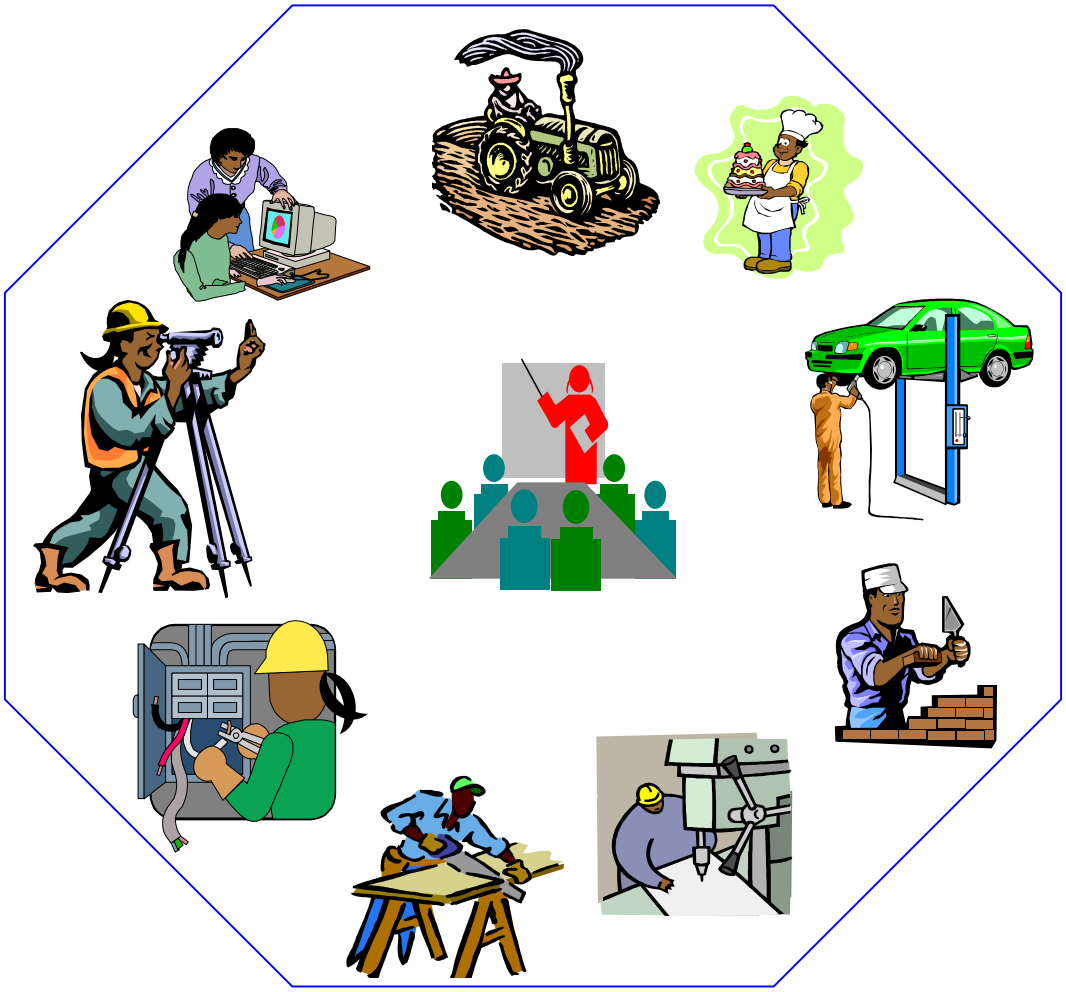
Federal Democratic Republic of Ethiopia

OCCUPATIONAL STANDARD

INTERMEDIATE BIOMEDICAL EQUIPMENT SERVICING

NTQF Level III



Ministry of Education

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Introduction

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

Occupational Standard: Intermediate Biomedical Equipment Servicing
Occupational Code: EEL BES

NTQF Level III

EEL BES3 01 0511 Install Intermediate Biomedical Equipment	EEL BES3 02 0511 Maintain and Repair Intermediate Biomedical Equipment	EEL BES3 03 0511 Provide Technical Support in Equipment Acquisition
EEL BES3 04 0511 Commission Biomedical Equipment	EEL BES3 05 0511 Keep Up With Technological Developments	EEL BES3 06 0511 Maintain and Repair Biomedical Equipment Control Systems
EEL BES3 07 0511 Apply Quality Control	EEL BES3 08 0511 Lead Small Teams	EEL BES3 09 0511 Lead Workplace Communication
EEL BES3 10 0511 Improve Business Practice	EEL BES3 11 1012 Maintain Quality System and Continuous Improvement Processes (Kaizen)	

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Install Intermediate Biomedical Equipment**
Unit Code	**EEL BES3 01 0511**
Unit Descriptor	This unit covers the knowledge, skills and attitudes necessary to install Intermediate biomedical equipment.

