

**Federal Democratic Republic of Ethiopia**

**Occupational Standard**

**ELECTRO-MECHANICAL WORKS**

**NTQF Level I**



*Ministry of Education*

*March 2017*

**Introduction**

Ethiopia has embarked on a process of reforming its Technical and Vocational Education and Training (TVET) System. Within the policies and strategies of the Ethiopian Government, technology transformation by using current 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 Ethiopian Occupational Standard (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 Ethiopian standards, which define the current and future occupational requirements and expected outcome related to a specific occupation using distinct Unit of Competences without taking TVET delivery into account.

The whole Package EOS document for an occupation is an integrated set of nationally endorsed core generic Unit of Competences organized in to different qualification levels built one upon the other below or side wise to make full occupational profile.

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

Together all the parts of a Unit of Competence guide the assessor/curriculum developer in determining the candidate training and assessment.

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 with their Unit Codes and Titles
* Detail contents of each Unit of Competence Occupational map providing the TVET providers with information and important requirements to consider when designing training programs using this standards and show a career path

**2.** **Modification History**

***2.1 Occupational Title:***

This occupational Standard is set for **Electro-Mechanical Works** ranging from Level 1:

**2.3 Description of the Occupation**

**2.3.1 Level Description**

### *NTQF Level I*

Breadth, depth and complexity of knowledge and skills embodied in the units qualify a person to perform a defined range of activities most of which may be routine and predictable.

Applications may include a variety of employment related skills including preparatory access and participation skills, broad-based induction skills and/or specific workplace skills. They may also include participation in a team or work group.

**2.3.2 Occupation Description**

The following description contains a summary of the employability competences as identified by the water sector for this qualification. The detail competences described here are broad industry requirements that may vary depending on industry organization. Competent technician at this level is expected to:

* Carry out simple Measurement and Calculation in regards of electromechanical works in water sectors
* Appling Basic Principles of Electrical and Electronics
* Use Tools, Equipment and Measuring Instruments.
* Also know the basic knowledge that is usefully for supporting electromechanical works in water.

***3. Unit Code:***

There are agreed conventions for the unit codes used for unit of competences organized for any specific occupational standard. Codes are given by considering international and national benchmarks.

**Occupational Title: Electro-Mechanical Equipment Operation and Maintenance**

**Unit Code: EIS EMW1 01/02/... 0317**

**Unit Coding is Described Here Under:**

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| **Character** | **What it stands for:** |
| EIS | First three characters signify *the priority/major industry/sector* acronym. E.g. ***Economic Infrastructure*** |
| EME1 | Four characters in the second group signify the acronym of the occupational title expressed as a work function and qualification level written in numerical form shows the unit belongs. **E.g.** **Electro-Mechanical Works *Level I...*** |
| 01 | Third group with two numbers signify the numerical order of the specific unit |
| 0317 | Fourth group of four characters signify the month and year of development. **E.g. March 2017** |

*4.* Version Change

The version number is either changed or not, depending on the extent of the change. This Occupational standard is organized in one level with the title “Electro-Mechanical Works." Those who are responsible to undertake competence assessment and provide training should check for the version review of the document to confirm the latest version number before developing assessment tools and commence training respectively. Users are also advised to contact the agency for any doubts they have on the document or may refer to the website.

Thedevelopment date is the time the document is prepared and validated by relevant industry experts and approved by relevant sector leading the industry. It indicates the effective date to use the document for training and assessment purposes and termination of use of the previous version for any purposes.

The endorsed occupational standards and their components may remain current up to five years from the date of development.

Users of this occupational standard are advised strictly to read and understand the table below for the changes made on the occupational standard during revision process.

**Occupational Title**: **Electro-Mechanical Equipment and Machinery Maintenance**

**Previous Occupational Level**: 1-4

**Version**: I

**Date of Development**: November 2009

**Modified Occupational** **level Name/Title**: **Electro-Mechanical Works**

**New Occupational Level**: 1-4

**Version**: II

**Date of Development/Review**: MARCH 2017

| Occupational Level | Changes on the units | Justification/Remark |
| --- | --- | --- |
| **I** | *Retained and Re-Approved Units:*   * Use Hand Tools * Cut and Join Sheet Metal * Perform Bench Work | By making Some changes on the contents, including updating unit codes |
| *Merged Units:*  Read and Interpret Working Drawings and Sketches | Merged with use maps ,drawing and specification in level II |
| *Replaced Units:* | Replaced by: |
| *Removed Units:* | None |
| ***New Units Added:***   * Carry Out Measurements and Calculations * Operate Personal Computer * Apply Basic Electrical and Electronics Principles * Demonstrate Care and Safe Practices * Apply Basic Water Sanitation and Hygiene Practices | New added from bench mark |

## 5. Occupational Map

## The following occupational map is the current occupational structure in this sector. It also shows titles of occupations, vertical pathways and the level of qualifications.



