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**Federal Democratic Republic of Ethiopia**

**Occupational Standard**

**BASIC ELECTRICAL/ELECTRONIC EQUIPMENT SERVICING**

 **NTQF Level I**



**Introduction**





*Ministry of Education*

*November 2015*

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standards (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET Qualification Framework (NTQF).They are national Ethiopia standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

* Occupational title, NTQF level
* Unit code
* Unit title
* Unit descriptor
* Elements and Performance criteria
* Variables and Range statement
* Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the occupation with all the key components of a Unit of Competence:

* chart with an overview of all Units of Competence for the respective level including the Unit Codes and the Unit Titles
* contents of each Unit of Competence (competence standard)
* occupational map providing the Technical and Vocational Education and Training (TVET) providers with information and important requirements to consider when designing training programs for this standards and for the individual, a career path

**UNIT OF COMPETENCE CHART**

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| **Occupational Standard:Basic Electrical/Electronic Equipment Servicing** |
| **Occupational Code: INDEES** |
| ***NTQF Level I*** |
| [IND EES1 08 1115](#IND_EES1_08_)Perform Basic Computer Operation[IND EES1 14 1115](#IND_EES1_14_)Develop Understanding of Entrepreneurship[IND EES1 12 1115](#IND_EES1_12_)Receive and Respond to Workplace Communication[IND EES1 09 1115](#IND_EES1_09_)Perform Housekeeping Procedures[IND EES1 01 1115](#IND_EES1_01_)Use Hand Tools and Test Instruments[IND EES1 02 1115](#IND_EES1_02_)Perform Measurement and Calculation[IND EES1 03 1115](#IND_EES1_03_)Prepare and Interpret Technical Drawing[IND EES1 06 1115](#IND_EES1_06_)Terminate and Connect Electrical Wirings and Electronic Circuits[IND EES1 07 1115](#IND_EES1_07_)Troubleshoot AC/DC Power Supply with Single-phase Input[IND EES1 04 1115](#IND_EES1_04_)Test Electrical & Electronic Parts[IND EES1 13 1115](#IND_EES1_13_)Demonstrate Work Values[IND EES1 10 1115](#IND_EES1_10_)Apply Quality Standards[IND EES1 11 1115](#IND_EES1_11_)Work with Others[IND EES1 05 1115](#IND_EES1_05_)Design and Construct Simple Printed Circuit Board[IND EES1 15 1115](#IND_EES1_15_)Apply 3S |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Use Hand Tools and Test Instruments** |
| **Unit Code** | [IND EES1 01 1115](#IND_EES1_01_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes on the safe use, handling and maintenance of tools and test instruments. |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare tasks and workstation
 | * 1. Tasks to be undertaken are properly identified.
	2. Appropriate ***hand toolsand test instruments*** are identified and selected according to the task requirements.
	3. Workstation is made ready in accordance with job requirements/specifications.
 |
| 1. Prepare hand tools
 | * 1. Appropriate hand tools are checked for proper operation and safety.
	2. Unsafe or faulty tools are identified and marked for repair according to standard company procedures.
 |
| 1. Use hand tools and test equipment
 | * 1. Tools are used according to tasksundertaken.
	2. All safety procedures in using tools are observed at all times and appropriate ***Personal Protective Equipment(PPE)***is used.
	3. Malfunctions, unplanned or unusual events are reported to the supervisor.
 |
| 1. Maintain hand tools
 | * 1. Tools are handled without damage according to procedures.
	2. Routine ***maintenance*** of tools is undertaken according to standard operational procedures, principles and techniques.
	3. Tools are stored safely in appropriate locations in accordance with manufacturer’s specifications or standard operating procedures.
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| **Variable** | **Range** |
| Hand tools and test instruments | * + Hand tools for adjusting, dismantling, assembling, finishing and cutting. Tool set includes the following but not limited to: screw drivers, pliers, punches, wrenches, files
	+ Test instruments for measuring voltage, current, and resistance. Test instruments include: volt meter, ohmmeter, ammeter, frequency meter, power meter, Kwh meter,
 |
| Personal Protective Equipment (PPE) | PPE includes the following but not limited to:* Gloves
* Protective eyewear
* Apron/overall
 |
| Maintenance | * Cleaning
* Lubricating
* Tightening
* Simple tool repairs
* Hand sharpening
* Adjustment using correct procedures
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate to:* Demonstratesafe working practices at all times
* communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
* plan tasks in all situations and reviewed task requirements
* perform all tasks to specification
* maintain and store tools in appropriate location
 |
| Underpinning knowledge | Demonstrate knowledge of:* Safety requirements in handling tools
* Tools: Function, Operation, Common faults
* Maintenance of tools
* Storage of Tools
 |
| Underpinning skills | Demonstrate skills of:* Reading skills required to interpret work instruction and numerical skills
* Communication skills
* Problem solving in emergency situation
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Perform Measurement and Calculation** |
| **Unit Code** | [IND EES1 02 1115](#IND_EES1_02_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes needed toidentify, care, handle and use measuring instruments. |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare tasks
 | 1. Object or component to be measured is identified according to procedures.
2. Correct specifications are obtained from relevant source.
3. Measuring tools are selected in line with job requirements.
4. Workstation is made ready in accordance with job specifications.
 |
| 1. Select measuring instruments
 | 1. Appropriate ***measuring instrument***is selected to achieve required outcome.
2. Accurate measurements are obtained for job.
3. ***Calculation*** needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/).
4. Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks.
5. Numerical computation is checked and corrected for accuracy.
6. Instruments are read to the limit of accuracy of the tool.
 |
| 1. Carry out measurements and calculation
 | 1. Measuring instruments are handles without damage according to procedures.
2. Measuring instruments are cleaned before and after using.
3. Proper storage of instruments is undertaken according to manufacturer’s specifications and standard operating procedures.
 |
| 1. Maintain measuring instruments
 | 1. Object or component to be measured is identified according to procedures.
2. Correct specifications are obtained from relevant source.
3. Measuring tools are selected in line with job requirements.
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| **Variable** | **Range** |
| Measuring instruments | May Includebut not limited to:* Straight edge
* Torque gauge
* Try square
* Protractor
* Combination gauge
* arm rule
 |
| Calculation | May Includebut not limited to:* Volume
* Area
* Displacement
* Inside diameter
* Circumference
* Length
* Thickness
* Outside diameter
* Taper
* Out of roundness
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate to:* Select proper measuring instruments according to tasks
* Carry out measurement and calculations
* Maintain and store instruments
 |
| Underpinning knowledge | Demonstrate knowledge of:* Types of measuring instruments and their uses
* Safe handling procedures in using measuring instruments
* Four fundamental operation of mathematics
* Formula for volume, area, perimeter and other geometric figures
 |
| Underpinning skills | Demonstrate skills of:* Reading skills required to interpret work instruction
* Communication skills
* Handling measuring instruments
* Performing mathematical calculations using the four fundamental operations
* Visualizing objects and shapes
* Interpreting formulae
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Prepare and Interpret Technical Drawing** |
| **Unit Code** | [IND EES1 03 1115](#IND_EES1_03_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes and values needed to prepare/interpret diagrams, engineering abbreviation and drawings, symbols, dimension. |