Elements	Performance Criteria
1. Interpret work instructions	1.1 Work instructions are read and interpreted to determine job requirements 1.2 ***Tools*** and ***testing devices*** needed to carry out the installation work are selected in accordance with established procedures and checked for correct operation and safety 1.3 ***Materials*** necessary to complete the work are obtained in accordance with job requirements
2. Install equipment and accessories	2.1 ***Equipment*** and components are prepared for correct sequential installation 2.2 ***OSH policies*** **and** ***procedures*** for installation are followed according to manufacturer's specifications 2.3 ***PPE*** is used according to company requirements 2.4 Electrical cabling and wiring devices of correct loading capacity are selected and safely installed according to National Electrical Code 2.5 Equipment is installed in accordance with manufacturer's instructions, requirements, and without damage to self and others or surrounding place or environment 2.6 ***Unplanned events*** or conditions are responded to in accordance with established institutional procedures
3. Test installed equipment and accessories	3.1 Equipment is tested in accordance with manufacturer's instructions 3.2 Final inspections are undertaken to ensure that the installed device conforms with manufacturer's instructions. 3.3 ***Work site*** is cleaned and cleared of all debris and left safe in accordance with the institution's requirements. 3.4 Report on installation and testing of equipment is prepared and submitted according to institution's procedures. 3.5 Endorse equipment to appropriate end user according to institution's requirements

Variable	Range
Tools	Includes but is not limited to: • cutting, shaping, drilling, threading, tapping, finishing, dismantling/assembling tools • pliers (assorted) • screwdrivers (assorted) • soldering gun/iron • electric drill and assorted bits • Wrench and spanners (spanners) • Staple gun
Test devices	Include but are not limited to: • Multi-tester • Signal generator • Oscilloscope • Calibrators • Gauges (assorted)
Materials	Include but are not limited to: • Tape (assorted) • Sealing materials • Cables • Wires • Soldering Lead • Wire tie
Equipment	Include but are not limited to: • Ventilator • Anesthesia machine • Diathermy/Electrosurgical unit • Slit lamp • Dental unit • Refractometer • Keratometer • Photometer • Analytical balance • Patient monitor • Defibrillator • Endoscope • Cryo machine • ECG
Personal protection equipment	• Industrial Mask • Safety goggles • Coveralls • Gloves • Shoe cover
OSH policies and procedures	• Ethiopia Electrical Code • OSH guidelines • Environmental protection legislation and regulations
Unplanned events or conditions	Include but are not limited to: • Fire and Flood • Earthquake • Alert levels • Electrical shock • Power interruption • Power overload
	• Laboratory • Clinics • Operating room/Delivery room • Wards/Units/Emergency room

Evidence Guide	
Critical aspects of competence	Assessment requires evidence that the candidate: • Interpreted work instructions according to job requirements. • Appropriately selected electrical cabling and wiring devices used • Installed equipment in accordance with manufacturer's instructions. • Tested installed equipment according to manufacturer's instructions
Underpinning knowledge and attitudes	• Occupational safety and health guidelines • Specifications and proper use of tools • General concepts and principles in electronics and electricity ➢ AC/DC power supplies ➢ Operational amplifiers ➢ Digital electronics ➢ Wiring techniques • Basic software programming • Use of test equipment and/ or instruments • Clinical application of equipment/instruments/tools • Drawing interpretation • Soldering technique • Knowledge in computer
Underpinning skills	• interpret work instructions, diagrams, schematics • interpret, define and explain work procedures • Problem solving in emergency situation(s) • Soldering skills • Troubleshooting • Courtesy and helping attitude • Use of computer
Resources Implication	Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Resources Implication	• access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Assessment Methods	Competence may be assessed through: • Interview / Oral questioning / Written Test • Observation/Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Maintain and repair Intermediate biomedical equipment**
Unit Code	**EEL BES3 02 0511**
Unit Descriptor	This unit covers the knowledge, skills and attitudes necessary in conducting maintenance and repair **Intermediate biomedical equipments**.

Elements	Performance Criteria
1. Prepares maintenance protocol and Respond to client/customer service request	1.1 Covered ***biomedical equipment and accessories*** are identified 1.2 Appropriate ***request*** form is received in accordance with institution protocols 1.3 Update basic biomedical equipment inventory on the covered BBE is secured and used as reference for preventive maintenance preparation 1.4 Repair history and equipment consumables are verified in line with the institution's procedure 1.5 Appropriate checklist forms tools, test equipment, calibrating tools, fast moving consumables and personal protective equipment are secured in line with job requirements 1.6 Prompt service is conducted on-site or in the workshop
1. Implements preliminary preventive maintenance protocol	2.1 Preventive maintenance program is properly communicated with the ***appropriate staff*** 2.2 Immediate surroundings of covered BBE are secured from ***unnecessary hazards*** 2.3 Performed basic biomedical equipment ocular inspection in accordance with institution's procedure 2.4 Cleaned and sanitized BBE in accordance with manufacturer standard and/or institution's procedure
2. Prepare the unit/equipment	3.1 Complete assembly check-up and fault symptoms are conducted, identified, and verified against client description and properly documented 3.2 Repair history is verified in line with the institution procedures 3.3 ***Service manuals and service information*** required for the corrective maintenance are made available at the beginning of the corrective maintenance activities 3.4 Workplace is cleaned in accordance with the institution procedure

4Perform electrical safety testing	4.1 Set-up appropriate test equipment and Systematic pre-testing procedure in accordance with equipment manufacturer standards and established occupational health and safety practices 4.2 Line voltage, ground resistance and current leakage of the covered BBE are measured in accordance with manufacturer standards and in strict observance of the established occupational health and safety practices 4.3 Electrical safety test results with equipment manufacturer's safety standards are analyzed 4.4 Electrical faults are corrected in accordance with equipment manufacture standards
5. Diagnose faults	5.1 System detect is identified using appropriate tools and test equipment and in accordance with organizational policies and procedures 5.2 Accurate diagnosis is completed within the specified timeframe 5.3 Diagnosis and findings of Basic Biomedical Equipment failures or technical problems are completely and accurately documented in accordance with institution standard. 5.4 Fault/s, defects and range of the problems are properly and courteously explained to the client in accordance with institution policy
6. Repair biomedical equipment and Perform functional test	6.1 Safety equipment is used to protect self and others in accordance with Established Occupational Health and Safety Practices 6.2 Defective spare parts/components are replaced with equivalent and/or better performing spare parts/components 6.3 Repair and/or replaced parts/components are soldered in accordance to current best industry practice 6.4 Necessary circuit adjustment, re-calibration and testing procedure is done and in conformance with equipment manufacturer specification standards 6.5 Necessary modification, conversion of parts and/or circuits is applied in accordance with industry best practice and equipment manufacturer specifications 6.6 Spare parts substitution is in accordance with the manufacturer's specification or equivalent 6.7 Corrective maintenance activity is accomplished within the required time frame 6.8 Care and extreme precaution in handling the unit is observed 6.9 Equipment set-up and start-up operation is performed in accordance with equipment manufacturer specifications 6.10 Equipment controls are set in accordance with manufacture's functional test standard 6.11 Controls and start up signals are checked in accordance with

