.1. Adjustable wrench 3.2. Wire stripper 3.3. Tweezer 3.4. Chisels: (a) Wooden, (b) Cold 3.5. Drill bits 3.6. Files: (a) Flat, (b) Round, (c) Half round 3.7. Hacksaw 3.8. Hammers: (a) Ball peen, (b) Claw 3.9. Hand drill 3.10. Measuring Tapes 3.11. Paint Brushes/Rollers 3.12. Pliers: (a) Combination Pliers, (b) cutting Pliers, (c) Diagonal cutting Pliers, (d) Long Nose Pliers, 3.13. Punches 3.14. Screwdrivers: (a) Star, (b) Flat, (c)Connecting 3.15. Try square 3.16. Neon tester

4. Tools	**Hand Tools** 3.18. Wire cutters 3.19. Magnifying glass 3.20. S.W.G. 3.21. De-soldering pump 3.22. Electrician knife 3.23. Ladder. **Power Tools** 3.24. Electric drill machine 3.25. Grinders 3.26. Soldering iron 3.27. Rework Station 3.28. Hot gun
5. Instruction	4.1 Note 4.2 Instruction sheet 4.3 Safety manual 4.4 Symbol display charts 4.5 Components display board
6. Equipment	5.1 Air blower 5.2 DC power supply 5.3 Magnifying lamp 5.4 Microscope 5.5 Oscilloscope 5.6 Signal generator
7. Measuring Instrument	6.1 Analogue tester 6.2 Pattern Generator 6.3 Frequency counter 6.4 DC power supply 6.5 LCR Bridge 6.6 Analogue oscilloscope 6.7 Digital oscilloscope 6.8 Sweep function generator 6.9 Multi-meter (Analog / Digital)
8. Measurement	7.1 AC Voltage / current 7.2 DC Voltage / current 7.3 Resistance 7.4 Capacitance 7.5 Inductance

9. Component	8.1 Resistor 8.2 Capacitors 8.3 Inductor 8.4 Diode 8.5 Transistor 8.6 FET, MOSFET 8.7 SCR 8.8 DIAC 8.9 TRIAC 8.10 IGBT 8.11 IC (Analog and Digital) 8.12 LDR 8.13 VDR 8.14 Pilot lamp 8.15 Fuse 8.16 Battery 8.17 Coupler 8.18 Sensor 8.19 LED 8.20 Receiver 8.21 Speaker 8.22 Microphone 8.23 Display Module 8.24 Battery 8.25 Switches 8.26 Antennas 8.27 Push button switch 8.28 Low voltage transformer 8.29 Relay
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Identified equipment and measuring instrument 1.2 Selected proper measuring instrument 1.3 Taken Measurement accurately 1.4 Recorded measurement.
2. Underpinning knowledge	Trainee will acquire knowledge of: 2.1 Use of equipment 2.2 List of measuring instrument 2.3 Use of measuring instrument 2.4 Sequence of using the instruments

3. Underpinning skills	3.1 Identifying equipment and measuring instrument 3.2 Selecting proper measuring instrument 3.3 Taking Measurement accurately 3.4 Recording measurement
4. Underpinning attitude	4.1 Commitment to occupational safety and health 4.2 Promptness in carrying out activities 4.3 Sincere and honest to the duties 4.4 Environmental concern 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Communication with peers, and seniors' workplace 4.8 Respect for rights of peers and seniors in workplace
5. Resource implication	The following resources must be provided: 5.1 Workplace (actual or simulated) 5.2 Tools, equipment and materials must be provided
6. Methods of assessment	Methods of assessment may include but not limited to**:** 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor

Accreditation Requirements

Training Providers must be accredited by NSDA, the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	OU-LE-CE-03-L1-V2: Identify and Test Electronics Components
Unit Descriptor	This unit covers the knowledge skills and attitudes required to perform testing of electronic components. It specifically includes tasks of preparing for testing and measuring, measuring electrical quantities and testing components.
Nominal Hours	**30 Hours**
Elements of competency	**Performance Criteria** **Bold & Underlined** words are elaborated in the Range of Variables
1. Prepare for test and measurement	1.1 Safe work practices observed and **personal protective equipment (PPE)** is used; 1.2 Appropriate equipment is selected according to tasks requirements. 1.3 **Measuring/testing equipment** are prepared as per job requirement; 1.4 Power supply and components are prepared.
2. Identify the components	2.1 Components to be tested are identified; 2.2 Function of components are interpreted 2.3 Components are prepared;
3. Test components	3.1 Terminal of testing equipment is connected to the **components** according to testing instruction 3.2 Components are tested and checked as per set standards
4. Clean and store measuring and testing equipment	4.1 Measuring and testing equipment are cleaned and maintained as per instruction manual 4.2 Measuring and testing equipment are stored safely in appropriate location according to standard workshop procedures 4.3 Unsafe or faulty equipment are identified and marked for repair after use according to current procedures

Range of Variables

Variable	**Range** (Included but not limited to):
1 PPE	1.1 Safety helmet 1.2 Safety shoes 1.3 Hand gloves 1.4 Apron 1.5 Goggles
2 Measuring equipment	1.1 DC power supply 1.2 LCR meter 1.3 Multi meter 1.4 Neon tester 1.5 Oscilloscope

3 Testing component.	2.1 Cells and battery. 2.2 Variable power supply. 2.3 Connecting wires 2.4 Transistors 2.5 Different types of resistors. 2.6 Different kinds of transformer 2.7 Different kinds of capacitors. 2.8 Different kinds of rectifiers. 2.9 LDR 2.10 VDR 2.11 Sensors 2.12 Push button switch	2.13 Diode 2.14 SCR 2.15 DIAC 2.16 TRIAC 2.17 FET 2.18 MOSFET 2.19 LED 2.20 ICs 2.21 Relay 2.22 Regulated and unregulated ICs

EVIDENCE GUIDE	
1 Critical aspects at competency.	1.1 Applied safety rules and used PPE. 1.2 Identified common electronics components 1.3 Used measuring equipment and power supply unit 1.4 Tested and checked electronics component.
2 Underpinning knowledge	2.1 List of common electronics components and parts 2.2 Function of common electronics components and parts 2.3 Use of common electronics components and parts 2.4 Principles of using measuring and testing equipment
3 Underpinning Skills	3.1 Applying safety rules and used PPE. 3.2 Identifying common electronics components 3.3 Using measuring equipment and power supply unit 3.4 Testing and checking electronics component.
4 Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Tidiness and timeliness 4.4 Respect of peers and seniors in workplace
5 Resource Implication.	The following resources must be provided. 5.1 Workplace 5.2 Materials relevant to the proposed activity 5.3 All tools, equipment, material and documentation required 5.4 Relevant specifications or work instructions
6 Method assessment.	Competency must be assessed by- 6.1 Written test 6.2 Demonstration 6.3 Oral Questioning/Interview
7 Context assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/ nominated assessor

Accreditation Requirements

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Unit Code and Title	**OU-LE-CE-04-L1-V2-Assemble Electronics Devices and Components**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to assemble electronic products. It specifically includes preparing to assemble products, preparing printed circuit board (PCB) modules, mounting and soldering components, performing assembly, and testing and inspecting products.
Nominal Hours	**50 Hours**
Element of Competency	**PERFORMANCE CRITERIA** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for	1.1. Workplace is prepared as per standard operating procedure. 1.2. Work instructions are obtained and clarified based on client requirements. 1.3. Responsible person is consulted for effective and proper work coordination. 1.4. **Tools and equipment** are prepared and checked in accordance with job requirement. 1.5. **Materials** are prepared and checked in accordance with job requirement. 1.6. Components needed are identified and prepared as per job requirement.
2. Prepare circuit on breadboard	2.1 **Circuit diagram** is selected 2.2 Breadboard is selected 2.3 **Components** are selected as per diagram 2.4 Circuit is prepared on breadboard as per diagram; 2.5 DC power supply is prepared; 2.6 Functionality of circuit is tested;
3. Mount and solder components	3.1 Printed circuit board (PCB) layout is checked; 3.2 **Mounting technique** is identified and selected. 3.3 Components are mounted as per diagram and soldered 3.4 Soldered components are checked 3.5 Performance of the circuit is tested,
4. Identify and test SMD components	4.1 SMD components are identified; 4.2 SMD components are listed 4.3 SMD components are interpreted; 4.4 SMD components are tested
5. Install SMD components	5.1 Common electronics **SMD component** are selected and collected 5.2 PCB is selected and collected; 5.3 SMD components are installed on PCB as per requirement 5.4 Functionality of circuit is tested;

