



COMPETENCY STANDARD FOR Consumer Electronics

(Light Engineering Industry Skills Council)

Level: 1

Competency Standard Code: CS-LE-CE-L1-EN-V1

**National Skills Development Authority
Prime Minister's Office, Bangladesh**

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Introduction

The National Skills Development Authority (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 skill 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 **Light Engineering** Sector. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills Training. Trainees who successfully pass the assessment will receive a qualification in the National Skills Qualification Framework (NSQF) 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:


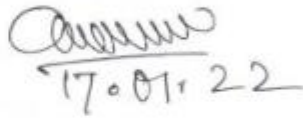
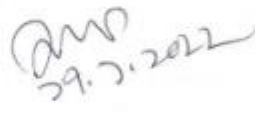


- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range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

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

Approval of Competency Standard

Approval of Competency Standard

Name and Designation	Signature
Dulal Krishna Saha Executive Chairman (Secretary) National Skills Development Authority	
Md. Nurul Amin Member (Registration & Certification) Joint Secretary National Skills Development Authority	 17.01.22
Quamrun Naher Siddiqua Member (Coordination & Assessment) Joint Secretary National Skills Development Authority	 29.1.2022
Dr. Md. Ziauddin Member (Admin & Finance) Joint Secretary National Skills Development Authority	
Alif Rudaba Member (Planning & Skills Standard) Joint Secretary National Skills Development Authority	 A.D. 2022

List of Abbreviations

General	
NSDA	National Skills Development Authority
BMET	Bureau of Manpower Employment and Training
B-SEP	Bangladesh Skills for Employment and Productivity
BTEB	Bangladesh Technical Education Board
DTE	Directorate of Technical Education
ILO	International Labour Organization
ISC	Industry Skills Council
BNQF	Bangladesh National Qualifications Framework
NSQF	National Skills Qualifications Framework
PPP	Public Private Partnership
SCVC	Standards and Curriculum Validation Committee
SEIP	Skills for Employment Investment Program
TVET	Technical Vocational Education and Training
UoC	Unit of Competency
Occupation Specific	
ESD	Electro-static discharge
OHS	Occupational health and safety
PCB	Printed circuit board
PPE	Personal protective equipment
SOP	Standard operating procedure

Course Structure

For

NATIONAL CERTIFICATE IN CONSUMER ELECTRONICS (NSQF LEVEL 1)

Sl. No.	Unit Code and Title		UoC Level	Nominal Duration (Hours)
Generic (2 UoCs required)				30
1	GU002L2V1	Apply occupational safety and health (OSH) procedure in the workplace	2	15
2	GU008L2V1	Carryout workplace interaction	2	15
Sector Specific (2 UoCs required)				40
3	SULE001L1V1	Interpret drawing and specifications	1	20
4	SULE002L1V1	Identify hand tools and power tools	1	20
Occupation Specific – Compulsory (7 UoCs required)				305
5	OUCE001L1V1	Apply fundamentals skills for electrical works	1	35
6	OUCE002L1V1	Use equipment and measuring instrument in the workplace	1	50
7	OUCE003L1V1	Identify and test electronics components	1	20
8	OUCE004L1V1	Assemble Electronics Devices and Components	1	60
9	OUCE005L1V1	Repair and service basic home appliances	1	100
10	OUCE007L1V1	Assemble and repair LED bulbs and LED tube light	1	20
11	OUCE008L1V1	Identify major parts of LCD/LED TV	1	20
Total Nominal Learning Hours				375

Units & Elements at a Glance:

Generic Competencies (30 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU002L2V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	<ol style="list-style-type: none"> 1. Identify OSH policies and procedure 2. Follow OSH procedure 3. Report hazards and risks 4. Respond to emergencies 5. Maintain personal well-being 	15
GN008L2V1	Carryout Workplace Interaction	<ol style="list-style-type: none"> 1. Interpret workplace communication and etiquette 2. Read and understand workplace documents 3. Participate in workplace meetings and discussions 4. Practice professional ethics at workplace 	15
Total Hour			30

Sector Specific Competencies (40 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SULE001L1V1	Interpret Drawings and Specifications	<ol style="list-style-type: none"> 1. Identify information from manuals 2. Identify drawings and specifications 3. Interpret drawings and specifications 4. Store manuals 	20
SULE002L1V1	Identify hand tools and power tools	<ol style="list-style-type: none"> 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 (305 Hours)