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| **Elements** | **Performance Criteria** |
| 1. Identify different kinds of technical drawings
 | * 1. Correct ***technical drawing*** is selected according to job requirements.
	2. Technical drawings are segregated in accordance with the types and kinds of drawings.
 |
| 1. Interpret technical drawing
 | 1. Components, assemblies or objects are recognized as required.
2. ***Dimensions*** of the key features of the objects depicted in the drawing are correctly identified.
3. ***Symbols*** used in the drawing are identified and interpreted correctly.
4. Drawing is checked and validated against job requirements or ***equipment*** in accordance with standard operating procedures.
 |
| 1. Prepare/make changes to schematics and drawings
 | 1. Electrical/electronic schematic is drawn and correctly identified.
2. Correct drawing is identified, equipment are selected and used in accordance with job requirements.
 |
| 1. Store technical drawings and equipment /instruments
 | * 1. Care and maintenance of drawings are undertaken according to company procedures.
	2. Technical drawings are recorded and inventory is prepared in accordance with company procedures.
	3. Proper storage of instruments is undertaken according to company procedures.
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| **Variable** | **Range** |
| Technical drawings | Include the following but not limited to:* Schematic diagrams
* Charts
* Block diagrams
* Lay-out plans
* Location plans
* Process and instrumentation diagrams
* Loop and System Control Diagrams
 |
| Dimensions  | Dimensions may include but not limited to:* Length
* Width
* Height
* Diameter and Angles
 |
| Symbols | May include but not limited to:* NEC- National Electric Code
* IEC -International Electro-technical Commission
* ASME - American Society of Mechanical Engineers
 |
| Equipment | May include but not limited to:* Components/dividers
* Drawing boards
* Rulers
* T-square and Calculator
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| **Evidence Guide** |
| Critical Aspects of competencies | Assessment require evidence that the candidate to:* Select correct technical drawing in line with job requirements
* Correctly identified the objects represented in the drawing
* Identify and interpret symbols used in the drawing correctly
* Prepare/produce= electrical/electronic drawings including all relevant specifications
* Store diagrams/equipment
 |
| Underpinning knowledge | Demonstrate knowledge of:* Drawing conventions
* Symbols
* Dimensioning Conventions
* Mark up/Notation of Drawings
* Mathematics:
* Four fundamental operations
* Percentage

Fraction* Trigonometric Functions
* Algebra and Geometry
 |
| Underpinning skills | Demonstrate skills of:* Drawing and Reading skills required to interpret work instruction
* Communication skills
* Interpreting electrical/electronic signs and symbols
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Test Electrical & Electronic Parts** |
| **Unit Code** | [IND EES1 04 1115](#IND_EES1_04_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes needed to identifyand testing of electrical & electronics parts. |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare to identify/test electrical/electronicparts
 | * 1. ***Materials*** are checked according to specifications and tasks
	2. Appropriate ***tools and test instrument*** are selected according to task requirements
	3. Task is planned to ensure occupational health and safety (OHS) guidelines and procedures are followed
	4. Electrical/electronic parts are identified correctly and prepared for testing, de-soldering/soldering of electronic parts in accordance with instructions and work procedures
 |
| 1. Identify and test Electrical/electronic parts
 | * 1. Safety procedures in using hand tools/test instrument are observed at all times and appropriate ***personal protectiveequipment***are used
	2. Work is undertaken safely in accordance with the workplace and standard procedures
	3. Important ***Electrical/Electronic Components*** are identified
	4. Appropriate range of ***methods***in testing***electrical /electronic circuits& parts*** (***capacitor, diode, resistor, transistor, power supply and other electrical/electronic component) a***re used according to specifications, manufacturer’s requirements and safety.
	5. Correct use of test/measuring instrument is followed according to electrical/electronic parts function and specification.
	6. Confirm the electrical/electronic parts data, function and value in accordance to parts/component specification.
 |
| 1. Test the construction of electrical/ electronic circuits
 | * 1. ***Testing*** of the completed construction of electrical/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment.
	2. ***Check the accurate operation*** of the constructed circuit.
	3. Unplanned events or conditions are responded to in accordance with established procedures.
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| **Variable** | **Range** |
| Materials | Included the following but not limited to:* + - Soldering lead
		- Flux
		- Cables
		- Printed Circuit Board (PCB)
		- Electrical/Electronic parts and components (resistor, diode, transistor, capacitor etc.)
		- Wires
		- AC/DC power supply
		- Data book
 |
| Tools, test/measuring instrument | Includes the following but not limited to:* + - Pliers
		- Cutters
		- Screw drivers
		- StDEF rule
		- Equipment
* Soldering gun
* Multi-tester
* Meggertester
 |
| Personal protective equipment | May include but not limited to:* + Goggles
	+ Gloves
	+ Apron/overall
 |
| Electrical/Electronic Components | Includes:* + Passive components
	+ Active components
	+ Logic gates *and* IC's
 |
| Electrical /electronic circuits | Includes:* + Power supply
	+ Rectifier and Amplifier
 |
| Methods | Includes:* + Amp/milliamp reading
	+ Voltage/millivolt reading
	+ Soldering/de-soldering techniques
	+ Resistance test
	+ Continuity test
	+ Short/open circuit test
	+ Input/output test
	+ Colour code/Value reading
	+ Components pin identification
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate to:* + Undertake work safely and according to workplace and standard procedures
	+ Useappropriate electrical/electronic test/measuring instrument
	+ Use appropriate electrical/electronic test/measuringtechniques
	+ Follow correct procedures in testing/measuring electronic parts and component
	+ perform identification of parts and value reading
	+ Conducttesting of the constructed electrical/electronic circuits using appropriate procedures and standards
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* + specifications and use of tools
	+ use of test instruments/equipment
	+ electrical/electronics theory
	+ single phase ac principles
	+ wiring techniques
	+ AC/DC power supplies
	+ soldering/de-soldering method and techniques
	+ colour code and specification of parts
 |
| Underpinning Skills | Demonstrate skills of:* + Reading skills required to interpret work instruction
	+ Communication skills
	+ Soldering/de-soldering techniques
	+ Circuit construction skill
	+ Use of test/measuring instrument techniques
	+ Data book Reading skill
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Design and Construct Simple Printed Circuit Board** |
| **Unit Code** | [IND EES1 05 1115](#IND_EES1_05_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes needed to design and construct basic consumer electrical/electronics circuits. |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare to construct/ electrical/electronics circuits
 | * 1. ***Materials*** are checked according to specifications and tasks.
	2. Appropriate ***tools and equipment*** are selected according to task requirements.
	3. Task is planned to ensure Occupational Health and Safety (OHS) guidelines and procedures are followed.
	4. Electrical/electronic circuits are correctly prepared for connecting and soldering in accordance with instructions and work site procedures.
 |
| 1. Construct electrical /electronics circuits on PCB
 | * 1. Safety procedures in using hand tools/equipment are observed at all times and appropriate ***personal protectiveequipment***is used.
	2. Work is undertaken safely in accordance with the workplace and standard procedures.
	3. Important ***Electrical/Electronic Components*** are identified.
	4. Appropriate range of ***methods***in constructing***electrical /electronic circuits***(Amplifiers, oscillators, power supply, digital circuits, air conditioner control circuit) are used according to specifications, manufacturer’s requirements and safety.
	5. Correct sequence of operation is followed according to job specifications (for example Transformer → Rectifier→ Filter → Regulator → Output to construct linear power supplycircuit).
	6. ***Accessories*** used are adjusted, if necessary.
	7. Confirm the construction is undertaken successfully in accordance with job specification.
 |
| 1. Test the construction of electrical/ electronic circuits
 | * 1. ***Testing*** of the completed construction of electrical/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment.
	2. ***Check the accurate operation*** of the constructed circuit.
	3. Unplanned events or conditions are responded to in accordance with established procedures.
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| **Variable** | **Range** |
| Materials | Included the following but not limited to:* + - Soldering lead
		- Flux
		- Cables
		- Ferric-chloride, permanent(ink) marker, sticker(reflector)
		- Printed Circuit Board (PCB)
		- Electrical/Electronic components and elements
		- Wires
 |
| Tools and equipment | Includes the following but not limited to:* + - Pliers
		- Cutters
		- Screw drivers
		- Starm rule