	manufacturer standard operating procedure and safety regulations 6.12 BBE operation protocols are simulated in accordance with manufacturer standard 6.13 Equipment lubrication is done in accordance with manufacturer standards 6.14 Accessories of the covered BBE are inspected and set-up in accordance with institution and equipment manufacturer specification respectively 6.15 Appropriate equipment consumables are replaced in accordance with manufacturer specifications 6.16 Functional test is completed within the specified time as provided in the institution BBE preventive maintenance procedures and guidelines
7. Check and calibrate basic biomedical equipment (BBE)	7.1 Appropriate calibration procedures and parameters are determined in accordance with equipment manufacturer standards and/or institution's guidelines 7.2 Calibration equipment is set-up in accordance with manufacturer standard and occupational and health safety procedures 7.3 BBE operation is simulated in accordance with equipment manufacturer standards 7.4 Calibration controls are crossed check and verified in accordance with manufacturer specifications 7.5 Necessary adjustments are made in accordance with equipment manufacturer instruction. 7.6 Covered BBE is subjected to final test in accordance with institution guidelines and procedures. 7.7 Performance and functional test is conducted immediately after re-assembly 7.8 Equipment status and performance is checked and ensured conformance with equipment manufacturer standard and other health safety regulations 7.9 Complete and accurate documentation is prepared. 7.10 Tools and test instrument are cleaned and cared as per organizational procedure 7.11 Waste materials are disposed in accordance with hospital waste management and other environmental requirements
8. Re-commission BBE	8.1 Reassembled BBE are subjected to final testing in accordance with institution standard 8.2 BBE and its immediate surrounding are cleaned in accordance with institution policy 8.3 Communicated with appropriate staff that preventive maintenance procedure is done and brief's the same on equipment status as per institution standard

	8.4 Basic biomedical equipment and its immediate surrounding are cleaned in accordance with institution policy 8.5 Appropriate staff is communicated on the status of the equipment as per institution standards
9. Document preventive and corrective maintenance activities	9.1 Basic biomedical equipment checklist forms and other preventive and corrective maintenance documents are accomplished in strict observance of institution standards 9.2 Reports are submitted to proper officer/office in accordance with institution policy 9.3 Preventive maintenance documents are systematically kept and updated as per institution standards 9.4 Health care equipment corrective maintenance form and other relevant reports are accomplished in strict observance of institution standards 9.5 Reports are submitted to proper officer/offices in accordance with institution policy 9.6 Corrective Maintenance documents are systematically kept and updated as per institution standards

Variable	**Range**
request	Proper service request form • Formal service request letter • Verbal service request (actual or phone) • Electronic communication equipment
Biomedical equipment	Include but are not limited to: • Ventilator • Anesthesia machine • Diathermy/Electrosurgical unit • Slit lamp • Dental unit • Refractometer • Keratometer • Photometer • Analytical balance • Patient monitor Defibrillator Endoscope Cryo machine ECG
Checklist form	Covered equipment P.M. checklist form
Tools, test	Includes but not limited to: • Cleaning Brush

equipment and calibrating tool	• Screwdrivers (assorted) • Soldering iron/gun • De-soldering tool • Wrenches (assorted) • Pliers (assorted) • ECG simulator • Electro surgical analyzer • Computer and printer	• Thermometer (digital & mercurial) • Electrical Safety Analyzer • Multi-meter (analog/digital) • Utility knife • Alignment tool • Internet access
Service manuals and information	• Operation's Manuals • Service/Technical Manual • Installation Manual • Parts List Manual • Supportive software/Drivers	• Job Report Sheets • Job Request/Order • Equipment History Card • Supplier Index
Fast moving consumables	• Oil, cleaning agents • Fuses (assorted) • Contact cleaner • Soldering lead • Tape (assorted) • Filters (assorted) • Sealing materials • Screws (assorted) • Wire tie	
Appropriate staff	• End-user • Immediate supervisor • Managers	
Personal Protective Equipment	• Working clothes • Hand Gloves • Goggles • Mask • Shoe cover	
Unnecessary hazards	• People • Wet floors • Open electrical wiring • Location	

Evidence Guide	
Critical aspects of Competence	Assessment requires evidence that the candidate: • Interpreted work instructions according to job requirements. • Appropriately selected electrical cabling and wiring devices used. • Installed equipment in accordance with manufacturer's instructions. • Tested installed equipment according to manufacturer's instructions
Underpinning	• Occupational safety and health guidelines

knowledge and attitudes	• Specification and proper use of tools • General concepts and principles of in electronics and electricity ➢ AC/DC power supplies ➢ Operational amplifiers ➢ Digital electronics ➢ Wiring techniques • Basic software programming • Use of test equipment/instruments • Clinical application of equipment/instruments/tools • Drawing interpretation • Electronic hand soldering
Underpinning skills	• Reading skills required to interpret work instructions, diagrams, schematics • Communication skills needed to interpret and define and explain work procedures • Problem solving in emergency situation • Soldering skills • Troubleshooting • Courtesy and helping attitude
Resources Implication	Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Assessment Methods	Competence may be assessed through: • Interview / Oral Questioning / Written Test • Observation/Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Provide Technical Support in Equipment Acquisition**
Unit Code	**EEL BES3 03 0511**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to track or determine technological updates and latest biomedical equipment and its specifications. It also includes preparing specifications and evaluation of biomedical equipment.