Code	Unit of Competency	Elements of Competency	Hours
OUCE001L1V1	Apply basic concepts of electricity	<ol style="list-style-type: none"> 1. Practice OSH. 2. Apply electrical concept and working principles 3. Interpret principles of electricity generation 4. Use electrical conductor, semiconductor and nonconductor 5. Select cables and wires 6. Perform connection of electrical circuits 	35
OUCE002L1V1	Use equipment and measuring instrument in the workplace	<ol style="list-style-type: none"> 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 and record measurement 8. Store the materials and clean the workplace 	50
OUCE003L1V1	Identify and Test Electronics Components	<ol style="list-style-type: none"> 1. Prepare for testing and measuring 2. Identify the components 3. Test components 4. Clean and store measuring and testing equipment 	20
OUCE004L1V1	Assemble Electronics Devices and Components	<ol style="list-style-type: none"> 1. Prepare for assemble 2. Prepare circuit on breadboard 3. Mount and solder components 4. Identify SMD components 5. Install SMD components 6. Clean and store tools and equipment 	60
OUCE005L1V1	Repair and Service Home Appliances	<ol style="list-style-type: none"> 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. Clean and store tools and equipment 	100
OUCE006L1V1	Assemble and repair LED bulbs	<ol style="list-style-type: none"> 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
OUCE003L1V1	Identify major parts of LED/LCD TV	<ol style="list-style-type: none"> 1. Follow OSH Practice 2. Identify the sections 3. Identify the components 4. Clean tools and equipment 	20
Total Hours			305

Generic Competencies

Unit Code and Title	GU002L2V1: Apply Occupational Safety and Health (OSH) Procedure in the Workplace
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required in applying occupational safety and health (OSH) procedures in the workplace. It specifically includes – identifying OHS policies and procedures, following OSH procedure, reporting to emergencies, and maintaining personal well-being.
Nominal Hours	15 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures.	1.1. <u>OHS policies</u> and <u>safe operating procedures</u> are accessed and stated. 1.2. <u>Safety signs and symbols</u> 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 <u>Personal protective equipment (PPE)</u> is selected and collected as required. 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OHS procedures and practices. 2.3 A clear and tidy workplace is maintained as per workplace standard. 2.4 PPE is maintained to keep them operational and compliant with OHS regulations.
3. Report hazards and risks.	3.1 <u>Hazards</u> 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 <u>emergency procedures</u> are followed. 4.3 <u>Contingency measures</u> during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures. 4.4 First aid procedures is applied during emergency situations.
5. Maintain personal well-being	5.1 OHS policies and procedures are adhered to. 5.2 OHS awareness programs are participated in as per workplace guidelines and procedures. 5.3 Corrective actions are implemented to correct unsafe condition in the workplace. 5.4 <u>“Fit to work” records</u> are updated and maintained according to workplace requirements.
Range of Variables	
Variables	Range (may include but not limited to):
1. OHS Policies	1.1. Bangladesh standards for OHS 1.2. Fire Safety Rules and Regulations 1.3. Code of Practice 1.4. Industry Guidelines

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

Evidence Guide

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

1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 stated OHS 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
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2. Underpinning knowledge	<ul style="list-style-type: none"> 2.1 Define OHS 2.2 OHS Workplace Policies and Procedures 2.3 Work Safety Procedures 2.4 Emergency Procedures 2.5 Hazard control procedure 2.6 Different types of Hazards 2.7 PPE and there uses 2.8 Personal Hygiene Practices 2.9 OHS Awareness
3. Underpinning skills	<ul style="list-style-type: none"> 3.1 Accessing OHS policies 3.2 Handling of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 5.1 Adequate workplace 5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, materials and documentation required 5.4 OHS Policies and Procedures
6. Methods of assessment	<ul style="list-style-type: none"> 6.1 Written test 6.2 Demonstration 6.3 Oral Questioning 6.4 Portfolio
7. Context of assessment	<ul style="list-style-type: none"> 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 Title	GN008L2V1: Carryout Workplace Interaction
Nominal Hours	15 Hours
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to carry out workplace interaction. It specifically includes – interpret workplace communication and etiquette; read and understand workplace documents; participate in workplace meetings and discussions; and practice professional ethics at workplace.
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables.
1. Interpret workplace communication and etiquette	<p>1.1 Workplace code of conducts are interpreted as per organizational guidelines</p> <p>1.2 Appropriate lines of communication are maintained with supervisors and colleagues</p> <p>1.3 Workplace interactions are conducted in a <u>courteous manner</u> to gather and convey information</p> <p>1.4 Questions about routine <u>workplace procedures and matters</u> are asked and responded as required</p>
2. Read and Understand Workplace Documents	<p>2.1 Workplace documents are interpreted as per standard.</p> <p>2.2 Assistance is taken to aid comprehension when required from peers / supervisors</p> <p>2.3 Visual information / symbols / signage's are understood and followed</p> <p>2.4 Specific and relevant information are accessed from <u>appropriate sources</u></p> <p>2.5 Appropriate medium is used to transfer information and ideas</p>
3. Participate in workplace meetings and discussions	<p>3.1 Team meetings are attended on time and followed meeting procedures and etiquette</p> <p>3.2 Own opinions are expressed and listened to those of others without interruption</p> <p>3.3 Inputs are provided consistent with the meeting purpose and interpreted and implemented meeting outcomes</p>
4. Practice professional ethics at workplace	<p>4.1 Responsibilities as a team member are demonstrated and kept promises and commitments made to others</p> <p>4.2 Tasks are performed in accordance with workplace procedures</p> <p>4.3 Confidentiality is respected and maintained</p> <p>4.4 Situations and actions considered inappropriate or which present a conflict of interest are avoided</p>
Range of Variables	
Variable	Range (May include but not limited to):