Equipment* Soldering gun
* Hand drill
* Multi-tester
 |
| Personal protective equipment | May include but not limited to:* + Goggles
	+ Gloves
	+ Apron/overall
 |
| Electrical/Electronic Components | Includes:* + Passive components
	+ Active components
	+ Logic gates
	+ IC's
 |
| Methods | Includes:* + Terminating
	+ Pin connection
	+ Soldering joints
	+ Plugs
 |
| Electrical /electronic circuits | Includes:* + Amplifiers(Voltage amplifiers, Current amplifier, Power amplifier)
	+ Oscillators
	+ Power supply, Rectifier
	+ Digital circuits (Adder, Subtractor, Encoder/Decoder, Multiplexer/De-multiplexer, Flip-flops, Counter, Shift register)
	+ Air conditioner control circuit
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:* + Undertake work safely and according to workplace and standard procedures
	+ UseappropriatePCB construction methods
	+ Followcorrect sequence in constructing the electrical/electronics circuit processon PCB
	+ Conduct testing of the constructed electrical/electronic circuits using appropriate procedures and standards
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* + specifications and use of tools
	+ use of test instruments/equipment
	+ electrical/electronics theory
	+ PCB construction process
	+ single phase ac principles
	+ wiring techniques
	+ DC power supplies
	+ soldering/de-soldering method and techniques
 |
| Underpinning Skills | Demonstrate skills of:* + Reading skills required to interpret work instruction
	+ Communication skills
	+ Soldering/de-soldering techniques
	+ Circuit construction skill on PCB
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Terminate and Connect Electrical Wirings and Electronic Circuits** |
| Unit Code | [IND EES1 06 1115](#IND_EES1_06_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes needed to terminate and connect electrical wirings and electronic circuits. |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare for termination/ connection of electrical wiring/electronics circuits
 | * 1. ***Materials*** are checked according to specifications and tasks.
	2. Appropriate ***tools and equipment*** are selected according to tasks requirements.
	3. Task is planned to ensure OHS guidelines and procedures are followed.
	4. Electrical wiring/electronic circuits are correctly prepared for connecting/termination in accordance with instructions and work site procedures.
 |
| 1. Terminate/ connect electrical wiring/electronic circuits
 | * 1. Safety procedures in using tools are observed at all times and appropriate ***personal protectiveequipment***is used.
	2. Work is undertaken safely in accordance with the workplace and standard procedures.
	3. Appropriate range of ***methods***in termination/connection is used according to specifications, manufacturer’s requirements and safety.
	4. Correct sequence of operation is followed according to job specifications.
	5. ***Accessories*** used are adjusted, if necessary.
	6. Confirm termination/connection undertaken successfully in accordance with job specification.
 |
| 1. Test termination/ connections of electrical wiring/ electronics circuits
 | * 1. Testing of all completed termination/ connections of electric wiring/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment.
	2. Wiring and circuits are checked using specified testing procedures.
	3. Unplanned events or conditions are responded to in accordance with established procedures.
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| **Variable** | **Range** |
| Materials | May include but not limited to:* + - Soldering lead
		- Cables
		- Wires
		- Insulating materials
		- flux
 |
| Tools and equipment | May include but not limited to:* + - Pliers
		- Cutters
		- Screw drivers
		- Insulation remover
		- Equipment
* Soldering gun and Multi-tester
 |
| Personal protective equipment | May include but not limited to:* + Goggles
	+ Gloves
	+ Apron/overall
 |
| Methods | Includes:* + Clamping
	+ Pin connection
	+ Soldered joints and Plugs
 |
| Accessories | May include but not limited to:* Brackets and Clamps
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:* + Undertook work safely and according to workplace and standard procedures
	+ Used appropriate termination/ connection methods
	+ followed correct sequence in termination / connection process
	+ Conducted testing of terminated connected electrical wiring/electronic circuits using appropriate procedures and standards
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* + specification and use of tools
	+ use of test instruments/equipment
	+ electrical theory
	+ single phase ac principles
	+ wiring techniques
	+ Type of wires
	+ DC power supplies
	+ soldering method and techniques
 |
| Underpinning Skills | Demonstrate skills to:* + Reading skills required to interpret work instruction
	+ Communication skills and Soldering techniques
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Troubleshoot AC/DC Power Supply with Single-phase Input** |
| **Unit Code** | [IND EES1 07 1115](#IND_EES1_07_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to troubleshoot and repairsingle-phase AC/DC power supply that includes transformer rewinding |