**UNIT OF COMPETENCE CHART**

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| **Occupational Standard: Electro-Mechanical Works** |
| **Occupational Code: EIS EMW1** |
| ***NTQF Level I***  **[EIS EMW1 01 0317](#EIS_EMW1_01_0317)**  Use Tools, Equipment and Measuring Instruments  **[EIS EMW1 02 0317](#EIS_EMW1_02_0317)**  Apply Basic Electrical and Electronics Principles  **[EIS EMW1 03 0317](#EIS_EMW1_03_0317)**  Perform Bench Works |
| **[EIS EMW1 12 0317](#EIS_EMW1_12_0317)**  Demonstrate Work Values  **[EIS EMW1 11 0317](#EIS_EMW1_11_0317)**  Receive and Respond to Workplace Communication  **[EIS EMW1 04 0317](#EIS_EMW1_04_0317)**  Cut and Join Sheet Metal  **[EIS EMW1 13 0317](#EIS_EMW1_13_0317)**  Develop Understanding of Entrepreneurship  **[EIS EMW1 06 0317](#EIS_EMW1_06_0317)**  Apply Basic Water Sanitation and Hygiene Practices  **[EIS EMW1 05 0317](#EIS_EMW1_05_0317)** Demonstrate Care and Safe Practices  **[EIS EMW1 09 0317](#EIS_EMW1_09_0317)**  Apply Quality Standards  **[EIS EMW1 08 0317](#EIS_EMW1_08_0317)**  Operate Personal Computer  **[EIS EMW1 07 0317](#EIS_EMW1_07_0317)**  Carry out Measurement and Calculation  **[EIS EMW1 10 0317](#EIS_EMW1_10_0317)**  Work with Others  **[EIS EMW1 14 0317](#EIS_EMW1_14_0317)**  Apply 3S |

**NTQF Level I**

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| **Occupational Standard: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Use Tools, Equipment and Measuring Instruments** |
| **Unit Code** | **[EIS EMW1 01 0317](#EIS_EMW1_01)** |
| **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 tools*** ***and 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 procedure |
| 1. Use hand tools and test equipment | * 1. Tools are used according to tasks undertaken   2. All safety procedures in using tools are observed at all times and appropriate ***Personal Protective Equipment*** ***(PPE)*** are used   3. Measuring tools are selected in line with job requirements   4. Measuring/testing devices are checked and adjusted as needed in accordance with work requirements   5. 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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| **Variables** | **Range** |
| Hand tools and test instruments | May include, but not limited to:   * Hand tools for adjusting, dismantling, assembling, finishing, cutting * Tool set includes the following but not limited to: screw drivers, pliers, punches, wrenches, files * Generic Mechanic Tools set (Wrench, pliers …..) * Power tools (Impact and air Wrench….) * Measuring and testing Tools (Torque wrench, Calliper ) * Special tools (Extractor, compression tester……) * Equipment (trolley jack, hydraulic press….) * Measuring tools/devices * Electrical measurement/device include: * Multi meter, * tachometer * timing light * engine analyser * spark plug cleaner/tester * tune scopes * test lamp * distributor test bench |
| PPE | May include, but not limited to:   * (Gloves, Protective eyewear Apron/overall, Safety shoes) |
| Maintenance | May include, but not limited to:   * 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:   * Demonstrated safe and proper use of hand tools and equipment * Demonstrated safe working practices at all times * Communicated information about processes, events or tasks being undertaken to ensure a safe and efficient working environment * Planned tasks in all situations and reviewed task requirements * Performed all tasks to specification * Maintained and stored tools in appropriate location |
| Underpinning knowledge | Demonstrate knowledge of:   * Safety requirements in handling tools * Tools: Function, Operation and Common faults * Maintenance of tools and equipment * Applications of different hand tools and equipment in a general engineering context * Common faults and/or defects in hand tools and equipment * Procedures for marking unsafe or faulty tools and equipment for repair * Routine maintenance requirements for a range of hand tools * Storage location and procedures for a range of hand tools * Use and application of personal protective equipment * Safe work practices and procedures |
| Underpinning skills | Demonstrate skills to:   * Reading skills required to interpret work instruction * Communication skills * Problem solving in emergency situation * Reading and following information on standard operating procedures * Selecting hand tools appropriate to the task * Using hand tools safely * Identifying hand tool defects and marking for repair * Maintaining/sharpening hand tools using appropriate 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Apply Basic Electrical and Electronics Principles** |
| **Unit Code** | **[EIS EMW1 02 0317](#EIS_EMW1_02)** |
| **Unit Descriptor** | This unit of competency describes the skills, attitude and knowledge required in electrical components, circuits, wiring system and electronics equipment. |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare to identify electrical/electronic parts | * 1. Prepare to ensure OHS policies and procedures are followed, the work is appropriately sequenced in accordance with requirements   2. Short circuits, open circuits, grounding and close circuits are prepared   3. Coil, capacitor and resistor are prepared   4. Contactor, relays, transformer, fuse and breaker are prepared   5. Electrical system’ components are checked against job requirements   6. Location in which specific items of accessories, apparatus and circuits are to be installed is determined from job requirements   7. ***Tools and testing devices*** needed to carry out the electrical circuits are obtained in accordance with established procedures and checked for correct operation and safety |
| 1. Identify and test Electrical/electronic parts | * 1. OHS policies and procedures are followed for installing electrical wiring systems   2. Electronics systems’ ***components & materials*** are checked against job requirements   3. Rectifier, amplifier and filter are tested   4. Diodes, transistor, thyrestor, and FET are tested   5. Accessories are terminated and connected in accordance with requirements   6. ***Circuit test*** isdone |
| 1. Test the construction of electrical/ electronic circuits | 1. Electrical power circuit diagrams are read 2. Electrical control circuit diagrams are prepared 3. Cable laying, joint, lamps, switches and junction box are tested 4. Cable is selected |