Elements	Performance Criteria
1. Track technological development on biomedical equipment	1.1 Available technologies are assessed/searched from available and accessible sources 1.2 Appropriate technology is selected based on requirement 1.3 Selected technology is recommended based on analysis of real condition
2. Prepare biomedical equipment specifications	2.1 Required information and specifications are identified and gathered correctly from the catalogue, experienced experts and ***other related publications*** 2.2 Gathered data are studied/analyzed based on the approved requirement / specifications or needs 2.3 Capacity and working system are determined according to established needs 2.4 Equipment specifications are prepared and documented based on standard parameters
3. Evaluate technical document of bids	3.1 Technical proposals of the bid documents are acquired in accordance with organization/company standard procedures 3.2 Specifications are evaluated and compared against declared requirements 3.3 Correct and best offer is identified based on approved criteria 3.4 Report of evaluation and recommendations are documented and submitted based on company standards

Variable	Range
Other sources	• user's requirement • equipment-performance and manufacturer's information background • procurement directives • regulatory information and standards • reference books • journals • internet

Evidence Guide	
Critical aspects of Competence	Assessment requires evidence that the candidate: • tracked technological development on biomedical equipment • prepared biomedical equipment specification • evaluated technical document of bids
Underpinning Knowledge and Attitudes	Demonstrate knowledge of : • health care technology • tracking process • internet browsing • different biomedical equipment and their specifications • procurement procedures • technical bid documents • data / information gathering and evaluation process • catalogue types and categories
Underpinning Skills	Demonstrate skills • preparing biomedical equipment specification • gathering and analyzing data / information • evaluating technical document of bids
Resources Implication	Access to real or appropriately simulated situations, including work areas, materials, catalogues and equipment manuals
Assessment Methods	Competence may be assessed through: • Interview / oral questioning / written exam • Observation /demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Consumer Electronics Servicing Level III

Unit Title	Commission Biomedical Equipment
Unit Code	EEL BES3 04 0511
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to undertake commissioning of biomedical equipment

Elements	Performance Criteria
1. Plan and prepare consumer electronic products and systems for commissioning	1.1 ***Commissioning procedures*** are planned and prepared based on ***OH&S policies and procedures*** and duplicate work is appropriately sequenced in accordance with requirements 1.2 ***Appropriate personnel*** are consulted to ensure the work is coordinated effectively with others involved in the work site 1.3 Commissioning procedures are checked against requirements 1.4 Materials necessary to complete the work are obtained in accordance with ***established procedures*** and checked against requirements 1.5 Tools, equipment and testing devices needed to carry out the commissioning work are obtained in accordance with established procedures and checked for correct operation and safety 1.6 Preparatory work is checked to ensure no unnecessary damage will occurred and process complies with requirements
2. Commission consumer electronic products and system	2.1 OH&S policies and procedures are followed 2.2 Circuits are checked and isolated where necessary using specified testing procedures 2.3 Commissioning activities are performed in accordance with requirements, without damage or distortion to the surrounding environment or components 2.4 ***Unplanned events or conditions*** are responded to in accordance with established procedures 2.5 Approval is obtained from appropriate personnel in accordance with established procedures, from appropriate personnel before any contingencies are implemented 2.6 On-going checks of the quality of the work are undertaken in accordance with established procedures

3. Inspect and document completion of work	3.1 Final inspections and performance checks are undertaken to ensure that the commissioning procedures of apparatus, associated circuits and components conforms to ***requirements*** 3.2 Work completion is documented and reported to personnel concerned in accordance with established procedures

Variable	**Range**
Commissioning procedures	May include but not limited to: • inspection • testing
OH&S policies and procedures	May include but not limited to: • Arrangements of an organization or enterprise to meet their legal and ethical obligations of ensuring that the workplace is safe and without risk to health. this may include: ▪ hazard 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
Appropriate person	May include but not limited to: • Site managers • Project managers • Engineers • Line managers • Regulatory personnel • Other personnel designated by an organization or enterprise
Established procedures	• formal arrangements of an organization, enterprise or statutory authority on task performances ▪ quality assurance systems incorporating, for example: • specifications, requirements and procedures • work orders / instructions • reporting procedures • improvement mechanisms • compliance requirements • safety management ▪ work clearance systems incorporating, for example: • work permits • monitoring and clearance procedures

	• isolation procedures ▪ OH&S practices ▪ procedures for operating safety systems, operating plant and equipment and reporting work activities ▪ maintenance, modification or supply of relevant schematic drawings and technical data ▪ arrangements for dealing with emergency situations
Unplanned events or conditions	May include but not limited to: • accidents/incidents • brownout/blackout • equipment breakdown • force major e.g. fire
Requirements	May include but not limited to: • statutory regulations • codes of practice • job specifications • procedures and work instructions • quality assurance systems • manufacturers' specifications • maintenance manuals, schedules and specifications/ standards • circuit/cable schedules • design specifications • customer/client requirements and specifications • Federal and Regional guidelines , policies and imperatives relating to the environment
Environmental Requirements	• proper disposal of chemicals equipment and components shall be based on existing requirements of the law and chemicals waste management • non-biodegradable parts of materials shall be packed and labeled properly for disposal