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| **Elements** | **Performance Criteria** |
| 1. Prepare product and work station for troubleshooting
 | * 1. Troubleshooting workplace is prepared in accordance with ***OHS policies and procedures****.*
	2. ***Responsible person***is consulted for effective and proper work coordination.
	3. Required ***materials*,*tools and equipment*** are prepared and checked in accordance with established procedures.
	4. Parts and materials needed to complete the work are prepared and obtained according to requirements.
 |
| 1. Diagnose faulty parts of power supply
 | * 1. Troubleshooting procedures arefollowed in accordance with OHS policies and procedures.
	2. Test instruments required for the job are used to test therequired parameters in accordance with the manufacturer'sdata and safety procedures.
	3. ***Defects/fault parts*** are identified using specified testing procedures.
	4. Identified defects and faults are explained to the responsible person in accordance with company policy and procedures.
	5. Results of diagnosis and testing are documented accurately and completely within the specified time.
	6. Customers are advised / informed regarding the status andserviceability of the unit.
 |
| 1. Maintain/repair the power supply unit
 | * 1. Personal protective equipmentis used in accordance with ***Occupational Health and Safety*** practices.
	2. Defective parts/components are replaced with identical or recommended appropriate equivalent ratings.
	3. ***Repaired or replaced parts/components***are soldered/mounted in accordance with the current industry standards.
	4. Control settings/adjustments are performed in conformity with service-manual specifications.
	5. Repair activity is performed within the required timeframe.
	6. Cleaning of unit is performed in accordance with standard procedures.
 |
| 1. Rewind low-power transformer
 | * 1. Rewinding process is performed in accordance with OHS policies and procedures.
	2. Process is checked according to established standards and requirements.
	3. Test instruments required for the job are used to test the required parameters in accordance with the manufacturer's data and safety procedures.
 |
| 1. Assemble low-power transformer
 | * 1. Assembling processes are performed in accordance with OHS policies and procedures.
	2. Process is checked according to established standards and requirements.
	3. Assembled products are checked in accordance with quality standards.
 |
| 1. Test and inspect repairedproducts
 | * 1. Repaired products are subjected to final visual inspection and testing in accordance with quality standards, procedures and requirements.
	2. Work completion is documented and responsible person is informed in accordance with established procedures.
	3. Housekeeping procedures are observed in accordance with 5S discipline and established procedures.
	4. Waste materials are disposed of in accordance with ***environmental requirements***.
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| **Variable** | **Range** |
| OHS policies and procedures | Arrangements of an organization or enterprise to meet their legal and ethical obligations of ensuring the workplace is safe and without risk to health. This may include:* + hazardous and risk assessment mechanisms
	+ implementation of safety regulations
	+ safety training
	+ safety systems incorporating:
		- work clearance procedures
		- isolation procedures
		- gas and vapor
		- monitoring/testing procedures
		- use of protective equipment and clothing
	+ use of codes of practice:
		- Ethiopian electrical code
 |
| Responsible person | May include but not limited to:* + Immediate supervisor
	+ Service supervisor/manager
 |
| Materials, tools and equipment | May include but not limited to:* + Conventional E-I Transformer Assembly
	+ Copper Wires
	+ Stranded Wires
	+ soldering and de-soldering tools
	+ screwdriver (assorted)
	+ screws (assorted)
	+ wrenches (assorted)
	+ Allen wrench/key
	+ utility knife/stripper
	+ multi-tester
	+ diodes, transistor, capacitor, resistor, transformer
	+ pliers (assorted)
	+ ball-peen hammer
	+ ESD-free work bench with mirror
	+ Caliper
 |
| Personal protective equipment | May include but not limited to:* + working clothes/apron
	+ hand gloves
	+ face/dust mask
	+ goggles and safety shoes
 |
| Repaired or replaced parts/components | May include but not limited to:* + soldering loss contacts
	+ rewinding low power transformer
	+ replacing faulty components
	+ cleaning
 |
| Environmental Requirements | May include but not limited to:* + proper disposal of chemicals and components shall be based on existing requirements of the law and chemical waste management
	+ non-biodegradable parts or materials shall be packed and labeled properly for disposal
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:* + Identified electrical/electronic components and devices and its proper handling
	+ Applied appropriate knowledge and technique on troubleshooting
	+ Repaired the unit according to specific requirements within timeframe allotted
	+ Applied safety rules and procedures
	+ Used tools and equipment properly
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* + Menstruation/Mathematics:
		- Conversion of Units
		- Applied Mathematics
	+ Drawing, Wiring, and Schematic Diagram:
		- Reading and interpreting orthographic projections and isometric views
		- Reading and interpreting electrical/electronic schematic diagram, wiring diagram and symbols
	+ Safety:
		- Work Safety requirements and economy of materials with durability
		- Knowledge in 5S application and observation of required procedures
	+ Materials, tools/instruments & equipment uses and specifications:
		- identification of hand and power tools
		- proper care and use of tools
		- identification of test and measuring instruments
		- proper care and use of test and measuring instruments
	+ System and processes:
		- Principles of Electrical Circuits
		- Fundamentals of Direct Current Circuits
		- Fundamentals of Alternating Current Circuits
		- Fundamentals of Electronic Components And Circuits
		- Fundamentals of Digital Logic, Components & Circuits
 |
| Underpinning Skills | Demonstrates skills of:* + application of troubleshooting technique
	+ use and maintenance of test instruments, tools, & equipment
	+ application of work safety practices and time management
	+ application of substitution technique
	+ soldering/de-soldering and wiring/cabling techniques
	+ schematic diagram reading skills
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Perform Basic Computer Operation** |
| **Unit Code** | [IND EES1 08 1115](#IND_EES1_08_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills, (and) attitudes and values needed to perform computer operations which include inputting, accessing, producing and transferring data using the appropriate hardware and software. |

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| **Element** | **Performance Criteria** |
| 1. Plan and prepare for task to be undertaken
 | * 1. Requirements of task are determined according to job specifications
	2. Appropriate ***hardware*** and ***software*** are selected according to task assigned and required outcome
	3. Task is planned to ensure ***OHS guidelines*** and procedures are followed
 |
| 1. Input data into computer
 | * 1. Data are entered into the computer using appropriate program/application in accordance with company procedures
	2. Accuracy of information is checked and information is saved in accordance with standard operating procedures
	3. Inputted data are stored in ***storage media*** according to requirements
	4. Work is performed within ***ergonomic guidelines***
 |
| 1. Access information using computer
 | * 1. Correct program/application is selected based on job requirements
	2. Program/application containing the information required is accessed according to company procedures
	3. ***Desk icons*** are correctly selected, opened and closed for navigation purposes
	4. Keyboard techniques are carried out in line with OH & S requirements for safe use of keyboards
 |
| 1. Produce/output data using computer system
 | * 1. Entered data are processed using appropriate software commands
	2. Data printed out as required using computer hardware/peripheral devices in accordance with standard operating procedures
	3. Files, data are transferred between compatible systems using computer software, hardware/ peripheral devices in accordance with standard operating procedures
 |
| 1. Maintain computer equipment and systems
 | * 1. Systems for cleaning, minor ***maintenance*** and replacement of consumables are implemented
	2. Procedures for ensuring security of data, including regular back-ups and virus checks are implemented in accordance with standard operating procedures
	3. Basic file maintenance procedures are implemented in line with the standard operating procedures
 |
| **Variable** | **Range** |
| Hardware  | May include but not limited to:* + Personal computers
	+ Networked systems
	+ Communication equipment
	+ Printers
	+ Scanners
	+ Keyboard
	+ Mouse
 |
| Software | May include but not limited to:* Word processing packages
* Data base packages
* Internet
* Spreadsheets
 |
| OH S guidelines | May include but not limited to:* OHS guidelines
* Enterprise procedures
 |
| Storage media | include the following but not limited to:* diskettes
* CDs
* zip disks
* hard disk drives, local and remote
 |
| Ergonomic guidelines | May include but not limited to:* Types of equipment used
* Appropriate furniture
* Seating posture
* Lifting posture
* Visual display unit screen brightness
 |
| Desk icons | May include but not limited to:* Icons include the following but not limited to:
* directories/folders
* files
* network devices
* recycle bin
 |
| Maintenance | May include but not limited to:* Creating more space in the hard disk
* Reviewing programs
* Deleting unwanted files
* Backing up files
* Checking hard drive for errors
* Using up to date anti-virus programs
* Cleaning dust from internal and external surfaces
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| **Evidence Guide** |
| Critical aspect of competence | Assessment requires evidence that the candidate to:* + Select and use hardware components correctly and according to the task requirement
	+ Identify and explain the functions of both hardware and software used, their general features and capabilities
	+ Produceaccurate and complete data in accordance with the requirements
	+ Useappropriate devices and procedures to transfer files/data accurately
	+ Maintain computer system
 |
| Underpinning knowledge | Demonstrates knowledge of:* + Basic ergonomics of keyboard and computer use
	+ Main types of computers and basic features of different operating systems
	+ Main parts of a computer
	+ Storage devices and basic categories of memory
	+ Relevant types of software
	+ General security
	+ Viruses
	+ OHS principles and responsibilities
	+ Calculating computer capacity
 |
| Underpinning skills | Demonstrates skills of:* + Reading skills required to interpret work instruction
	+ Communication skills
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Perform Housekeeping Procedures** |
| **Unit Code** | [IND EES1 09 1115](#IND_EES1_09_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to apply the basic housekeeping procedures. |