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| **Variables** | **Range** |
| Tools and testing devices | May include, but not limited to:   * + - Pliers     - Cutters     - Screw drivers     - Testing devices includes: * Multi-meter * Megger tester |
| Components & materials | May include, but not limited to:   * + - Contactor, relays, transformer, fuse and breaker     - Diodes, transistor, thyrestor, and FET     - Cables, lamps, switches and junction box |
| Circuit test | May include, but not limited to:   * + - Resistance test, continuity test, open circuit test, LED test, grounding test     - Diode test, transistor test     - Contactor check     - Push button     - Relay test |

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| **Evidence Guide** | |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:   * + - Performed installation and termination of wiring system     - Identify electrical/electronic components     - Proper use of tools and correct electrical testing methods     - Understand continuity test |
| Underpinning  Knowledge and Attitudes | Demonstrate knowledge of:   * + - Specifications and use of tools     - Use of test instruments/equipment     - Electrical/electronic 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:   * + - Choosing the right instruments for the test     - Circuit construction skill     - Use of test/measuring instrument techniques     - Best practice with regard to methods of testing, their inter-relationship and sequence     - The approved procedures and requirements for terminating the installation     - Read diagrams and drawings to facilitate the connection of wiring systems, wiring enclosures and equipment     - The procedures for proving a connection is electrically and mechanically sound |
| Resources Implication | The following resources must be provided:   * + - Tools and testing devices appropriate to assembly of electrical control system     - Wiring diagrams, layout drawings |
| Methods of Assessment | Competency may be assessed through:   * + - Interview/Written Test     - Demonstration/Observation with Oral Questioning |
| Context of Assessment | Competency may be assessed in the workshop or in a simulated work place setting. |

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| **Occupational Standard: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Perform Bench Works** |
| **Unit Code** | **[EIS EMW1 03 0317](#EIS_EMW1_03)** |
| **Unit Descriptor** | This unit covers the competences required to determine work requirements, perform basic bench work operations (i.e. layout; cutting with hacksaw and chisel; filing; drilling; tapping etc…) and check the components for conformance to specifications. |

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| **Elements** | **Performance Criteria** |
| * 1. Plan task and prepare work piece | 1. Work activities are sequentially planned based on the required tasks and the applied safety regulations 2. ***Materials*** are selected according to specifications of the drawing. 3. Dimensions/features are marked on work piece in accordance with drawing specifications |
| * 1. Perform hand tool operations | 1. Work pieces are clamped based on instructions and applied standards. 2. Hand tools are selected and used according to task and safety regulations 3. Work pieces are cut, ***chipped***, ***filed*** or scraped within tolerances specified in the drawing. 4. ***Threads*** are cut according to standard procedures 5. ***Bench work operations*** are performed applying safety procedures and using personal protective devices. |
| * 1. Perform basic   drill, ream and hone operations | * 1. Boreholes are drilled, reamed and honed to drawing specification and according to guidance.   2. All operations are performed applying safety procedures and using personal protective devices. |
| * 1. Perform Off-hand grind cutting tools | 1. Cut edges are honed and free of burrs. 2. Cutter is sharpened to conform to specifications. 3. Cutters are ground using appropriate cooling agents. 4. Cutting tool grinding is performed applying safety procedures and using personal protective devices. |