1. Courteous Manner	<ul style="list-style-type: none"> 1.1 Effective questioning 1.2 Active listening 1.3 Speaking skills
2. Workplace Procedures and Matters	<ul style="list-style-type: none"> 2.1 Notes 2.2 Agenda 2.3 Simple reports such as progress and incident reports 2.4 Job sheets 2.5 Operational manuals 2.6 Brochures and promotional material 2.7 Visual and graphic materials 2.8 Standards 2.9 OSH information 2.10 Signs
3. Appropriate Sources	<ul style="list-style-type: none"> 3.1 HR Department 3.2 Managers 3.3 Supervisors
<p>Evidence Guide</p> <p>The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency</p>	
1. Critical Aspects of Competency	<p>Assessment required evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Followed workplace code of conducts is as per organizational guidelines 1.2 Interpreted workplace documents as per standard 1.3 Interpreted workplace instructions and symbols 1.4 Interpreted and implemented meeting outcomes
2. Underpinning Knowledge	<p>Trainee will acquire knowledge of:</p> <ul style="list-style-type: none"> 2.1 Workplace communication and etiquette 2.2 Workplace documents, signs and symbols 2.3 meeting procedure and etiquette
3. Underpinning Skills	<ul style="list-style-type: none"> 3.1 Demonstrating performance of workplace communication and etiquette 3.2 Following workplace instructions and symbol 3.3 Following workplace code of conducts is as per organizational guidelines 3.4 Interpreting workplace documents as per standard 3.5 Interpreting and implementing meeting outcomes

4. Underpinning Attitudes	<ul style="list-style-type: none"> 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 Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 5.1 Workplace (actual or simulated) 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	<p>Methods of assessment may include but not limited to:</p> <ul style="list-style-type: none"> 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of Assessment	<ul style="list-style-type: none"> 7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor.
<p>Accreditation Requirements</p> <p>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 NSQF qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Sector Specific Competencies

Unit Code and Title	SULE001L1V1: Interpret Drawings and Specifications
Nominal Hours	20 Hours
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.
Elements of Competency	Performance Criteria <u>Bold and Underlined</u> 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 <u>drawings</u> and <u>specifications</u> are correctly identified. 2.2 <u>Terms and abbreviations</u> are identified. 2.3 <u>Signs and symbols</u> 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
1. Drawings	2.1 Technical Drawings 2.2 Sketch
2. Specifications	3.1 Product specifications 3.2 Performance specifications 3.3 Method specifications
3. Instructions	4.1 Orders 4.2 Special Orders
4. Terms and abbreviations	Refers to all terms and abbreviations associated with the Consumer Electronics occupation
5. 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	<p>Assessment required evidence that the candidate:</p> <p>1.1 interpret drawings and specifications in consumer electronics appliances documents</p> <p>1.2 satisfying the requirements mentioned in the Performance Criteria and Range of Variables</p>
2. Underpinning knowledge	<p>2.1 Types of appliances manuals</p> <p>2.2 Identification of signs and symbols</p> <p>2.3 Drawings and specifications</p> <p>2.4 Terms and abbreviations used</p>
3. Underpinning skills	<p>3.1 Identifying appropriate manuals</p> <p>3.2 Identifying drawings and specifications</p> <p>3.3 Interpreting drawings and specifications</p> <p>3.4 Storing manuals</p>
4. Underpinning attitudes	<p>4.1 Commitment to occupational health and safety</p> <p>4.2 Environmental concerns</p> <p>4.3 Eagerness to learn</p> <p>4.4 Tidiness and timeliness</p> <p>4.5 Respect for rights of peers and seniors in workplace</p>
5. Resource implications	<p>5.1 Pens</p> <p>5.2 Telephone</p> <p>5.3 Computer</p> <p>5.4 Writing materials</p> <p>5.5 Online communication</p> <p>5.6 Manuals</p> <p>5.7 Drawings and Specifications</p>
6. Methods of assessment	<p>6.1 Workplace observation</p> <p>6.2 Demonstration</p> <p>6.3 Oral questioning</p> <p>6.4 Written test</p> <p>6.5 Portfolio</p>
7. Context of assessment	<p>7.1 Competency assessment must be done in NSDA accredited assessment centre</p> <p>7.2 Assessment should be done by a NSDA certified/nominated assessor</p>
<p>Accreditation Requirements</p> <p>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.</p>	