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| **Elements** | **Performance Criteria** |
| 1. Sort and remove unnecessary items  | 1. Reusable, recyclable materials are sorted in accordance with company/office procedures.
2. ***Unnecessary items*** are removed and disposed of in accordance with company or office procedures.
 |
| 2. Arrange items  | 1. Items are arranged in accordance with company/office housekeeping procedures.
2. Work area is arranged according to job requirements.
3. Activities are prioritized based on instructions.
4. Items are provided with clear and visible ***identificationmarks***based on procedures.
5. Safety equipment and evacuation passages are kept clear and accessible based on instructions.
 |
| 3. Maintain work area, tools and equipment  | 1. Cleanliness and orderliness of work area is maintained in accordance with company/office procedures.
2. Tools and equipment are cleaned in accordance with manufacturer’s instructions/manual.
3. ***Minor repairs*** are performed on tools and equipment in accordance with manufacturer’s instruction/manual.
4. Defective tools and equipment are reported to immediate supervisor.
 |
| 4. Follow standardized work process and procedures  | 1. Materials for common use are maintained in designated area based on procedures.
2. Work is performed according to standard work procedures.
3. Abnormal incidents are reported to immediate supervisor.
 |
| 5. Perform work spontaneously  | 1. Work is performed as per instruction.
2. Company and office ***decorum*** are followed and complied with.
3. Work is performed in accordance with Occupational Health and Safety (OHS) requirements.
 |

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| **Variable** | **Range** |
| Unnecessary items | May include but are not limited to:* Non-recyclable materials
* Unserviceable tools and equipment
* Pictures, posters and other materials not related to work activity
* Waste materials
 |
| Identification marks | Includes:* + Labels
	+ Tags
	+ Colour coding
 |
| Minor repair | Includes:* Replacement of parts
* Application of lubricants
* Sharpening of tools
* Tightening of nuts, bolts and screws
 |
| Decorum | Includes:* + Company/ office rules and regulations
	+ Company/ office uniform
	+ Behavior
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:* Practiced the basic procedures of 5S
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Principles of 5S
* Work process and procedures
* Safety signs and symbols
* General OHS principles and legislation
* Environmental requirements relative to work safety
* Accident/Hazard reporting procedures
 |
| Underpinning Skills | Demonstrates skills of:* + Basic communication skills
	+ Interpersonal skills
	+ Reading skills required to interpret instructions
	+ Reporting/recording accidents and potential hazards
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Apply Quality Standards** |
| **Unit Code** | [IND EES1 10 1115](#IND_EES1_10_1115) |
| **Unit Descriptor** | This unit covers the knowledge, attitudes and skills required in applying quality standards in the operational activities. |

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| **Elements** | **Performance Criteria** |
| 1. Assess own work | 1. Completed work is checked against organization standards relevant to the activity being undertaken.
2. An understanding is demonstrated on how the work activities are completed and work relate to the next process and to the final appearance of the service / product.
3. Faulty service is identified and isolated in accordance with policies and procedures.
4. Faults and any identified causes are recorded and reported in accordance with standard procedures.
 |
| 2. Assess quality of service rendered | 1. Services rendered quality is ***checked*** against standards and specifications.
2. Service rendered are evaluated using the appropriate evaluation parameters and in accordance with standards.
3. Causes of any identified faults are identified and corrective actions taken in accordance with policies and procedures.
 |
| 3. Record information | 1. Basic information on the quality performance is recorded in accordance with organization procedures.
2. Records of work quality are maintained according to the requirements of the organization / enterprise.
 |
| 4. Study causes of quality deviations | 1. Causes of deviations from final outputs or services are investigated and reported in accordance with standard procedures.
2. Suitable preventive action is recommended based on organization ***quality standards*** and causes of deviation from specified quality standards of final service or output.are identified
 |
| 5. Complete documentation | 1. Information on ***quality parameters*** and other indicators of service performance is recorded.
2. All service processes and outcomes are recorded.
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| **Variable** | **Range** |
| Quality check | May include but not limited to:* Visual inspection
* Physical measurements
* Check against specifications/preferences
 |
| Quality standards | May include but not limited to:* materials
* service
* output
* processes/procedures
 |
| Quality parameters | May include but not limited to:* style/design/specifications
* durability
* service variations
* materials
* damage and imperfections
 |

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| **Evidence Guide** |
| Critical Aspects of Competency | Demonstrates skills and knowledge to:* Check completed work continuously against standard
* Identify and isolate faulty service / workmanship
* Checkservice rendered against organization standards
* Identify and apply corrective actions on the causes of identified faults
* Record basic information regarding quality performance
* Investigate causes of deviations of services against standard
* Recommend suitable preventive actions
 |
| Underpinning Knowledge  | Demonstrates knowledge of:* Relevant quality standards, policies and procedures
* Characteristics of services
* Safety environment aspects of service processes
* Relevant evaluation techniques and quality checking procedures
* Workplace procedures
* Reporting procedures
 |
| Underpinning Skills | Demonstrates skills to:* Interpret work instructions, specifications and standards appropriate to the required work or service
* Carry out relevant performance evaluation
* Maintain accurate work records in accordance with procedures
* Meet work specifications
* Communicate effectively within defined workplace procedures
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Work with Others** |
| **Unit Code** | [IND EES1 11 1115](#IND_EES1_11_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills, and attitudes required to develop workplace relationship and contribute in workplace activities. |