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| **Variables** | **Range** |
| Materials | used in bench work operations include:   * Ferrous * Non Ferrous |
| Chipped | May include, but not limited to:   * Grooves * Slots * keyways |
| Filed | Filling operations May include, but not limited to:   * Contoured outline * Contoured holes   File types based on May include, but not limited to:   * teeth cut (single cut, double cut, rasp and curved tooth) * cut (bastard, second cut) * cross section (square, round, triangular, half-round) * shape (flat, hand, pillar, mill) |
| Threads | May include, but not limited to:   * Internal threads * External threads |
| Bench work operations | May include, but not limited to:   * Layout and marking * Cutting * Chipping and Filing * Drilling * Boring and counter boring * Lapping * Scraping * Honing * Spot-facing * Reaming * Thread cutting * Off-hand grinding |
| Work holding Devices | May include, but not limited to:   * Clamps * Vice |
| Extractor | May include, but not limited to:   * Screw extractor * Stud extractors |
| Scraper | May include, but not limited to:   * Flat surface (flat scraper, hook scraper) * Curve surface (half-round bent scraper, three-cornered scraper) |
| Bench work tools and Equipment | May include, but not limited to:   * Drill Press * Pedestal Grinder * Surface plate * Layout and marking tools * Cutting tools (hacksaw, chisel, files) * Drills, reamers, laps * Thread cutting tools (taps and stock and die) * Inspection and measuring tools (templates, vernier caliper, micrometer, straight edge, gages, etc…) * Chisels * flat cold chisel * cape chisel * diamond-point chisel * round nose chisel |

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| **Evidence Guide** | |
| Critical Aspects of Competence | Must demonstrate knowledge and skills of:   * Laid-out and marked dimensions/features on the work-piece * Cut, chipped and filed work-piece * Drilled, reamed and lapped holes * Cut threads * Performed off-hand grinding |
| Underpinning Knowledge and Attitudes | Must demonstrate knowledge of:   * Shop Safety Practices May include, but not limited to:  Safe working habits  * Identification of hazardous areas * Use of protective clothing and devices * Safe handling of tools, equipment and materials * Housekeeping practices * Application of first-aid treatment * Use of fire extinguishers * Shop Mathematics May include, but not limited to:  Basic arithmetic operationsFractions and decimalsPercentages and ratiosConversion of units (English to metric)Trigonometric functionsComputation of feed, cutting speed and machine rpm  * Drawing/Plans May include, but not limited to:  Standard drawing symbolsOrthographic and isometric drawings  * Measurements May include, but not limited to:  Linear measuring tools (rules, vernier, micrometer, height gage)Geometrical tolerances  * Materials and related science May include, but not limited to:  Classification and mechanical properties of engineering materials  * + - Use and care of bench work tools and equipment     - Theory, System and Operations May include, but not limited to:  Laying-out and markingSawing, cutting, chipping, filing, lappingDrilling, reaming, tappingCutting threadsScraping and honingExternal threadingExtracting fastenersOff-hand grinding |
| Underpinning Skills | Must demonstrate skills in:   * Performing bench work operations * Using bench work tools and equipment * Using measuring instruments * Operating drill press and grinders * Perform layout, filing, cutting, drilling, tapping, scrapping, lapping, honing * Performing safety measures and procedures |
| Resource Implications | The following resources must be provided:   * Materials, tools, equipment and facilities appropriate to proposed activity * drawings, sketches or blueprint |
| Methods of Assessment | Competence may be assessed through:   * Interview/ Written exam * Demonstration/Observation with Oral Questioning |
| Context of Assessment | Competence may be assessed in the workplace or in simulated workplace environment. |

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| **Occupational Standard: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Cut and Join Sheet Metal** |
| **Unit Code** | **[EIS EMW1 04 0317](#EIS_EMW1_04)** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes in applying cutting and joining sheet metal using variety of techniques, and tools and equipment. |

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| **Elements** | **Performance Criteria** |
| 1. Analyze work task | * 1. Task is analyzed according to applied requirements and expertise needed   2. Quality assurance requirements are identified and adhered based on task specifications   3. OHS requirements associated with cutting and joining sheet metal, and the workplace environment, are adhered to throughout the work |
| 1. Plan and prepare work | 1. Tasks are planned and sequenced in conjunction with others involved or affected by the work 2. Tools, equipment and ***materials***, including personal safety equipment, are selected and checked for serviceability and compliance with plans/specifications 3. Work area is prepared to support the efficient cutting and joining of sheet metal 4. Sealants, fixing and sheet metal materials are checked for compatibility and appropriateness for the job |
| 1. Cut and join sheet metal | * 1. Sheet metal is marked out in accordance with plans/specifications   2. Sheet metal is cut to pattern and measured using appropriate cutting tools and according to specifications   3. Surface is prepared and cleaned of grease and other contaminants   4. Sheet metal is joined to comply with plans/specifications, avoiding damage to all surrounding surfaces |
| 1. Quality assure work and clean up | * 1. Aligned, joined and sealed components are visually inspected and measured according to specifications   2. Work area, tools and equipment are cleaned, checked, maintained and stored in accordance with regulations and procedures   3. Documentation is completed in accordance with workplace requirements |

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| **Variables** | Range |
| Materials | May include, but not limited to:   * Ferrous * Non ferrous * Galvanized sheet |
| Tools and machine elements | May include, but not limited to:   * Iron scissors * Hand shear * Machine shear * Guillotine * Taping screws * Nut and bolts * Rivets * Adhesives * Sealants |