6. Clean and store tools and equipment	6.1 Tools and equipment are cleaned in accordance with work site procedures. 6.2 Tools and equipment are stored safely in appropriate location according to standard procedures
RANGE OF VARIABLES	
VARIABLE	**Range** (Included but not limited to):
1. Tools and equipment	1.1. Tools 1.1.1. Screwdrivers 1.1.2. Wrenches 1.1.3. Allen wrench 1.1.4. Allen keys 1.1.5. Soldering iron 1.1.6. De-soldering tools 1.1.7. Multi-testers (analog/digital) 1.1.8. Utility knife/stripper 1.1.9. Pliers 1.1.10. Cleaning brush 1.1.11. High-grade magnifying glass (with lamp) 1.2. Equipment: 1.2.1. Variable power supply 1.2.2. Variable transformer 1.2.3. Hot air soldering station 1.2.4. Function/signal generator 1.2.5. Oscilloscope (digital) 1.2.6. Flashlight/headlamp 1.2.7. Assorted electronic sensors
2. Materials	2.1 Soldering wire 2.2 SMD soldering paste 2.3 Wires (stranded/solid/hook-up) 2.4 Assorted electronic components
3. SMD Components	3.1 Fuses 3.2 Coil 3.3 Non-polarized Capacitor 3.4 Polarized capacitor 3.5 Resistors 3.6 Coupler 3.7 Sensor

	3.8 Diode 3.9 LED 3.10 Zener diode 3.11 Photo diode 3.12 Regulator IC 3.13 Receiver 3.14 Speaker 3.15 Transistor 3.16 Transformer 3.17 Microphone 3.18 Switch
4. Components	4.1 Transformer 4.2 Diode 4.3 Transistor 4.4 Resistor 4.5 Capacitor 4.6 ICs 4.7 Relay 4.8 LDR 4.9 VDR 4.10 Switch 4.11 Speaker/Buzzer 4.12 LED 4.13 Sensors
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Prepared for product assembly 1.2 Identified tools, equipment and materials 1.3 Prepared printed circuit board layout and modules 1.4 Mounted and soldered components 1.5 Assembled components 1.6 Tested and inspected products 1.7 Recorded and reporting job completion

2. Underpinning knowledge	2.1. Rectifier 2.2. Amplifier 2.3. Power supply 2.4. Switching
3. Underpinning skills	3.1 Preparing for product assembly 3.2 Identifying tools, equipment and materials 3.3 Interpreting schematic diagrams 3.4 Splicing and joining wires 3.5 Preparing printed circuit board (PCB) layout and modules 3.6 Mounting and soldering components 3.7 Performing assembly 3.8 Carrying out testing and inspection
4. Required Attitude	4.1 Tidy and punctual 4.2 Prompt in carrying out activities 4.3 Sincere and honest concerning duties 4.4 Active on teamwork 4.5 Eager to learn 4.6 Concerned for proper use of tools 4.7 Committed to occupational health and safety practices 4.8 Respectful of peers, subordinates and seniors in the workplace
5. Resource implications	The following resources must be provided. 5.1 Workplace (simulated or actual) 5.2 Personal protective equipment (PPE) 5.3 Tools and equipment 5.4 Materials and accessories 5.5 Job specifications 5.6 Standard operating procedure 5.7 Projector 5.8 Stationary 5.9 Learning manual
6. Method of assessment	Competency must be assessed by- 6.1 Written test 6.2 Demonstration 6.3 Oral Questioning