Unit Code and Title	SULE002L1V1: Identify hand tools and power tools
Nominal Hours	20 Hours
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.
Elements of Competency	Performance Criteria <u>Bold and Underlined</u> terms are elaborated in the Range of Variables.
1. Follow OSH (Occupational safety and health) practices	1.1 Safe work practices followed 1.2 <u>Personal Protective Equipment</u> (PPE) is used. 1.3 <u>Hazards</u> 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 <u>Hand tools</u> are identified; 2.3 <u>Power tools</u> 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 <u>sequence of operations</u> ; 4.2 Produce desired outcomes conforming to <u>job specifications</u> ; 4.3 All safety requirements are compiled during and after use; 4.4 <u>Operational maintenance</u> 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	<p style="text-align: center;"><u>Hand Tools</u></p> 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. <p style="text-align: center;"><u>Power Tools</u></p> 2.26 Electric drill machine 2.27 Grinders 2.28 Soldering iron 2.29 Hot gun

3. Equipment	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 4.1 Clamping, 4.2 Alignment and 4.3 Adjustment.
5. Job specifications	<ul style="list-style-type: none"> 5.1 Finish size and 5.2 Shape
6. Operational maintenance	<ul style="list-style-type: none"> 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.	
Critical aspects of competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<p>The following resources must be provided</p> <ul style="list-style-type: none"> 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
<p>Accreditation Requirements</p> <p>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.</p>	

Occupation Specific Competencies

Unit Code and Title	OUC001L1V1: Apply basic concepts of electricity
Nominal Hours	35 hours
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 performing connection of electrical circuits.
Element of Competency	Performance Criteria <u>Bold and Underlined</u> terms are elaborated in the range of variables
1. Practice OSH.	1.1 Appropriate PPE is selected. 1.2 PPE is used as per workplace requirements.
2. Apply electrical concept and working principles.	2.1 Source of electricity is interpreted; 2.2 Use of electricity is demonstrated; 2.3 Difference between AC and DC explained; 2.4 Use of <u>electrical measuring units</u> explained; 2.5 Measurement of voltage, current and resistance with <u>measuring instrument</u> are demonstrated; 2.6 Power and energy of a particular load is explained; 2.7 Power and energy of a particular load is calculated; 2.8 Measurement of power and energy with measuring instrument are demonstrated;
3. Interpret principles of electricity generation.	3.1 Principles of generate electricity is explained; 3.2 Difference between AC and DC demonstrated. 3.3 Flow of electrical current is explained.
4. Use electrical conductor, semiconductor and nonconductor.	4.1 Types of <u>electrical conductors</u> are identified and used 4.2 Types of <u>semiconductors</u> are identified. 4.3 Types of <u>nonconductors/Insulators</u> are identified;
5. Select cables and wires	4.4 Difference between cables and wires are identified; 4.5 Types of cables and wire are identified; 4.6 Coulor of phase, neutral and earth wires are identified; 4.7 Size of wire and cables are measured by SWG
6. Perform connection of electrical circuits	5.1 Electrical circuits are explained. 5.2 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;
Range of Variables	
Variable	Range

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).
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 AVO meter (Analog and Digital).
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 Charcoal. 4.2 Carbon. 4.3 Wet soil 4.4 Germanium 4.5 Silicon
5. Nonconductor.	Nonconductor 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.
<p>Accreditation Requirements</p> <p>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.</p>	

Unit Code and Unit Title	OUCE002L1V1: Use equipment and measuring instrument in the workplace
Nominal Hours	50 hours
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.
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the range of variables
1. Follow OSH practices	1.1 Safe work practices followed and Personal 1.2 <u>Personal Protective Equipment (PPE)</u> is used 1.3 <u>Hazards</u> at workplace is eliminated
2. Identify equipment and measuring instrument	2.1 <u>Tools</u> are collected and used as per <u>instruction</u> 2.2 <u>Equipment</u> is identified, collected and documented 2.3 <u>Measuring instrument</u> are identified, collected 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 <u>Components</u> 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 Joints are picked up clearly. 4.3 Jumper is picked up from copper strip board. 4.4 De-soldering tool is applied. 4.5 De-soldering is performed as per instruction.
5. Use SMD rework station (Hot gun)	3.1 SMD rework station (Hot gun) is collected 3.2 Temperature and air pressure of hot gun are set 3.3 Different types of nozzles are used
6. Prepare For Measurement	4.1 Job is identified to be measured 4.2 Measuring instrument and equipment is selected according to job requirements 4.3 <u>Routine adjustments</u> are done for measurement.