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| **Evidence Guide** | |
| Critical Aspects of Competence | Must demonstrate knowledge and skills of:   * Removed damaged and broken fasteners * Repaired threads and rivets * Scraped and honed holes |
| Underpinning Knowledge and Attitudes | Must demonstrate knowledge of:   * SI and British system of measurement * Characteristics of various metal materials their compatibility with different joining methods * Electrolysis and problems associated with of dissimilar metals * Capillary action, thermal expansion and fabrication techniques to prevent leaking |
| Underpinning Skills | Must demonstrate skills of:   * Workplace and equipment safety requirements including relevant statutory regulations, and standards * Characteristics of various metal materials their compatibility with different joining methods * Appropriateness of different fastening methods for different applications * Safe work methods |
| 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. |
| Assessment Methods | Competency may be assessed through:   * Interview/Written Test * Observation/Demonstration with Oral Questioning |
| Context of Assessment | Competency may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Demonstrate Care and Safe Practices** |
| **Unit Code** | **[EIS EMW1 05 0317](#EIS_EMW1_05)** |
| **Unit Descriptor** | This unit of competence describes the outcomes required to understand, apply and satisfy safe practices in a work-like context. It includes identifying and following procedures for hazards and risks, monitoring and maintaining cleanliness and tidiness in work activities, and reporting hazards and risks in appropriate ways. It may apply to general OHS requirements and specific workplace policies and procedures. |

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| **Elements** | **Performance Criteria** |
| 1. Follow safe work procedures. | * 1. Typical ***hazards*** associated with working with water are found out and described.   2. Relevant OHS, ***hazard control procedures*** and ***strategies*** are checked to ensure safe work practices and use them to assess ways to overcome identified hazards.   3. Safety procedures for reporting hazards are checked and applied in the work environment.   4. ***Personal protective clothing*** and equipment specified in safety and workplace procedures are used. |
| 1. Maintain personal wellbeing in a work environment. | * 1. ***Risks*** are assessed to personal wellbeing which may affect safe performance and follow procedures to address them.   2. Procedures are followed for maintaining a tidy and clean personal work area. |
| 1. Be aware of and report on safety of self and others. | * 1. Situations that may endanger own safety and that of other workers are identified and reported.   2. Incidents and injuries are dealt promptly and reported to ***appropriate people*** to contact when a problem arises.   3. ***Activities*** are taken to foster safe working. |
| 1. Follow emergency procedures. | * 1. Response is given to a range of emergencies.   2. ***Emergency*** procedures are followed.   3. Help is gained from team members and supervisors when needed. |

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| **Variable** | **Range** |
| Hazards | May Include, but not limited to:   * Untidy work conditions, including poor hygiene practices and unnecessary obstacles and equipment in work areas * Moving machinery * Materials handling * Working at heights * Lifting objects * Dangerous surfaces * Movement of equipment, goods and vehicles * Oxygen deficiency, toxic gases and confined spaces * Volatile and toxic substances * Live electrical conductors * Sharps in water, including needles, glass and metal fragments * Sharp mechanical devices * Earth subsidence * Failure of support systems * High pressure water jets * Drowning * Traffic * Bush navigation and survival |
| Hazard control procedures | May Include, but not limited to:   * Emergency, fire and accident procedures * Hazard identification and removal and hazard control * Use of personal protective clothing and equipment * Relevant manufacturer guidelines relating to the operation and use of equipment * Safety regulations * Safe use of chemicals and toxic substances |
| Strategies | May Include, but not limited to:   * Manual handling procedures * Correct posture * Safe lifting and bending * Using appropriate personal protective clothing and equipment * Good hygiene and health maintenance |
| Personal protective clothing | May Include, but not limited to:   * Gloves * Masks * Aprons * Hair covering * Uniform * Safety headwear and footwear * Safety glasses * Two-way radios * High visibility clothing |
| Risks | May Include, but not limited to:   * Smoking, alcohol and drug use * Lack of sleep * Poor diet * Lack of exercise * Stress * Not using appropriate methods when lifting or moving heavy objects * Not wearing proper personal protective clothing and equipment |
| Appropriate people | May Include, but not limited to:   * Supervisors * Team leaders * Other persons authorised or nominated by the organisation |
| Activities | May Include, but not limited to:   * Problem solving meetings * Suggestion schemes * Regular communication with team leaders * Training * Information sessions |
| Emergencies | May Include, but not limited to:   * Accidents, including those that do not result in injury * Injuries such as cuts, scalds and burns * Spills and leakages of harmful gas and liquids * Structural failures and breakages * Fire * Flooding * Getting lost * Power failures or shorts |