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

Accreditation Requirements

Training Providers must be accredited by NSDA, the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA

Unit Code and Title	OU-LE-CE-05-L1-V2- Repair and Service Basic Home Appliances
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to repair and service basic domestic electronic appliances. It specifically includes the tasks of preparing appliances, tools, equipment and workplaces, servicing cooker (Rice, Carry. Induction, Infra-red), blender and Juicer, Microwave Oven, IPS and UPS in the workplace.
Nominal Hours	**80 Hours**
Elements of Competency	**PERFORMANCE CRITERIA** **Bold & Underlined** terms are elaborated in the range of variables
1. Prepare appliances, tools, equipment and workplace	1.1 Safe work practices are observed and personal protective Equipment (PPE) are used; 1.2 Workplace is prepared in accordance with **OSH policies and procedures.** 1.3 Responsible person is consulted for effective and proper work coordination. 1.4 Required **tools, equipment and materials** are prepared and checked in accordance with work place requirement. 1.5 **Domestic Electronics Appliances** are collected and prepared according to requirements.
2. Services Cooker (Rice, Carry. Induction, Infra-red)	2.1 Cookers are dismantled for internal tests/servicing/repairs according to manufacturer's instructions; 2.2 Continuity of wire/switch/protective devices are checked by using specified test 2.3 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures. 2.4 Windings are checked by using specified test instruments to detect defects. 2.5 Faulty components are diagnosed; 2.6 Faulty parts are repaired/replaced as per diagnosed fault. 2.7 Cooker is re-assembled and checked in test bench as per standard
3. Services Blender and Juicer	3.1 Blender and Juicer are dismantled for internal tests/servicing/ repairs according to manufacturer's instructions; 3.2 Continuity of wire/switch/protective devices are checked by using specified test 3.3 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures. 3.4 Windings are checked by using specified test instruments to detect defects. 3.5 Faulty components are diagnosed; 3.6 Faulty parts are repaired/replaced as per diagnosed fault. 3.7 Blender and Juicer is re assembled and checked in test bench as per standard

4. Service Microwave Oven	4.1 Microwave Oven is dismantled for internal tests/servicing/repairs according to manufacturer's instructions 4.2 Continuity of wire/switch/protective device are checked by using specified test 4.3 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures. 4.4 Problems in D.C circuits are solved; 4.5 Faulty components are diagnosed and cleaned the parts with specified cleaning material 4.6 Drawings, diagrams, schedules, standards, codes and specifications are used; 4.7 Faulty parts are repaired/replaced as per diagnosed fault. 4.8 Microwave Oven is reassembled and checked 4.9 Microwave Oven in test bench as per standard.
5. Service Electric Iron and Kettle	5.1 Electric Iron and Kettle are dismantled for internal tests/servicing/ repairs according to manufacturer's instructions; 5.2 Continuity of wire/switch/protective devices are checked by using specified test 5.3 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures. 5.4 Faulty components are diagnosed; 5.5 Faulty parts are repaired/replaced as per diagnosed fault.
6. Service rechargeable fan	6.1 Rechargeable fan are dismantled for internal tests/servicing/ repairs according to manufacturer's instructions; 6.2 Continuity of wire/switch/protective devices are checked by using specified test 6.3 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures. 6.4 Faulty components are diagnosed; 6.5 Faulty parts are repaired/replaced as per diagnosed fault
7. Clean and store tools and equipment	6.1 Cleaning of tools and equipment is performed in accordance with work site procedures. 6.2 Tools and equipment are stored safely in appropriate location according to standard procedures

RANGE OF VARIABLES

Variables	**Range** (Included but not limited to):
1. OHS policies and procedures	1.1 Hazardous and risk assessment mechanisms. 1.2 Implementation of safety regulations. 1.3 Safety training. 1.4 Safety systems incorporating. 1.5 Work clearance procedures 1.6 Isolation procedures. 1.7 Use of protective equipment and clothing