Evidence Guide

Critical Aspects of Competence	sessment requires evidence that the candidate: • planned commissioning procedures in line with job requirements • prepared/obtained materials, PPE, tools, equipment and testing devices in line with established procedures • demonstrated compliance with safety regulations applicable to worksite operations • performed commissioning activities in line with established procedures and job requirements • performed final inspection to ensure commissioning electrical system meet job requirements • documented and reported completion of work to supervisor in line with established procedures • communicated effectively with others to ensure safe and effective work operations
Underpinning Knowledge and Attitudes	• Blueprint/Diagram reading • Use of Schematic Diagram and Interpreting Schematic Symbols • System and Processes ▪ Troubleshooting Analysis ▪ Fundamentals of Electronics ▪ Fundamentals of Computer Operation ▪ Fundamentals of Microprocessors/Microcontroller ▪ Fundamentals of Building Wiring ▪ Fundamentals of Electromagnetic compatibility • Operation of Different Consumer Electronic Products and Systems and Accessories • Safety ▪ Work safety requirements and economy of materials with durability ▪ Knowledge in 5S application and observation of required timeframe • Materials, Tools and Equipment: Uses and Specifications ▪ Soldering materials adhesives and insulation ▪ Identification of appropriate tools, equipment and devices • Applied Mathematics • Laws and Regulations ▪ Regional / Local laws or regulations ▪ Ethiopia Electrical Code ▪ Federal legislations

Underpinning Skills	• Work efficiency • Communication skills in interpreting service manual and dealing with the client • Troubleshooting technique and applied solutions in repairing consumer electronic product and system • Skills in the use and maintenance of test instruments, tools and equipment • Applying work safety practices and time management • Skills in operation of basic computer software application • Interpreting schematic diagrams in relation to job requirements
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials, diagrams and manuals, tools, test instruments and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competence may be assessed through: • Interview / oral questioning / written exam • Simulation/demonstration • Observation
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Keep Up with Technological Developments**
Unit Code	**EEL BES3 05 0511**
Unit Descriptor	This unit covers the knowledge, skills, and attitudes needed to keep abreast with technological development in regards to biomedical equipment.

Elements	Performance Criteria
1. Identify the gap	1.1 Developments in biomedical technology field are tracked national and international 1.2 Institutional expectations are identified in terms of competences 1.3 Self assessment is done in relation to technological developments and company expectations
2. Look for self development opportunities and modalities	2.1 Information on self development opportunities are gathered and program providers are contacted 2.2 Providers response is evaluated based on cost, accessibility and modality 2.3 Management is informed on the need for and opportunities of self development 2.4 Support/ sponsorship for self development is ensured and organized
3. Involve in self development	3.1 Necessary preparations are made for self development involvement 3.2 Professional organizations are identified 3.3 Departmental meetings and seminars are actively attended 3.4 Professional journals, regulation updates, service operation manuals and technical bulletins are read 3.5 Manufacturers' schools and in-service trainings are attended 3.6 Additional formal/further education is pursued
4. Transfer technological development knowledge and skill to others	4.1 Documents obtained (from self development programs) are reviewed 4.2 Transfer material are developed in form of manuals, handouts, presentation, 4.3 Knowledge transfer program is organized based on available resource and time 4.4 Knowledge transfer program schedule is communicated to workers and management 4.5 Knowledge transfer conducted in accordance with the plan 4.6 Feedback on knowledge transfer is analyzed, reported and documented

Variable	Range
Tools and equipment	Audiovisual equipment, training materials, references, computers, stationeries, practical training tools, equipment and materials, training room/venue, electronic media

Evidence Guide	
Critical aspects of Competence	Assessment requires evidence that the candidate: • identified the gap • looked for self development opportunities and modalities • involved in self development • transferred technological development knowledge and skill to others
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • self evaluation and gap identification • training methodology • training materials development • audiovisual aids • computer application • safety rules and regulations • equipment operation and principles • medical policies and medical ethics • research methods • quality improvement process
Underpinning Skills	Demonstrates skills to: • identify the gap • look for self development opportunities and modalities • involve in self development • transfer technological development knowledge and skill
Resources Implication	Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Assessment Methods	Competence may be assessed through: • Interview / questioning / written test • Observation /demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Maintain and Repair Biomedical Equipment Control Systems**
Unit Code	**EEL BES3 06 0511**
Unit Descriptor	This unit covers the knowledge, skills and attitudes needed to maintain and repair Biomedical Equipment Control Systems

Elements	Performance Criteria
1. Plan and prepare for maintenance/ repair	1.1 Maintenance or repair work is planned and prepared in line with job requirements. 1.2 ***OHS policies and procedures*** are followed in line with job requirements. 1.3 Biomedical Equipment Control Systems are identified in line with job requirements 1.4 ***Biomedical Equipment Control Systems*** to be maintained or repaired are identified based on job/service order or instructions 1.5 ***Biomedical Equipment Control Systems*** for maintenance or repair are checked against specifications and requirements. 1.6 ***Materials*** necessary to complete the work are obtained in accordance with established procedures and checked against job requirements. 1.7 ***Tools, equipment and testing devices*** needed for the maintenance/repair are obtained and checked for correct operation and safety
2. Maintain Biomedical Equipment Control Systems	2.1 Scheduled/periodic maintenance is performed in accordance with manufacturer's requirements 2.2 Normal function of Biomedical Equipment Control Systems is checked in accordance with manufacturer's instructions & standard procedures. 2.3 Necessary adjustments, replacement of components or parts of instruments, control devices and correction measures are responded appropriately. 2.4 Unplanned events or conditions are responded to in accordance with established procedures 2.5 Appropriate ***personal protective equipment*** is used as per OH&S procedure.
3. Repair Biomedical Equipment Control Systems	3.1 Normal function of Biomedical Equipment Control Systems is checked in accordance with manufacturer's instructions. 3.2 **Fault/s or problem/s** in system or component is/are diagnosed in line with the standard operating procedures. 3.3 Necessary adjustments including calibrations and other