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| **Element** | **Performance Criteria** |
| 1. Develop effective workplace relationship
 | * 1. ***Duties and responsibilities*** are done in a positive manner to promote cooperation and good relationship.
	2. Assistance is sought from ***workgroup*** when difficulties arise and addressed through discussions.
	3. ***Feedback on performance*** provided by others in the team is encouraged, acknowledged and acted upon.
	4. Differences in personal values and beliefs are respected and acknowledged in the development.
 |
| 1. Contribute to work group activities
 | * 1. ***Support is provided to team members*** to ensure workgroup goals are met.
	2. Constructive contributions are made to workgroup goals and tasks according to ***organizational requirements***.
	3. Information relevant to work is shared with team members to ensure designated goals are met.
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| **Variable** | **Range** |
| Duties and responsibilities  | May include but not limited to:* Job description and employment arrangements
* Organization’s policy relevant to work role
* Organizational structures
* Supervision and accountability requirements including OHS
* Code of conduct
 |
| Work group  | May include but not limited to:* Supervisor or manager
* Peers/work colleagues
* Other members of the organization
 |
| Feedback on performance | May include but not limited to:* Formal/Informal performance appraisal
* Obtaining feedback from supervisors and colleagues and clients
* Personal, reflective behavior strategies
* Routine organizational methods for monitoring service delivery
 |
| Providing support to team members | May include but not limited to:* Explain/clarify
* Help colleagues
* Provide encouragement
* Provide feedback to another team member
* Undertake extra tasks if necessary
 |
| Organizational requirements | May include but not limited to:* Goals, objectives, plans, system and processes
* Legal and organization policy/guidelines
* OHS policies, procedures and programs
* Ethical standards
* Defined resources parameters
* Quality and continuous improvement processes and standards
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| **Evidence Guide** |
| Critical aspects of Competence  | Demonstrates skills and knowledge to:* Providesupport to team members to ensure goals are met
* Act on feedback from clients and colleagues
* Access learning opportunities to extend own personal work competencies to enhance team goals and outcomes
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* relevant legislation that affects operations, especially with regards to safety
* reasons why cooperation and good relationships are important
* the organization’s policies, plans and procedures
* how to elicit and interpret feedback
* workgroup member’s responsibilities and duties
* importance of demonstrating respect and empathy in dealings with colleagues
* how to identify and prioritize personal development opportunities and options
 |
| Underpinning Skills | Demonstrates skills to:* read and understand the organization’s policies and work procedures
* write simple instructions for particular routine tasks
* interpret information gained from correspondence
* request advice, receive feedback and work with a team
* organize work priorities and arrangement
* select and use technology appropriate to a task
* relate to people from a range of social, cultural and ethnic backgrounds
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Receive and Respond to Workplace Communication** |
| **Unit Code** | [IND EES1 12 1115](#IND_EES1_12_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to receive, respond and act on verbal and written communication. |

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| **Element** | **Performance Criteria** |
| 1. Follow routine spoken messages
 | * 1. Required information is gathered by listening attentively and correctly interpreting or understanding information/instructions.
	2. Instructions/information is properly recorded.
	3. Instructions are acted upon immediately in accordance with information received.
	4. Clarification is sought from workplace supervisor on all occasions when any instruction/information is not clear.
 |
| 1. Perform workplace duties following written notices
 | * 1. ***Written notices and instructions*** are read and interpreted correctly in accordance with ***organizational guidelines***.
	2. Routine written instruction is followed in sequence.
	3. Feedback is given to workplace supervisor based on the instructions/information received.
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| **Variable** | **Range** |
| Written notices and instructions | May include but not limited to:* Handwritten and printed material
* Internal memos
* External communications
* Electronic mail
* Briefing notes
* General correspondence
* Marketing materials
* Journal articles
 |
| Organizational guidelines | May include but not limited to:* Information documentation procedures
* Company policies and procedures
* Organization manuals and service manual
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* organizational procedures for handling verbal and written communications
* Receiving and acting on verbal messages and instructions
* Demonstrating competence in recording instructions/information
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* organizational policies/guidelines in regard to processing internal/external information
* ethical work practices in handling communications
* communication process
 |
| Underpinning Skills | Demonstrates skills to:* receive and clarifyconciseness messages/information/communication
* record messages/information accurately
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Demonstrate Work Values** |
| **Unit Code** | [IND EES1 13 1115](#IND_EES1_13_1115) |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitude required in demonstrating proper work values. |

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| **Elements** | **Performance Criteria** |
| 1. Define the purpose of work
 | * 1. One’s unique sense of purpose for working and the ‘whys’ of work is identified, reflected on and clearly defined for one’s development as a person and as a member of society.
	2. Personal mission is achieved in harmony with company’s values.
 |
| 1. Apply work values/ethics
 | 1. ***Work values/ethics/concepts*** are classified and reaffirmed in accordance with the transparent company ethical standards, policies and guidelines.
2. ***Work practices*** are undertaken in compliance with industry work ethical standards, organizational policy and guidelines.
3. Personal behavior and relationships with co-workers and/or clients are conducted in accordance with ethical standards, policy and guidelines.
4. ***Company resources*** are used in accordance with transparent company ethical standard, policies and guidelines.
 |
| 1. Deal with ethical problems
 | * 1. Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct are accessed and applied in accordance with transparent company ethical standard, policies and guidelines.
	2. ***Work incidents/situations***are reported and/or resolved in accordance with company protocol/guidelines.
	3. Resolution and/or referral of ethical problems identified are used as learning opportunities.
 |
| 1. Maintain integrity of conduct in the workplace
 | 1. Personal work practices and values are demonstrated consistently with acceptable ethical conduct and company’s core values.
2. Instructions are provided to co-workers based on ethical, lawful and reasonable directives.
3. Company values/practices are shared with co-workers using appropriate behavior and language.
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| **Variable** | **Range** |
| Work values/ethics/ concepts | May include but are not limited to:* + Commitment/ Dedication
	+ Sense of urgency
	+ Sense of purpose
	+ Love for work
	+ High motivation
	+ Orderliness
	+ Reliability and Dependability
	+ Competence
	+ Goal-oriented
	+ Sense of responsibility
	+ Being knowledgeable
	+ Loyalty to work/company
	+ Sensitivity to others
	+ Compassion/Caring attitude
	+ Balancing between family and work
* Sense of nationalism
 |
| Work practices | May include but are not limited to:* Quality of work
* Punctuality
* Efficiency
* Effectiveness
* Productivity
* Resourcefulness
* Innovativeness/Creativity
* Cost consciousness
* 5S
* Attention to details
 |
| Company resources  | May include but are not limited to:* Consumable materials
* Equipment/Machineries
* Human
* Time
* Financial resources
 |
| Work incidents/Situations  | May include but are not limited to:* + Violent/intense dispute or argument
	+ Gambling
	+ Use of prohibited substances
	+ Pilferages
	+ Damage to person or property
	+ Vandalism
	+ Falsification
	+ Bribery
	+ Sexual Harassment
	+ Blackmail
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* + Define one’s unique sense of purpose for working
	+ Clarify and affirm work values/ethics/concepts consistently in the workplace
	+ Demonstrate work practices satisfactorily and consistently in compliance with industry work ethical standards, organizational policy and guidelines
	+ Demonstrate personal behaviour and relationships with co-workers and/or clients consistent with ethical standards, policy and guidelines
	+ Use company resources in accordance with company ethical standard, policies and guidelines.
	+ Follow company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* + Occupational health and safety
	+ Work values and ethics
	+ Company performance and ethical standards
	+ Company policies and guidelines
	+ Fundamental rights at work including gender sensitivity
	+ Work responsibilities/job functions
	+ Corporate social responsibilities
	+ Company code of conduct/values
	+ Balancing work and family responsibilities
 |
| Underpinning Skills | Demonstrates skills in:* + Interpersonal skills
	+ Communication skills
	+ Self awareness, understanding and acceptance
	+ Application of good manners and right conduct
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* + Interview / Written Test
	+ Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Develop Understanding of Entrepreneurship** |
| **Unit Code** | [IND EES1 14 1115](#IND_EES1_14_1115) |
| **Unit Descriptor** | This unit covers knowledge, skills and attitude required to understand the concepts, principles, functions, strategies and methods of entrepreneurship. It also covers identifying and developing the entrepreneurial competencies. |