7. Take and record measurement	<p>1.1 Measurement is taken with basic calculation according to the job documents.</p> <p>1.2 Measurement is checked against job requirement.</p> <p>1.3 Measurements are recoded on form/drawing/sketches</p>
8. Store the materials	<p>2.1 Equipment and measuring instrument are cleaned and stored.</p> <p>2.2 The workplace is cleaned as per workplace standard.</p>
Range of Variables	
Variable	Range (May include but not limited to):
1. Personal Protective Equipment (PPE)	<p>1.1 Safety helmet</p> <p>1.2 Safety belt</p> <p>1.3 Safety shoes</p> <p>1.4 Hand gloves</p> <p>1.5 Apron</p> <p>1.6 Safety eye glass</p> <p>1.7 Goggles</p>
2. Hazard	<p>2.1. Accumulation of waste materials</p> <p>2.2. Random storage of tools, equipment and furniture</p> <p>2.3. Storage of rejected wires, cables and structural materials</p> <p>2.4. Storage of flammable materials</p> <p>2.5. Congested emergency exit</p> <p>2.6. Oil spilt floor at workplace</p>
3. Instruction	<p>3.1 Note</p> <p>3.2 Instruction sheet</p> <p>3.3 Safety manual</p> <p>3.4 Symbol display charts</p> <p>3.5 Components display board</p>
4. Equipment	<p>5.1 Soldering Iron</p> <p>5.2 SMD rework station (Hot gun)</p> <p>5.3 De-soldering pump</p> <p>5.4 Multi-meter (Analog / Digital)</p> <p>5.5 Air blower</p> <p>5.6 DC power supply</p> <p>5.7 LCD tester</p> <p>5.8 Magnifying lamp</p> <p>5.9 Microscope</p> <p>5.10 Oscilloscope</p> <p>5.11 Signal generator</p>
5. Measuring Instrument and Equipment	<p>5.1 Analogue tester</p> <p>5.2 Digital multimeter</p> <p>5.3 Pattern Generator</p> <p>5.4 Frequency counter</p> <p>5.5 Industrial DC power supply</p> <p>5.6 LCR Bridge</p>

	5.7 Sequence trainer 5.8 PLC sequence trainer 5.9 Analogue oscilloscope 5.10 Digital oscilloscope 5.11 Sweep function generator
6. Measurement	4.1 AC Voltage / current 4.2 DC Voltage / current 4.3 Resistance 4.4 Capacitance 4.5 Inductance
7. Component	6.1 Transistor 6.2 Fuse 6.3 Resistor 6.4 Speaker 6.5 Receiver 6.6 Microphone 6.7 Battery 6.8 Fuses 6.9 Inductor 6.10 Capacitors 6.11 Coupler 6.12 Sensor 6.13 Diode 6.14 LED 6.15 ICs 6.16 Receiver 6.17 Speaker 6.18 Microphone 6.19 Display Module 6.20 Battery 6.21 Switches 6.22 Antennas 6.23 Diac 6.24 Triac 6.25 SCR 6.26 FET 6.27 MOSFET 6.28 IGBT
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: <ul style="list-style-type: none"> 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	<p>Trainee will acquire knowledge of:</p> <p>2.1 Use of equipment 2.2 List of measuring instrument 2.3 Use of measuring instrument 2.4 Sequence of using the instruments</p>
3. Underpinning skills	<p>3.1 Identifying equipment and measuring instrument 3.2 Selecting proper measuring instrument 3.3 Taking Measurement accurately 3.4 Recording measurement</p>
4. Underpinning attitude	<p>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</p>
5. Resource implication	<p>The following resources must be provided:</p> <p>5.1 Workplace (actual or simulated) 5.2 Tools, equipment and materials must be provided</p>
6. Methods of assessment	<p>Methods of assessment may include but not limited to:</p> <p>6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio</p>
7. Context of assessment	<p>7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor</p>
<p>Accreditation Requirements</p> <p>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.</p>	

Unit Code and Title	OUCE003L1V1: Identify and Test Electronics Components
Nominal Hours	20 Hours
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.
Elements of competency	Performance Criteria <u>Bold & Underlined</u> words are elaborated in the Range of Variables
1. Prepare for testing and measuring	1.1 Safe work practices observed and personal proactive equipment (PPE) worn as required for the work place requirement. 1.2 Appropriate equipment is selected according to tasks requirements. 1.3 <u>Measuring/testing equipment</u> and work place are prepared according to specification and tasks. 1.4 Power supply and component needed to complete the work are prepared.
2. Identify the components	2.1 Common electronic components and parts are identified; 2.2 Components & Parts are listed; 2.3 Function of components are interpreted 2.4 Components and parts are used;
3. Test components	3.1 Terminal of testing equipment is connected to the <u>components</u> 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):
Measuring equipment	1.1 Industrial DC power supply 1.2 LCR Bridge 1.3 Digital multi meter 1.4 Sequence trainer 1.5 Analogue tester 1.6 PLC sequence trainer 1.7 Analogue oscilloscope 1.8 Pattern Generator 1.9 Digital oscilloscope 1.10 Sweep function generator