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| **Evidence Guide** | |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:   * Identified potential water assignment hazards * Understood and applying appropriate safety requirements and safe work practices * Used appropriate personal protective clothing and equipment * Understood factors that contribute to personal wellbeing and explore their effect on safety and performance * Understanding and applying procedures for proactively identifying and reporting potential and actual threats to safety understanding and applying procedures for dealing with emergency situations |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:   * Procedures related to safe work practices to be followed in specific locations * Location hazards and ways to minimize or remove them * Equipment, materials and activities and the processes and precautions for their use * Personal protective clothing and equipment relevant to location and activity relevant hygiene and safety standards |
| Underpinning Skills | Demonstrates skills to:   * Use literacy skills for interpreting safety information * Use interpersonal and communication skills, including listening, questioning and receiving feedback * Report activity and location hazards, ohs incidents and related action * Solve or report problems identified when dealing with safety hazards and applying appropriate hazard control procedures * Use personal protective clothing and equipment appropriate for safety risks follow instructions |
| 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Apply Basic Water Sanitation and Hygiene Practices** |
| **Unit Code** | **[EIS EMW1 06 0317](#EIS_EMW1_06)** |
| **Unit Descriptor** | This unit describes the performance outcomes, skills and knowledge required to apply good hygiene practices within a range of service industry operations. It requires the ability to follow predetermined procedures, identify and control simple hazards and take particular hygiene and sanitation measures to ensure colleagues and self at a health risk |

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| **Elements** | **Performance Criteria** |
| 1. Follow hygiene and sanitation procedures and identify hazards | * 1. ***Hygiene and sanitation procedures*** and policies are accessed and followed correctly and consistently according to organization and legal requirements to ensure health and safety of customers and colleagues.   2. ***Poor organization practices*** that are inconsistent with hygiene procedures are identified and reported.   3. ***Hygiene hazards*** that may affect the health and safety of customers, colleagues and self are identified.   4. Action is taken to remove or minimize the hazards within scope of individual responsibility and according to organization and legal requirements.   5. Hygiene hazards are promptly reported to appropriate person for follow up where control of hazard is beyond the scope of individual responsibility |
| 1. Identify hazards | * 1. Hazard identification tools and template documents are accessed and used according to organization procedures.   2. Appropriate methods are used to identify actual or foreseeable hazards that have the potential to harm the health and safety of workers or anyone else in the workplace.   3. Other personnel where appropriate in hazard identification process are involved.   4. Keep records of hazardsare identified according to organization procedures |
| 1. Report any personal health issues | * 1. Any personal ***health issues*** that are likely to cause a hygiene risk are reported.   2. Incidents of food contamination that have resulted from the personal health issue are reported.   3. Do not participate in food handling activities where there is a risk of food contamination as a result of the health issue |
| 1. Prevent food and other item contamination | * 1. Clean clothes, wear required personal protective clothing and only use organization-approved bandages and dressings are maintained to prevent contamination to food.   2. Ensure that no clothing or ***other items worn*** contaminate food.   3. Unnecessary direct contact is prevented with ready to eat food.   4. Do not allow food to become contaminated with any body fluids or tobacco product from sneezing, coughing, blowing nose, spitting, smoking or eating over food or food preparation surfaces.   5. The use of clean materials and clothes and safe and hygienic practices is maintained to ensure that no ***cross***-***contamination of other items in the workplace occurs*** |
| 1. Prevent cross-contaminations by washing hands | * 1. ***Hands are*** ***washed at appropriate times*** and hand washing procedures followed correctly and consistently according to organization and legal requirements.   2. Hands are washed using ***appropriate facilities***. |