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| **Elements** | **Performance Criteria** |
| 1. Describe and explain the concept, principles, and scope of entrepreneurship
 | 1.1 The concept and principles of entrepreneurship are analyzed and discussed.* 1. Entrepreneurial traits and distinguishing features, entrepreneurial motivations and types of entrepreneurs are identified and discussed.
	2. The role of entrepreneurship development for the Ethiopian economy is explained and discussed.
	3. Entrepreneurship for women and disables is discussed and analyzed.
 |
| 1. Discuss how to become anentrepreneur
 | 1. The positive mind set, attitude towards poverty and “can do mentality” is developed.
2. Self-employment as an individual economic independence and personal growth is discussed and analyzed.
3. Advantages and disadvantages of self-employment and being an employee are explained and discussed.
4. Major competencies of successful entrepreneurs are identified and explained.
5. Self-potential is assessed to determine if qualified to become an entrepreneur.
6. The behaviors of successful entrepreneurs are identified and discussed.
7. Business ideas are generated using appropriate tools, techniques and steps.
8. Business opportunities are identified and assessed.
 |
| 1. Discuss how to start and organize an enterprise
 | * 1. The concepts and ***legal forms*** of ***business enterprises*** in Ethiopia are identified and discussed
	2. Business Ethics is understood and developed.
	3. Facts about micro, small and medium enterprises are discussed, clarified and understood.
	4. Key success factors in setting up micro, small and medium businesses are identified and explained.
	5. Procedures for identifying suitable market for business are discussed and understood.
	6. ***Major factors*** to consider in selecting a location for a business are identified and discussed.
	7. Amount of money needed to start an enterprise is estimated and various sources of finance identified and discussed.
 |
| 1. Discuss how to operate an enterprise
 | * 1. Processes of hiring and managing people are explained and discussed.
	2. The importance, techniques and application of self-management skills, negotiation skills and time management skills, decision skills are discussed and understood.
	3. The techniques and procedures of managing sales are explained and discussed.
	4. Factors to be considered in selecting suppliers and the steps to follow when doing business with them are identified and discussed.
	5. Awareness of how new technologies can affect micro, small and medium business is developed, and Characteristics of appropriate technology for use are explained and discussed.
	6. Risk assessment and management of business enterprise are performed regularly.
	7. Qualities are properly inspected and inventories properly managed.
	8. Basic concepts of Monitoring and Evaluation are explained and understood.
 |
| 1. Discus how to prepare and use financial records
 | * 1. Importance of ***financial source documents*** and record keeping is discussed.
	2. ***Financial recording documents*** are identified and prepared.
	3. Different types of cost and expense that occur in a business and how to manage them are discussed and understood.
	4. Factors and procedures in knowing the cost and expense of the enterprise are discussed and understood.
	5. Simple financial statements are prepared and understood
 |
| 1. Develop one’s own business plan
 | * 1. The concept, importance and process of preparing/ writing a business plan are discussed and understood
	2. ***Feasibility of the business*** idea is made clear and understood.
	3. Findings of the feasibility study are interpreted, assessed and analyzed.
	4. Standard structure and format are applied in preparing business plan.
	5. Problems that may arise or encounter when starting a business are identified and understand.
 |

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| **Variables** | **Range** |
| Legal forms  | May include but not limited to:* Sole proprietorship
* Partnership
* Cooperatives
* Private Limited Company
 |
| Business Enterprises | May include but not limited to:* Micro
* Small
* Medium
 |
| Major factors | May include but not limited to:* Economics (local economy)
* Population
* Competition
 |
| Financial source documents | May include but not limited to:* Cash book
* Vouchers
* Invoices
* Receipts
* Check
 |
| Financial Recording documents | May include but not limited to:* Journal
* Ledger
* Fixed asset records
* Inventory record
* Payroll sheet
* Account receivable
* Account payable
* Daily sales record
 |
| Feasibility of the business | May include but not limited to:* opportunities available
* market competition
* timing/ cyclical considerations
* skills available
* resources available
* location and/ or premises available
* risk related to a particular business opportunity, especially
* in regard to Occupational Health and Safety and
* environmental considerations
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* Explain principles and concept of entrepreneurship
* Discuss how to become entrepreneur
* Discuss how to organize an enterprise
* Discuss how to operate an enterprise
* Discus how to prepare and use financial records
* Develop business plan
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* Entrepreneurship concepts, principles, roles and types
* Entrepreneurial traits, motivation and distinguishing features
* Types of entrepreneurs
* Entrepreneurial competencies
* Entrepreneurial behaviors
* Business ideas and business opportunities
* Self potential assessment
* Types of enterprises
* Legal forms of business ownership
* Risk assessment and evaluation
* Self-employment and employment
* Managing sales, people and time
* Facts about micro, small and medium enterprises
* Micro, Small and Medium Enterprises
* Key success factors for setting up micro, small and medium enterprises
* Procedures for identifying suitable markets
* Business location
* Major factors for selecting business location
* Quality control
* Inventory management
* Monitoring and evaluation
* New technologies
* Startup capital
* Investment capital
* Working capital
* Financing options
* Financial records
* Costs and expenses
* Business plan
* Feasibility study
 |
| Underpinning Skills | Demonstrate skills of:* Planning, organizing, hiring and leading skills
* Self-management skills
* Negotiation skills
* Time management skills
* Problem solving skills
* Decision making skills
* Selling skills
* Risk assessment skills
* Presentation skills
* Inventory controlling skills
* Using technology
* Financial record keeping skills
* Preparing simple financial statement
* Financial reporting skills
* Managing money
* Suppliers selection skills
* Monitoring and evaluation skills
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Basic Electrical/Electronic Equipment Servicing Level I** |
| **Unit Title**  | **Apply 3S** |
| **Unit Code** | [IND EES1 15 1115](#IND_EES1_15_1115) |
| **Unit Descriptor** | This unit of competence covers the knowledge, skills and attitudes required by a worker to apply 3S techniques to his/her workplace. The unit assumes the worker has a particular job in the allocated workplace known by the individual. |