1. Measuring and testing component.	3.1 Cells and battery. 3.2 Variable power supply. 3.3 Connecting wires 3.4 Transistors 3.5 Different types of resistors. 3.6 Different kinds of transformer 3.7 Different kinds of capacitors. 3.8 Different kinds of rectifiers.	3.9 Diode 3.10 SCR 3.11 DIAC 3.12 TRIAC 3.13 FET 3.14 MOSFET 3.15 LED
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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

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	OUCE004L1V1-Assemble Electronics Devices and Components
Nominal Hours	60 Hours
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.
Element of Competency	PERFORMANCE CRITERIA <i>Bold & Italicized</i> terms are elaborated in the Range of Variables
1. Prepare for assemble	<p>1.1. Assembly workplace is prepared as per standard operating procedure.</p> <p>1.2. Work instructions are obtained and clarified based on client requirements.</p> <p>1.3. Responsible person is consulted for effective and proper work coordination.</p> <p>1.4. <u>Tools and equipment</u> are prepared and checked in accordance with job requirement.</p> <p>1.5. <u>Materials</u> are prepared and checked in accordance with job requirement.</p> <p>1.6. Parts and components needed are identified and prepared as per job requirement.</p>
2. Prepare circuit on breadboard	<p>2.1 <u>Circuit diagram</u> is selected</p> <p>2.2 Breadboard is selected</p> <p>2.3 <u>Components</u> are selected as per diagram</p> <p>2.4 Circuit is prepared on breadboard as per diagram;</p> <p>2.5 Functionality of circuit is tested;</p>
3. Mount and solder components	<p>3.1 Printed circuit board (PCB) layout is checked for conformity with schematic diagram as per layout rules.</p> <p>3.2 <u>Mounting technique</u> is identified and selected.</p> <p>3.3 Components are mounted as per diagram and soldered</p> <p>3.4 Soldered components are checked</p> <p>3.5 Performance of the circuit is tested,</p>
4. Identify SMD components	<p>4.1 SMD components are identified;</p> <p>4.2 SMD components are listed</p> <p>4.3 SMD components are interpreted;</p>
5. Install SMD components	<p>5.1 Common electronics <u>SMD component</u> are selected and collected</p> <p>5.2 PCB is selected and collected;</p> <p>5.3 SMD components are installed on PCB as per requirement</p> <p>5.4 Functions are tested</p>
6. Clean and store tools and equipment	<p>6.1 Cleaning of tools and equipment is performed in accordance with work site procedures.</p> <p>6.2 Tools and equipment are stored safely in appropriate location according to standard procedures</p>

RANGE OF VARIABLES	
VARIABLE	Range (Included but not limited to):
1. Tools and equipment	1.1. Tools <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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-electrolytic Capacitor 3.4 Electrolytic 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 Switch 4.10 Speaker/Buzzer 4.11 LED

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: <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 2.1. Rectifier 2.2. Amplifier 2.3. Power supply 2.4. Switching
3. Underpinning skills	<ul style="list-style-type: none"> 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

	<p>3.7 Performing assembly</p> <p>3.8 Carrying out testing and inspection</p>
4. Required Attitude	<p>4.1 Tidy and punctual</p> <p>4.2 Prompt in carrying out activities</p> <p>4.3 Sincere and honest concerning duties</p> <p>4.4 Active on teamwork</p> <p>4.5 Eager to learn</p> <p>4.6 Concerned for proper use of tools</p> <p>4.7 Committed to occupational health and safety practices</p> <p>4.8 Respectful of peers, subordinates and seniors in the workplace</p>
5. Resource implications	<p>The following resources must be provided.</p> <p>5.1 Workplace (simulated or actual)</p> <p>5.2 Personal protective equipment (PPE)</p> <p>5.3 Tools and equipment</p> <p>5.4 Materials and accessories</p> <p>5.5 Job specifications</p> <p>5.6 Standard operating procedure</p> <p>5.7 Projector</p> <p>5.8 Stationary</p> <p>5.9 Learning manual</p>
6. Method of assessment	<p>Competency must be assessed by-</p> <p>6.1 Written test</p> <p>6.2 Demonstration</p> <p>6.3 Oral Questioning</p>
7. Context of assessment	<p>7.1 Competency assessment must be done in NSDA accredited assessment centre</p> <p>7.2 Assessment should be done by a NSDA certified/nominated assessor</p>
<p>Accreditation Requirements</p> <p>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</p>	