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| **Variable** | **Range** |
| Hygiene and sanitation procedures | May Include, but not limited to:   * Personal hygiene * Safe and hygienic handling of food and beverages * Regular hand washing * Correct food storage * Suitable dress and personal protective equipment and clothing * Avoidance of cross-contamination * Hygienic cleaning practices to avoid cross-contamination * Use of cleaning equipment, clothes and materials to avoid cross-contamination * Safe handling and disposal of linen and laundry * Appropriate handling and disposal of garbage * Cleaning and sanitising * Procedures documented in the organisation food safety program * Procedures covered by staff training programs * Procedures required by the national food safety code |
| Poor organization practices | May Include, but not limited to:   * Poor personal hygiene practices * Poor food handling practices that may result in the contamination of food * Poor cleaning practices that may result in cross-contamination of food and other items * Practices inconsistent with the organisation's food safety program * Outdated practices not in keeping with current organisation activities |
| Hygiene hazards | May Include, but not limited to:   * Contaminated food * Vermin * Airborne dust * Items such as linen, tea towels and towels that may be contaminated with human waste, such as blood and body secretions * Dirty equipment and utensils * Contaminated garbage * Use of practices not in keeping with current organisation activities * Colleagues without appropriate training or understanding of good hygiene practices, policies and procedures * Equipment not working correctly, such as fridge and temperature probes |
| Hazard identification tools and template documents | May Include, but not limited to:   * Self-designed tools developed for the organization as part of an OHS management system tools and templates developed: * By external consultancy services * By industry associations for use by member businesses * For public use and found within business management publications, including those developed by OHS regulatory authorities self-designed tools |
| Appropriate methods | May Include, but not limited to:   * Conduct of site safety audits * Completion of a safety checklist * Inspections of the workplace * Observation of daily activities * Investigation of accidents and incidents * Review of injury or illness registers * Environmental monitoring of the workplace * Investigation of staff complaints or reports of safety concerns * Review of staff feedback via consultative processes, such as meetings, surveys or suggestion box submissions |
| Health issues | May Include, but not limited to:   * Food-borne diseases * Airborne and Infectious diseases |
| Other items worn | May Include, but not limited to:   * Hair accessories * Jewellery * Watches and Bandages |
| Cross-contamination of other items in the workplace | May Include, but not limited to:   * Infected linen * Items such as linen, tea towels and towels that may be contaminated with human waste, such as blood and body secretions * Dirty equipment and utensils * Spreading bacteria from bathroom or bedroom areas to kitchen areas in an accommodation facility |
| Washing hands at appropriate times | May Include, but not limited to:   * Immediately before working with food * Immediately after handling raw food * Before commencing or recommencing work with food * Immediately after using the toilet * Immediately after smoking, coughing, sneezing, blowing the nose, eating, drinking, and touching the hair, scalp or any wound |
| Appropriate facilities | May Include, but not limited to:   * Warm running water * Soap * Single use towels * Designated hand washing sink |

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| **Evidence Guide** | |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:   * Ability to access and interpret hygiene procedures and consistently apply these during day-to-day activities * Understanding of the importance of following hygiene procedures and of the potential implications of disregarding those procedures * Project or work activities that show the candidate's ability to apply good hygiene practices on multiple occasions in a range of different operational circumstances to ensure consistency in the application of hygiene procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:   * Very basic understanding of federal and regional food safety legislative compliance requirements, contents of national codes and standards that underpin regulatory requirements, and local government food safety regulations * Working knowledge of organisation personal hygiene policies and procedures * Ramifications of failure to observe hygiene policies and procedures * Broad understanding of the general hazards in handling food, linen, laundry and garbage, including major causes of contamination and cross-infection * Sources and effects of microbiological contamination of food and other items that would require protection in the industry sector and business * Basic understanding of the choice and application of cleaning and sanitising equipment and materials |
| Underpinning Skills | Demonstrates skills in:   * Communication skills to verbally report hygiene hazards and poor organisation practice * Literacy skills to read and interpret relevant organisation policies, procedures and diagrams that identify good hygiene practices |
| 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Carry out Measurement and Calculation** |
| **Unit Code** | **[EIS EMW1 07 0317](#EIS_EMW1_07)** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes needed to identify, 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, classified and interpreted according to the appropriate regular ***geometric shape*** and drawing standard 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. Obtain 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** |
| Geometric shape | May include, but is not limited to:   * Round * Square * Rectangular * Triangle * Sphere * Conical * Semi-circle * Other irregular shapes |
| Measuring instruments | May include, but is not limited to:   * Straight edge * Torque gauge * Try square * Protractor * Combination gauge * Steel rule:   + Micrometer (In-out, depth)   + Vernier caliper (out, inside)   + Dial gauge with mag, std.   + Straight edge * Thickness gauge:   + Voltmeter   + Ammeter   + Mega-Ohm meter   + Kilowatt hour meter   + Gauges * Thermometers |
| Calculation | May include, but is not limited to:   * Linear * Volume * Area * Displacement * Wattage * Voltage * Resistance * Amperage * Frequency * Impedance * Conductance * Capacitance * 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:   * Selected proper measuring instruments according to tasks * Carried out measurement and calculations * Maintained and stores instruments * Perform calculation using four fundamental operations |
| 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 formulas for volume, areas, perimeters of plane and geometric figures * Interpreting formula |
| Resource implication | * Place of assessment * Measuring instruments * Straight edge * Torque gauge * Try square * Protractor * Combination gauge * Steel rule |
| 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Operate Personal Computer** |
| **Unit Code** | **[EIS EMW1 08 0317](#EIS_EMW1_08)** |
| **Unit Descriptor** | This unit defines the competency required to operate a Personal Computer (PC) with its basic software programs and to communicate via electronic data interchange. |