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| **Elements** | **Performance Criteria** |
| 1. Organize junior Kaizen Promotion Team (KPT).
 | 1. Basics, principles and stages of KPT are identified using appropriate procedures.
2. Structure of ***Junior KPT*** is established in accordance with the organizational procedures.
3. Effective and appropriate contributions are made to complement team activities and objectives using individual skills and competencies.
4. Effective and appropriate forms of communications are used and undertaken with KPT members who contribute to know KPT activities and objectives.
5. Kaizen Board (Visual Management Board) is prepared and used in harmony with different workplace contexts.
 |
| 2. Prepare for work. | 1. Work instructions are used to determine job requirements, including method, material and equipment.
2. Job specifications are read and interpreted following working manual.
3. ***OHS requirements***, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.
4. Appropriate materials are selected.
5. ***Safety equipment and tools*** are identified and checked for safe and effective operation.
 |
| 1. Sort items.
 | * 1. Plan is prepared to implement sorting activities.
	2. Cleaning activities are performed.
	3. All ***items*** in the workplace are identified following ***the appropriate procedures***.
	4. Necessary and ***unnecessary items*** are listed using the ***appropriate format***.
	5. ***Red tag*** strategy is used for unnecessary items.
	6. Unnecessary items are evaluated and placed in an appropriate place other than the workplace.
	7. ***Necessary items*** are recorded and quantified using appropriate format.
	8. Performance results are reported using appropriate formats.
	9. Necessary items are regularly checked in the workplace.
 |
| 1. Set all items in order.
 | 1. Plan is prepared to implement set in order activities.
2. General cleaning activities are performed.
3. Location/layout, storage and indication methods for items are decided.
4. Necessary ***tools and equipment*** are prepared and used for setting in order activities.
5. Items are placed in their assigned locations.
6. After use, the items are immediately returned to their assigned locations.
7. Performance results are reported using appropriate formats.
8. Each item is regularly checked in its assigned location and order.
 |
| 1. Perform shine activities.
 | 1. Plan is prepared to implement shine activities.
2. Necessary tools and equipment are prepared and used for shinning activities.
3. ***Shine activity*** is implemented using appropriate procedures.
4. Performance results are reported using appropriate formats.
5. Regular shinning activities are conducted.
 |

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| **Variable** | **Range** |
| Junior KPT | may include but not limited to:* 3S
* 3MU (Mura, Muri and MUDA)
* 4P (Policy, Procedure, People and Plant)
* 4M (Material, Method, Man and Machine)
* PDCA (Plan, Do, Check and Act)
 |
| OHS requirements | may include but not limited to:* Legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
* Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices.
* Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization.
* Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
 |
| Safety equipment and tools | may include but not limited to:* dust masks / goggles
* glove
* working cloth
* first aid
* safety shoes
 |
| Items  | may include but not limited to:* tools
* jigs/fixtures
* materials/components
* machine and equipment
* manuals
* documents
* personal items (e.g. bags, lunch boxes and posters)
* safety equipment and personal protective equipment
* other items which happen to be in the work area
 |
| The appropriate procedures |  may include but not limited to:* steps for implementing 3S (sort, set in order and shine) activities.
* written, verbal and computer based or in some other format.
 |
| Unnecessary items | are not needed for current production or administrative operation and include but not limited to:* defective or excess quantities of small parts and inventory
* outdated or broken jigs and dies
* worn-out bits
* outdated or broken tools and inspection gear
* old rags and other cleaning supplies
* electrical equipment with broken cords
* outdated posters, signs, notices and memos

some locations where unneeded items tend to accumulate may include but not limited to:* in rooms or areas not designated for any particular purpose
* in corners next to entrances or exists
* along interior and exterior walls
* next to partitions and behind pillars
* under the eaves of warehouses
* under desks and shelves and in desk and cabinet drawers
* near the bottom of tall stacks of items
* on unused management and production schedule boards
* in tools boxes that are not clearly sorted
 |
| Appropriate format  | may include but not limited to:* all items.
* necessary items.
* unnecessary items.
 |
| Red tag | may include but not limited to:A format prepared with a red color paper or card which is filled and attached temporarily on the unnecessary items until decision is made. The red tag catch people’s attention because red is a color that stands out. So to filland attach red tag on items, asks the following three questions:* Is this item needed?
* If it is needed, is it needed in this quantity?
* If it is needed, does it need to be located here?
 |
| Necessary items | Are required in the workplace for current production or administrative operation in the amount needed. |
| Tools and equipment  | May include but not limited to:* paint
* hook
* sticker
* signboard
* nails
* shelves
* chip wood
* sponge
* broom
* pencil
* shadow board/ tools board
 |
| Shine activity | May include but not limited to:* Inspection
* Cleaning
* Minor maintenance may include:
* Tightening bolts
* Lubrication
* Replacing missing parts
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* Discuss how to organize KPT.
* Describe the pillars of 5S.
* Implement 3S in own workplace by following appropriate procedures.
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Kaizen principle, pillars and concept
* Key characteristic of Kaizen
* Elements of Kaizen
* Wastes/MUDA
* Basics of KPT
* Aims, benefits and principles of KPT
* Stages of KPT
* Structure and role of the components of Junior KPT
* Concept and parts of Kaizen board
* Concept and benefits of 5S
* The pillars of 5S
* Three stages of5S application
* Benefits and procedure of sorting activities
* The concept and application of Red Tag strategy
* OHS procedures
* Benefits and procedure of set in order activities
* Set in order methods/techniques
* Benefits and procedure of shine activities
* Inspection methods
* Planning and reporting methods
* Method of Communication
 |
| Underpinning Skills | Demonstrates skills of:* Participating actively in KPT
* technical drawing
* communication skills
* planning and reporting own tasks in implementation of 3S
* following procedures to implement 3S in own workplace
* using sorting formats to identify necessary and unnecessary items
* improving workplace layout following work procedures
* preparing labels, slogans, etc.
* reading and interpreting documents
* observing situations
* gathering evidence by using different means
* recording activities and results using prescribed formats
* working with others
* solving problems by applying 3S
* preparing and using Kaizen board
* preparing and using tools and equipment to implement 3S
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |



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We wish to extend thanks and appreciation to the many representatives of business, industry, academe and government agencies who donated their time and expertise to the development of this occupational standard.

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This occupational standard was developed in May 2013 at Armaments Department Fire Control (FCI) Section, Major General MulugetaBuli Technical College.

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