2. Materials, tools and equipment	**Tools** 3.1 Soldering iron 3.2 Screwdriver (assorted) 3.3 Utility knife/stripper 3.4 Pliers (assorted) 3.5 Test jig 3.6 Work bench with mirror 3.7 Blower machine 3.8 Insulation floor mat 3.9 Magnifying glass with stand 3.10 Cleaning brush 3.11 Soldering sucker	**Materials** 3.12 Lead-free solder 3.13 Cleaning agent 3.14 Wires 3.15 Assorted electronic components 3.16 Insulation floor mat **Equipment** 3.17 Analogue oscilloscope 3.18 Digital oscilloscope 3.19 Digital multimeter 3.20 Pattern Generator 3.21 AVO meter
3. Domestic Electronics Appliances	4.1 Cooker (Rice, Carry. Induction, Infra-red) 4.2 Blender and Juicer 4.3 Microwave Oven 4.4 Electric Iron 4.5 Electric Kettle 4.6 Rechargeable fan	

EVIDENCE GUIDE	
1. Critical aspects of competency	1.1 Prepared appliances, tools, equipment and workplace 1.2 Performed servicing of basic domestic electronic appliances: 1.3 Applied safety rules and procedure 1.4 Assembled and disassembled appliances 1.5 Conducted testing assembled appliance.
2. Underpinning knowledge	2.1 Operations of basic domestic electronic appliances 2.2 Symptoms and faults of appliances; 2.3 Remedies of faults;
3. Underpinning skills	3.1 Preparing appliances, tools, equipment and workplace 3.2 Performing servicing of basic domestic electronic appliances: 3.3 Applying safety rules and procedure 3.4 Assembling and disassembling appliances 3.5 Conducting testing assembled appliance.
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Tidiness and timeliness 4.4 Respect of peers and seniors in workplace
5. Resource implications	The following resources must be provided. 5.1 Workplace 5.2 Materials relevant to the proposed activity 5.3 All tools, equipment, material and documentation required 5.4 Relevant specifications or work instructions

6. Method of assessment	Competency must be assessed by- 6.1 Written test 6.2 Demonstration 6.3 Oral Questioning/Interview
8. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor
Accreditation Requirements Training Providers must be accredited by NSDA, the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA	

Unit Code and Title	**OU-LE-CE-06-L1-V2- Assemble and repair LED bulbs and LED tube light**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to assemble and repair LED bulbs. It specifically includes the task of preparing for assemble and repair LED bulbs, assembling LED bulb and repairing LED bulbs.
Nominal Hours	**20 Hours**
Element of Competency	**PERFORMANCE CRITERIA** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Prepare for assemble and repair	1.1. Workplace is prepared as per standard operating procedure. 1.2. Work instructions are obtained and clarified based on client requirements. 1.3. Responsible person is consulted for effective and proper work coordination. 1.4. **Tools and equipment** are prepared and checked in accordance with job requirement. 1.5. **Materials** are prepared and checked in accordance with job requirement. 1.6. Components are identified and prepared as per job requirement.
2. Assemble LED bulb	2.1 Circuit diagram is collected; 2.2 **Parts of LED bulb** are selected as per diagram 2.3 Circuit is prepared on PCB as per diagram; 2.4 Functionality of bulb is tested;
3. Repair LED bulb	3.1 Faults of LED bulb are identified; 3.2 Parts are selected accordingly; 3.3 Faulty parts are replaced; 3.4 Performance of the LED bulb is tested;
4. Assemble LED tube light	4.1 Circuit diagram is collected; 4.2 **Parts of LED tube light** are selected as per diagram 4.3 Circuit is prepared on PCB as per diagram; 4.4 Functionality of tube light is tested;
5. Repair LED tube light	5.1 Faults of LED bulb are identified; 5.2 Parts are selected accordingly; 5.3 Faulty parts are replaced; 5.4 Performance of the LED tube light is tested;
6. Clean and store tools and equipment	6.3 Cleaning of tools and equipment is performed in accordance with work site procedures. 6.4 Tools and equipment are stored safely in appropriate location according to standard procedures
RANGE OF VARIABLES	
VARIABLE	**Range** (Included but not limited to):