	correction measures are responded appropriately 3.4 Unplanned events or conditions are responded to in accordance with established procedures 3.5 Appropriate personal protective equipment is used in line with standard procedures.
4. Inspect and test the repaired Biomedical Equipment Control Systems	4.1 Biomedical Equipment Control Systems are checked/ inspected to ensure safe operation 4.2 Conduct appropriate functional test(s) and inspection to ensure that the testing conducted on the device conforms with the manufacturer's instruction/manual 4.3 Work site is cleaned and cleared of all debris and left in safe condition in accordance with company procedures 4.4 Test results are recorded in Instrument/ control devices history cards 4.5 Report is prepared and completed according to company requirements

Variable	**Range**
OH & S policies and procedures	• OH & S guidelines • Ethiopian environmental proclamations and regulations
Instrumentation and control standards	Include but not limited to: • OIML (International Organization for Legal Metrology) Standard or ES • Regulations for consumers' electrical installations, 1969, issued by Ethiopian Electric Light and power Authority (EELPA), (now EEPCo) • Ethiopian building code standard EBCS -10 and EBCS-11, various Ethiopian ES on electrical materials and standards • Standards) or Ethiopian Standards (ES) • ISA (Instrumentation, Systems and Automation) Society (formerly Instrument Society of America) • ANSI (American National Standards Institute) • ASME (American Society of Mechanical Engineers) • NEC (National Electric Code) • IEC (International Electrotechnical Commission)
Instruments and Devices	Include but not limited to: • sensors/transmitters/transducers • indicators both analogue and digital • controllers including plc controlled devices • control valves • actuators • recorders • enunciator associated with the installed devices • process switches

Biomedical Equipment Control Systems	• PLC/Programmable Logic Control • Pneumatics control systems • Power Electronic control devices • Electro-Pneumatic control systems • Electro- magnetic control

Tools	• cutting, shaping, drilling, threading, tapping, finishing, dismantling/assembling tools • pliers (assorted) • screw drivers (assorted) • soldering iron/gun • wrenches
Equipment/testing devices	Include but not limited to • maintenance bench • instrument air supply equipment • power supply equipment • multimeter • calibrators • computer • PLC module and software • Pneumatic training kits • Power electronics training kits
Materials	Include but not limited to • sealing materials • pipes/tubes & fittings • wires and cables • cleaning materials • lubricating materials • spare parts or components
Personal protective equipment	Include but not limited to: • Ear muffs/plugs • Goggles/glasses/face shield • Safety belt/ harness • Safety shoes • Safety apparel/suit, hat, mask and gloves
Fault/s or problem/s	• mechanical • electrical • electronics • computer-based • pneumatic • hydraulics

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • interpreted work instructions according to job requirements • conducted maintenance properly on the devices using

	standard procedures • diagnosed faults on the devices • repaired or replaced defective components and/ or devices • calibrated or adjusted instrument or device to the functional parameters or work requirements • checked the maintained/repaired devices to ensure safety • recorded maintenance/ repair results in history cards • reported the tasks undertaken
Underpinning Knowledge	Include but not limited to: • occupational health and safety • instrumentation & control standards • use of tools and testing devices • mathematical calculations • electrical and electronics theories • measurement and calibration (metrological techniques) • wiring techniques • drawing interpretation • soldering techniques • principles of instrumentation and control • process variable measurements (pressure, level, flow, temperature, analysis, etc.) • process control theory • process control system (single-loop & multi-loop controllers, DCS, DAS, SCADA, etc) • sensors, transmitters, transducers & converters • programmable logic controllers • control valves and final control elements • pneumatics • introduction to power electronics • computer operations • corrective & preventive maintenance procedures
Underpinning Skills	• Interpret work instructions • Interpret and define work procedures • Selection & use of proper tools & equipment • Diagnosing skills on device level • Basic software programming • Problem solving in unplanned events • Recording and reporting maintenance/ repair activities
Resource Implication	Include but not limited to: • Biomedical Equipment Control Systems • Tools • Test equipment and calibrators • Materials and PPE • Technical manuals • Instrumentation & Control drawings

Method of Assessment	• Observation / Demonstration • Oral Questioning / written test
Context of Assessment	Assessment may be conducted in the workplace or in a simulated environment

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Apply Quality Control**
Unit Code	**EEL BES3 07 0511**
Unit Descriptor	This unit covers the knowledge, skills, and attitudes needed to apply quality standards in the workplace. The unit also includes the application of relevant safety procedures and regulations, organization procedures and client specifications.