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| **Elements** | **Performance Criteria** |
| 1. Identify the functions of PC hardware components | 1. ***Hardware components*** are identified in terms of device type and functions 2. The interaction of components is identified in terms of the flow of data between them |
| 1. Understand operation of the system and application software | 1. ***System software*** is identified and described in terms of its purpose and operation 2. Application software is identified and its purpose stated in terms of outputs 3. The interaction between system software and application software is described |
| 1. Perform basic operation and maintenance procedures | 1. Basic components of a PC system are connected to enable it to be operated safely 2. A PC system is powered up according to organisational requirements 3. Simple hardware faults are identified and corrected or reported according to organisational requirements 4. A PC system is cared for and maintained according to organisational requirements |
| 1. Operate a printer | 1. Data from a personal computer is displayed on printed output media based on instructions 2. Simple ***printer*** hardware faults and printer related error messages are identified and remedied according to manuals |
| 1. Apply ergonomic principles for safe operation. | 1. ***Ergonomic*** principles are explained in terms of user physical well-being 2. Ergonomic requirements are explained in terms of environment |

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| **Variable** | **Range** |
| Hardware components | May include, but not limited to:   * Central processing unit, * Motherboard * Keyboard * Mouse * Display monitor * CD drives, * Random Access Memory (RAM), * Read Only Memory (ROM), * Printer, * Digital camera, * Scanner, * Modem, * WiFi, connection to a network or the Internet. |
| System software | May include, but not limited to:   * Word processing, * Spread sheet * Database * Desktop publishing * Graphics * Communication * Multimedia * Web browser. |
| Printer | May include, but not limited to:   * Data from different applications is printed * Remedies must be demonstrated or explained |
| Ergonomic | May include, but not limited to:   * Desk dimensions, * Posture in chair and seating height; * Feet placement * Position of monitor * Keyboard and mouse relative to user * Rest periods and exercise |
| Safe connections components | May include, but not limited to:   * System unit * Keyboard * Monitor * Mouse or other pointing device * Power leads * Digital camera * Scanner * Portable external storage * Modem * Connection to a network or the Internet * Use of system protection and/or maintenance utility software. |

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| **Evidence Guide** | |
| Critical Aspects of Competence | To demonstrate competency in this unit the person will require access to:   * Personal computer * Printer * Mouse and keyboard * Monitor * Basic software |
| Underpinning Knowledge | Must demonstrate knowledge of:   * Basic keyboarding skills * Computer functions * Basic parts of a computer and various hardware components * Storage devices and basic categories * Basic software opration |
| Underpinning Skills | Must demonstrate skills of:   * Saving and retrieving files to various locations * Mouse management (button usage) for different applications * Reading and writing at a level where basic workplace documents are understood * Ability to communicate with peers and supervisors * Seeking assistance and expert advice * Interpretation of user manuals and help functions * The ability to input user access details for accessing a Personal Computer (PC), possibly a networked environment |
| 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. |
| Assessment Methods | Competency may be assessed through:   * Interview/ Written Test * Observation/ Demonstration with Oral Questioning |
| Context of Assessment | Competency may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Apply Quality Standards** |
| **Unit Code** | **[EIS EMW1 09 0317](#EIS_EMW1_09)** |
| **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 and completed 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 are ***quality 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 are 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 identified causes of deviation from specified quality standards of final service or output. |
| 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 and 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 * Check service 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Work with Others** |
| **Unit Code** | **[EIS EMW1 10 0317](#EIS_EMW1_10)** |
| **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 to workgroup goals and tasks are made according to ***organizational requirements***   3. Information relevant to work are 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:   * Explaining/clarifying * Helping colleagues * Providing encouragement * Providing feedback to another team member * Undertaking 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:   * + Provide support to team members to ensure goals are met   + Acton 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:   * + 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Receive and Respond to Workplace Communication** |
| **Unit Code** | **[EIS EMW1 11 0317](#EIS_EMW1_11)** |
| **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 material * 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 and service manuals |

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| **Evidence Guide** | |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:   * + Demonstrate knowledge of organizational procedures for handling verbal and written communications   + Receive and act on verbal messages and instructions   + Record 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 clarify conciseness 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Demonstrate Work Values** |
| **Unit Code** | **[EIS EMW1 12 0317](#EIS_EMW1_12)** |
| **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 are 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 to co-workers are provided 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 and 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 and 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 behavior 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Develop Understanding of Entrepreneurship** |
| **Unit Code** | **[EIS EMW1 13 0317](#EIS_EMW1_13)** |
| **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. The concept and principles of entrepreneurship are analyzed and discussed.   2. Entrepreneurial traits and distinguishing features, entrepreneurial motivations and types of entrepreneurs are identified and discussed.   3. The role of entrepreneurship development for the Ethiopian economy is explained and discussed.   4. Entrepreneurship for women and disables is discussed and analyzed. |
| 1. Discuss how to become an entrepreneur | 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 and Feasibility study |
| Underpinning Skills | Demonstrate skills to:   * 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: Electro- Mechanical Works Level I** | |
| **Unit Title** | **Apply 3S** |
| **Unit Code** | **[EIS EMW1 14 0317](#EIS_EMW1_14)** |
| **Unit Descriptor** | This Unit Title 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. |
| 1. 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 shining 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 and 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 and unnecessary items. |
| Red tag | 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 fill and 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, but not limited to: * Tightening bolts * Lubrication and 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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