1. Tools and equipment	1.1. Tools 1.1.1. Screwdrivers 1.1.2. Soldering iron 1.1.3. De-soldering tools 1.1.4. Multimeter (analog/digital) 1.1.5. Knife 1.1.6. Wire stripper 1.1.7. Pliers 1.1.8. Cleaning brush 1.1.9. High-grade magnifying glass 1.2. Equipment: 1.2.1. Variable power supply 1.2.2. Hot air gun
2. Materials	2.5 Soldering wire 2.6 SMD soldering paste 2.7 Wires (stranded/solid/hook-up) 2.8 Assorted electronic components
3. Parts of led bulb	3.1 Lamp body 3.2 Lamp base 3.3 Lamp cover 3.4 Driver circuit 3.5 LED chip 3.6 Heat sink
4. Parts of led tube light	4.1 Lamp holder 4.2 Driver 4.3 Insulating sleeve 4.4 Aluminum PCB 4.5 SMD LED 4.6 PC cover

Evidence Guide

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

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. prepared for assemble and repair works 1.2. Assembled LED bulb and tube light 1.3. Repaired LED bulbs and tube light
2. Underpinning knowledge	2.1. Principles of LED 2.2. Components of LED bulbs and tube light 2.3. Assembling technique of LED bulbs and tube light 2.4. Repairing technique of LED bulbs and tube lights

3. Underpinning skills	3.1 preparing for assemble and repair works 3.2 Assembling LED bulb and tube light 3.3 Repairing LED bulbs and tube light
4. Required Attitude	4.1 Tidy and punctual 4.2 Prompt in carrying out activities 4.3 Sincere and honest concerning duties 4.4 Active on teamwork 4.5 Eager to learn 4.6 Concerned for proper use of tools 4.7 Committed to occupational health and safety practices 4.8 Respectful of peers, subordinates and seniors in the workplace
5. Resource implications	The following resources must be provided. 5.1 Workplace (simulated or actual) 5.2 Personal protective equipment (PPE) 5.3 Tools and equipment 5.4 Materials and accessories 5.5 Job specifications 5.6 Standard operating procedure 5.7 Learning manual
6. Method of assessment	Competency must be assessed by- 6.4 Written test 6.5 Demonstration 6.6 Oral Questioning
7. Context of assessment	7.3 Competency assessment must be done in NSDA accredited assessment centre 7.4 Assessment should be done by a NSDA certified/nominated assessor
Accreditation Requirements Training Providers must be accredited by NSDA, the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA	

Unit Code and Title	**OU-LE-CE-07-L1-V2: Identify major parts of LED TV**
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Identify major parts of LED TV. It specifically includes the tasks of following OSH practice; identifying sections and components of LED TV
Nominal Hours	**30 Hours**
Elements of Competency	**Performance Criteria** **Bold** and **Underlined** terms are elaborated in the Range of Variables
1. Follow OSH Practice	1.1 **Tools and equipment** are collected and used 1.2 **Personal Protective Equipment (PPE)** is used 1.3 OSH is followed
2. Identify the sections	2.1 The TV set is disassembled 2.2 **Sections of TV** is identified 2.3 Sections of TV is listed;
3. Identify the components	3.1 **Components** of TV are identified; 3.2 Components of TV are listed; 3.3 Function of parts are interpreted 3.4 TV is reassembled
4. Clean tools and equipment	4.1 Tools and equipment are cleaned 4.2 Waste materials are disposed as per workplace standard 4.3 Condition of tools is checked after use 4.4 Tools and equipment are stored as per workplace standard
Range of Variables	
Variable	**Range** (May include but not limited to)
1. Personal Protective Equipment (PPE)	1.1 Mask 1.2 Gloves 1.3 Safety shoes 1.4 Apron 1.5 Goggles 1.6 Smoke absorber 1.7 Floor mat 1.8 Wrist band
2. Sections of TV	2.1 Power Section 2.2 Control Section 2.3 Network Section 2.4 Audio Section