Elements	Performance Criteria
1. Assess quality of received equipment	1.1 Work instructions are obtained and work is carried out in accordance with standard operating procedures 1.2 Received ***equipments*** are checked against manufacturer's specifications 1.3 Faulty equipment is identified, isolated and reported 1.4 ***Faults*** and any identified causes are recorded and/or reported in accordance with company procedures 1.5 Faulty equipment are recommended for replacement or returned to supplier following standard procedures
2. Assess quality of service	2.1 Information on the quality and other indicators of production performance is ***documented*** in accordance with workplace procedures 2.2 Completed work is checked against documented workplace standards relevant to the task undertaken 2.3 Faulty items or below standard services are identified and corrected 2.4 Deviations from specified ***quality standards*** and its causes are documented and reported in accordance with the organization standards operating procedures
3. Engage in quality improvement	3.1 Process improvement procedures are participated in relation to workplace assignment 3.2 Work is carried out in accordance with process improvement procedures 3.3 Performance of operation or quality of product or service to ensure customer satisfaction is monitored

Variable	Range
Equipment	May include but not limited to: • Weighing scale, Infant/Adult • Clinical weighing scale • Gooseneck lamp/Examining light • Oxygen gauge • Sphygmomanometer • Suction apparatus • Autoclave • OR/DR light • OR table • Nebulizer • Rotator/Shaker • Electromuscular stimulator • Spectrophotometer • Uninterruptible power supply • Bag valve mask (Pedia and Adult) • Anesthesia bag • Clinical oven
Faults	May include but not limited to: • equipment not according to specification • equipment contain manufacturing defects • equipment do not conform with government regulation • equipment have safety defect
Documentation	May include but not limited to: • Organization work procedures and manuals • Manufacturer's instruction manual • Client requirements/specifications • Forms
Quality standards	May include but not limited to: • Materials • component parts • equipment operation • systems and processes • services

Evidence Guide	
Critical aspects of Competence	Assessment requires evidence that the candidate: • Carried out work in accordance with the company's standard operating procedures • Performed task according to specifications • Reported defects detected in accordance with standard operating procedures • Carried out work in accordance with the process improvement procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Relevant production processes, materials and products • Characteristics of materials/component parts used in electronic production processes • Quality checking procedures • Workplace procedures • Safety and environmental aspects of production processes • Fault identification and reporting • Quality improvement process
Underpinning Skills	Demonstrates skills to: • interpret work instruction • interpret and apply defined work procedures • carry out work in accordance with OHS policies and procedures
Resources Implication	Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Assessment Methods	Competence may be assessed through: • Interview / questioning / written test • Observation /demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III	
Unit Title	**Lead Workplace Communication**
Unit Code	**EEL BES3 09 0511**
Unit Descriptor	This unit covers the knowledge, attitudes and skills to lead in the dissemination and discussion of information and issues in the workplace.

Elements	Performance Criteria
1. Communicate information about workplace processes	1.1 Appropriate ***communication method*** is selected 1.2 Multiple operations involving several ics areas are communicated accordingly 1.3 Questions are used to gain extra information 1.4 Correct sources of information are identified 1.5 Information is selected and organized correctly 1.6 Verbal and written reporting is undertaken when required 1.7 Communication skills are maintained in all situations
2. Lead workplace discussion	2.1 Response to workplace issues are sought 2.2 Response to workplace issues are provided immediately 2.3 Constructive contributions are made to workplace discussions on such issues as production, quality and safety 2.4 Goals/objectives and action plan undertaken in the workplace are communicated.
3. Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication 3.3 Dialogue is initiated with appropriate staff/personnel 3.4 Communication problems and issues are raised as they arise

Variable	Range

Methods of communication	• Non-verbal gestures • Verbal • Face to face • Two-way radio • Speaking to groups • Using telephone • Written • Using Internet • Cell phone

Evidence Guide	
Critical aspects of Assessment	Demonstrates skills and knowledge to: • Dealt with a range of communication/information at one time • Made constructive contributions in workplace issues • Sought workplace issues effectively • Responded to workplace issues promptly • Presented information clearly and effectively written form • Used appropriate sources of information • Asked appropriate questions • Provided accurate information
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Organization requirements for written and electronic communication methods • Effective verbal communication methods
Underpinning Skills	Demonstrates skills to: • Organize information • Understand and convey intended meaning • Participate in variety of workplace discussions • Comply with organization requirements for the use of written and electronic communication methods
Resources Implication	The following resources must be provided: variety of information, communication tools, simulated workplace
Assessment Methods	Competence may be assessed through: • Interview • Observation/Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing Level III

Unit Title	Lead Small Teams
Unit Code	**EEL BES3 08 0511**
Unit Descriptor	This unit covers the knowledge, attitudes and skills to lead small teams including setting and maintaining team and individual performance standards.

Elements	Performance Criteria
1. Provide team leadership	1.1. ***Work requirements*** are identified and presented to team members 1.2. Reasons for instructions and requirements are communicated to team members 1.3. ***Team members' queries and concerns*** are recognized, discussed and dealt with
2. Assign responsibilities	2.1. Duties and responsibilities are allocated having regard to the skills, knowledge and aptitude required to properly undertake the assigned task and according to company policy 2.2. Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible
3. Set performance expectations for team members	3.1. Performance expectations are established based on client needs and according to assignment requirements 3.2. Performance expectations are based on individual team members duties and area of responsibility 3.3. Performance expectations are discussed and disseminated to individual team members
4. Supervised team performance	4.1. ***Monitoring of performance*** takes place against defined performance criteria and/or assignment instructions and corrective action taken if required 4.2. Team members are provided with ***feedback***, positive support and advice on strategies to overcome any deficiencies 4.3. ***Performance issues*** which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy 4.4. Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction 4.5. Team operations are monitored to ensure that employer/ client needs and requirements are met 4.6. Follow-up communication is provided on all issues affecting the team 4.7. All relevant documentation is completed in accordance with company procedures
Variable	**Range**
Work requirements	• client profile