Unit Code and Title	OUCE005L1V1 - Repair and Service Basic Home Appliances
Nominal Hours	100 Hours
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.
Elements of Competency	PERFORMANCE CRITERIA <u>Bold & Underlined</u> terms are elaborated in the range of variables
1. Prepare appliances, tools, equipment and workplace	<p>1.1 Safe work practices observed and personal protective Equipment are (PPE) worn as required for the work performed.</p> <p>1.2 Assembly workplace is prepared in accordance with <u>OH&S policies and procedures.</u></p> <p>1.3 <u>Responsible person</u> is consulted for effective and proper work coordination.</p> <p>1.4 Required <u>materials, tools and equipment</u> are prepared and checked in accordance with work place requirement.</p> <p>1.5 <u>Domestic Electronics Appliances</u> are needed to complete the work are prepared and obtained according to requirements.</p>
2. Services Cooker (Rice, Carry. Induction, Infra-red)	<p>2.1 Occupational, Health and Safety regulations, codes and practices in the workplace are applied;</p> <p>2.2 Cookers are dismantled for internal tests/servicing/repairs according to manufacturer's instructions;</p> <p>2.3 Continuity of wire/switch/protective devices are checked by using specified test</p> <p>2.4 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures.</p> <p>2.5 Windings are checked by using specified test instruments to detect defects.</p> <p>2.6 Faulty components are diagnosed;</p> <p>2.7 Faulty parts are repaired/replaced as per diagnosed fault.</p> <p>2.8 Winding is rewind if wind is burnt;</p> <p>2.9 Cooker is re-assembled and checked in test bench as per standard</p>
3. Services Blender and Juicer	<p>3.1 Occupational, Health and Safety regulations, codes and practices in the workplace are applied;</p> <p>3.2 Blender and Juicer are dismantled for internal tests/servicing/ repairs according to manufacturer's instructions;</p> <p>3.3 Continuity of wire/switch/protective devices are checked by using specified test</p> <p>3.4 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures.</p> <p>3.5 Windings are checked by using specified test instruments to detect defects.</p> <p>3.6 Faulty components are diagnosed;</p>

	<p>3.7 Faulty parts are repaired/replaced as per diagnosed fault.</p> <p>3.8 Winding is rewind if wind is burnt;</p> <p>3.9 Blender and Juicer is re assembled and checked in test bench as per standard</p>
4. Service Microwave Oven	<p>4.1 Occupational, Health and Safety regulations, codes and practices in the workplace are applied;</p> <p>4.2 Microwave Oven is dismantled for internal tests/servicing/repairs according to manufacturer's instructions</p> <p>4.3 Continuity of wire/switch/protective device are checked by using specified test</p> <p>4.4 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures.</p> <p>4.5 Problems in D.C circuits are solved;</p> <p>4.6 Faulty components are diagnosed and cleaned the parts with specified cleaning material</p> <p>4.7 Drawings, diagrams, schedules, standards, codes and specifications are used;</p> <p>4.8 Faulty parts are repaired/replaced as per diagnosed fault.</p> <p>4.9 Microwave Oven is re assembled and checked Microwave Oven in test bench as per standard.</p>
5. Service Electric Iron and Kettle	<p>5.1 Occupational, Health and Safety regulations, codes and practices in the workplace are applied;</p> <p>5.2 Electric Iron and Kettle are dismantled for internal tests/servicing/repairs according to manufacturer's instructions;</p> <p>5.3 Continuity of wire/switch/protective devices are checked by using specified test</p> <p>5.4 Visual mechanical defects are inspected such as, loose connection, short circuit, insulation and temperatures.</p> <p>5.5 Faulty components are diagnosed;</p> <p>5.6 Faulty parts are repaired/replaced as per diagnosed fault.</p>
6. Clean and store tools and equipment	<p>7.1 Cleaning of tools and equipment is performed in accordance with work site procedures.</p> <p>7.2 Tools and equipment are stored safely in appropriate location according to standard procedures</p>

RANGE OF VARIABLES

Variables	Range (Included but not limited to):
1. OHS policies and procedures	<p>1.1 Hazardous and risk assessment mechanisms.</p> <p>1.2 Implementation of safety regulations.</p> <p>1.3 Safety training.</p> <p>1.4 Safety systems incorporating.</p> <p>1.5 Work clearance procedures</p> <p>1.6 Isolation procedures.</p> <p>1.7 Use of protective equipment and clothing</p>
2. Responsible person	<p>2.1 Competent Authority</p> <p>2.2 Service supervisor</p>

3. Materials, tools and equipment	Tools	Materials
	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	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
4. Domestic Electronics Appliances	4.1 Cooker (Rice, Carry. Induction, Infra-red, Multi) 4.2 Blender and Juicer 4.3 Microwave Oven 4.4 Electric Iron 4.5 Electric Kettle	
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	7.3 Competency assessment must be done in NSDA accredited assessment centre 7.4 Assessment should be done by a NSDA certified/nominated assessor
<p>Accreditation Requirements</p> <p>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</p>	