3. Tools	3.1 Screwdrivers 3.2 Wrenches 3.3 Allen wrench 3.4 Allen keys 3.5 Soldering iron 3.6 De-soldering tools 3.7 Multi-testers (analog/digital) 3.8 Utility knife/stripper 3.9 Pliers 3.10 Cleaning brush 3.11 High-grade magnifying glass (with lamp)
4. Equipment	4.1 Multi-meter (Analog / Digital). 4.2 SMD Rework Station 4.3 Soldering Iron 4.4 Pre heat station 4.5 DC power supply. 4.6 Magnifying Glass
5. Major parts	5.1 T-con Board 5.2 Power board and mother board 5.3 Wi-Fi module 5.4 Ocell/Panel 5.5 Inverter/Backlight Drive 5.6 IR Board 5.7 Key Pad 5.8 Back Light 5.9 LVDS (Low Voltage Differential Signal) 5.10 Remote
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Identified sections of LED TV 1.2 Identified components of LED TV
2. Underpinning knowledge	Trainee will acquire knowledge of: 2.1 Sections of LED TV 2.2 Function of the sections 2.3 Components of LED TV 2.4 Parts of basic LED TV
3. Underpinning skills	3.1 Assembling and disassembling of LED TV 3.2 Identifying sections of LED TV 3.3 Identifying components of LED TV 3.4 Identifying parts of LED TV

4. Required attitudes	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implication	The following resources must be provided: 5.1 Workplace (actual or simulated) 5.2 Note 5.3 Instruction sheet 5.4 Safety manual 5.5 LED TV 5.6 LED TV disassembling and reassembling tools and equipment;
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/ nominated assessor

Accreditation Requirements

Training Providers must be accredited by NSDA, the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Development of Competency Standard

The Competency Standards for National Skills Certificate in **Consumer Electronics** Standard is developed by NSDA on 22-24 November, 2021.

Respectable members:

1.	Dulal Krishna Saha, Executive Chairman (Secretary), National Skills Development Authority (NSDA)	Chairperson
2.	Alif Noor, Deputy Manager, TVET and Skills, UCEP, Bangladesh	Member
3.	Md, Abdullah Al Mabud, Specialist (LMD), BTEB, Dhaka	Member
4.	Md. Shawkat Ali Miah, Senior Instructor (Electronics), BK-TTC, DHaka	Member
5.	Saida Momtaz Zobaida Iqbal, Instructor and HOD (Electronics), Dhaka Mohila Polytechnic Institute,	Member
6.	Md. Abdul Quiyum, Instructor (Electronics), Bangla-German Technical Training Centre, Dhaka	Member
7.	Shushil Rishi, Senior Instructor (Electronics), SOS Vocational Taining Centre, Dhaka	Member
8.	Md. Moniruzzaman, Production Manager, Singer Bangladesh Ltd. Dhaka	Member
9.	Mst. Shefa, Line Engineer, Benli Electronics Ltd. Gazipur,	Member
10.	Md. Ahsanuzzaman, PICO Technology, Mirpur, Dhaka	Member
11.	Md. Habibur Rahman, MD, HB Engineering Ltd. Dhaka	Member
12.	Md. Abdur Razzaque, Specialist, NSDA,	Member

Validation of Competency Standard by Standard and Curriculum Validation Committee (SCVC)

The Competency Standards for National Skills Certificate in **Consumer Electronics** Standard is validated by SCVC on 09-10 January, 2022.

Respectable members of the SCVC:

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Review and validate of Competency Standard

The Competency Standards for National Skills Certificate in Consumer Electronics, Level-1 is reviewed and validated by NSDA on 20 November 2024.

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