Unit Code and Title	OUCE006L1V1- Assemble and repair LED bulbs and LED tube light
Nominal Hours	20 Hours
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.
Element of Competency	PERFORMANCE CRITERIA <i>Bold & Italicized</i> terms are elaborated in the Range of Variables
1. Prepare for assemble and repair	<p>1.1. Assembly workplace is prepared as per standard operating procedure.</p> <p>1.2. Work instructions are obtained and clarified based on client requirements.</p> <p>1.3. Responsible person is consulted for effective and proper work coordination.</p> <p>1.4. <u>Tools and equipment</u> are prepared and checked in accordance with job requirement.</p> <p>1.5. <u>Materials</u> are prepared and checked in accordance with job requirement.</p> <p>1.6. Parts and components needed are identified and prepared as per job requirement.</p>
2. Assemble LED bulb	<p>2.6 Circuit diagram is collected;</p> <p>2.7 <u>Parts</u> are selected as per diagram</p> <p>2.8 Circuit is prepared on PCB as per diagram;</p> <p>2.9 Functionality of bulb is tested;</p>
3. Repair LED bulb	<p>3.6 Faults of LED bulb are identified;</p> <p>3.7 Parts are selected accordingly;</p> <p>3.8 Faulty parts are replaced;</p> <p>3.9 Performance of the LED bulb is tested;</p>
4. Assemble LED tube light	<p>4.1 Circuit diagram is collected;</p> <p>4.2 <u>Parts</u> are selected as per diagram</p> <p>4.3 Circuit is prepared on PCB as per diagram;</p> <p>4.4 Functionality of tube light is tested;</p>
5. Repair LED tube light	<p>5.1 Faults of LED bulb are identified;</p> <p>5.2 Parts are selected accordingly;</p> <p>5.3 Faulty parts are replaced;</p> <p>5.4 Performance of the LED tube light is tested;</p>
6. Clean and store tools and equipment	<p>6.3 Cleaning of tools and equipment is performed in accordance with work site procedures.</p> <p>6.4 Tools and equipment are stored safely in appropriate location according to standard procedures</p>

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. Hot air soldering station 1.2.3. Assorted electronic sensors
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: <ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<p>The following resources must be provided.</p> <ul style="list-style-type: none"> 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	<p>Competency must be assessed by-</p> <ul style="list-style-type: none"> 6.4 Written test 6.5 Demonstration 6.6 Oral Questioning
7. Context of assessment	<ul style="list-style-type: none"> 7.5 Competency assessment must be done in NSDA accredited assessment centre 7.6 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	OUCE008L1V1: Identify major parts of LED/LCD TV
Nominal Hours	20 Hours
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Identify major parts of LED/LCD TV. It specifically includes the tasks of following OSH practice; identifying sections and components of LED/LCD TV
Elements of Competency	Performance Criteria <u>Bold and Underlined</u> terms are elaborated in the Range of Variables
1. Follow OSH Practice	1.1 <u>Tools and equipment</u> are collected and used 1.2 <u>Personal Protective Equipment (PPE)</u> is used 1.3 OSH is followed
2. Identify the sections	2.1 The TV set is disassembled 2.2 <u>Sections of TV</u> is identified 2.3 Sections of TV is listed;
3. Identify the components	3.1 <u>Components & Parts</u> of TV are identified; 3.2 Components & Parts of TV are listed; 3.3 Function of components 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 and safety glasses 1.6 Smoke absorber 1.7 Floor mat
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 components & parts	5.1 T-con Board 5.2 Ocell/Panel 5.3 Inverter/Backlight Drive 5.4 IR Board 5.5 Key Pad 5.6 Back Light 5.7 LVDS (Low Voltage Differential Signal) 5.8 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/LCD TV 1.2 Identified components of LED/LCD TV
2. Underpinning knowledge	Trainee will acquire knowledge of: 2.1 Sections of LED/LCD TV 2.2 Function of the sections 2.3 Components of LED/LCD TV 2.4 Parts of basic LED/LCD TV
3. Underpinning skills	3.1 Assembling and disassembling of LED/LCD TV 3.2 Identifying sections of LED/LCD TV 3.3 Identifying components of LED/LCD TV 3.4 Identifying parts of LED/LCD TV

4. Required attitudes	<ul style="list-style-type: none"> 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	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 5.1 Workplace (actual or simulated) 5.2 Note 5.3 Instruction sheet 5.4 Safety manual 5.5 LED/LCD TV 5.6 LED/LCD TV disassembling and reassembling tools and equipment;
6. Methods of assessment	<p>Methods of assessment may include but not limited to:</p> <ul style="list-style-type: none"> 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio
7. Context of assessment	<ul style="list-style-type: none"> 7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor
<p>Accreditation Requirements</p> <p>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.</p>	

Development of Competency Standard

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

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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.

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