	• assignment instructions
Team member's concerns	• roster/shift details
Monitor performance	• formal process • informal process
Feedback	• formal process • informal process
Performance issues	• work output • work quality • team participation • compliance with workplace protocols • safety • customer service

Evidence Guide	
Critical aspects of Assessment	Demonstrates skills and knowledge to: • maintained or improved individuals and/or team performance given a variety of possible scenario • assessed and monitored team and individual performance against set criteria • represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf • allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed • set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • company policies and procedures • relevant legal requirements • how performance expectations are set • methods of monitoring performance • client expectations • team member's duties and responsibilities

Underpinning Skills	Demonstrates skills to: • communication skills required for leading teams • informal performance counselling skills • team building skills • negotiating skills
Resources Implication	Access to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Resources Implication	• access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task
Assessment Methods	Competence may be assessed through: • Interview / Oral questioning / Written Test • Observation/Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing	
Unit Title	**Improve Business Practice**
Unit Code	**EEL BES3 10 0511**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required in promoting, improving and growing business operations.

Elements	Performance Criteria
1. Diagnose the business	1.1 ***Data required*** for diagnosis is determined and acquired 1.2 ***Competitive advantage*** of the business is determined from the data 1.3 ***SWOT analysis*** of the data is undertaken
2. Benchmark the business	2.1 Sources of relevant benchmarking data are identified 2.2 ***Key indicators*** for benchmarking are selected in consultation with key stakeholders 2.3 Like indicators of own practice are compared with benchmark indicators 2.4 Areas for improvement are identified
3. Develop plans to improve business performance	3.1 A consolidated list of required improvements is developed 3.2 Cost-benefit ratios for required improvements are determined 3.3 Work flow changes resulting from proposed improvements are determined 3.4 Proposed improvements are ranked according to agreed criteria 3.5 An action plan to implement the top ranked improvements is developed and agreed 3.6 ***Organizational structures*** are checked to ensure they are suitable
4. Develop marketing and promotional plans	4.1 The practice vision statement is reviewed 4.2 Practice ***objectives*** are developed/reviewed 4.3 Target markets are identified/refined 4.4 ***Market research data*** is obtained 4.5 ***Competitor analysis*** is obtained 4.6 ***Market position*** is developed/reviewed 4.7 Practice ***brand*** is developed 4.8 ***Benefits*** of practice/products/services are identified

	4.9 ***Promotion tools*** are selected/developed
5. Develop business growth plans	5.1 Plans to increase ***yield per existing client*** are developed 5.2 Plans to add new clients are developed 5.3 Proposed plans are ranked according to agreed criteria 5.4 An action plan to implement the top ranked plans is developed and agreed 5.5 Practice work practices are reviewed to ensure they support growth plans
6. Implement and monitor plans	6.1 Implementation plan is developed in consultation with all relevant stakeholders 6.2 Indicators of success of the plan are agreed 6.3 Implementation is monitored against agreed indicators 6.4 Implementation is adjusted as required

Variables	**Range**
Data required includes:	• Organization capability • Appropriate business structure • Level of client service which can be provided • Internal policies, procedures and practices • Staff levels, capabilities and structure • Market, market definition • Market changes/market segmentation • Market consolidation/fragmentation • Revenue • Level of commercial activity • Expected revenue levels, short and long term • Revenue growth rate • Break even data • Pricing policy • Revenue assumptions • Business environment • Economic conditions • Social factors • Demographic factors • Technological impacts • Political/legislative/regulative impacts • Competitors, competitor pricing and response to pricing • Competitor marketing/branding

	• Competitor products
Competitive advantage includes:	• Services/products • Fees • Location • Timeframe
Objectives should be 'SMART' , that	• Specific • Measurable • Achievable • Realistic • Time defined

Market research data includes:	• Data about existing clients
	• Data about possible new clients
	• Data from internal sources
	• Data from external sources such as:
	• Trade associations/journals
	• Yellow Pages small business surveys
	• Libraries
	• Internet
	• Chamber of Commerce
	• Client surveys
	• Industry reports
	• Secondary market research
	• Primary market research such as:
	  • telephone surveys
	  • personal interviews
	  • mail surveys

Competitor analysis	• Competitor offerings • Competitor promotion strategies and activities • Competitor profile in the market place
SWOT analysis includes:	• Internal strengths such as staff capability, recognized • Quality • Internal weaknesses such as poor morale, • Under-capitalization, poor technology • External opportunities such as changing market and • Economic conditions • External threats such as industry fee structures, strategic • Alliances, competitor marketing
Key indicators may include:	• Salary cost and staffing

	• Personnel productivity (particularly of principals) • Profitability • Fee structure • Client base • Size staff/principal • Overhead/overhead control
Organizational structures include:	• Legal structure (partnership, Limited Liability Company, etc.) • Organizational structure/hierarchy • Reward schemes
Market position should include data on:	• Product • The good or service provided • Product mix • The core product - what is bought • The tangible product - what is perceived • The augmented product - total package of consumer • Features/benefits • Product differentiation from competitive products • New/changed products • Price and pricing strategies (cost plus, supply/demand, ability to pay, etc.) • Pricing objectives (profit, market penetration, etc.) • Cost components • Market position • Distribution strategies • Marketing channels • Promotion • Promotional strategies • Target audience • Communication • Promotion budget
Practice brand may include:	• Practice image • Practice logo/letter head/signage • Phone answering protocol • Facility decor • Slogans • Templates for communication/invoicing • Style guide • Writing style • AIDA (attention, interest, desire, action)

Benefits may include:	• Features as perceived by the client • Benefits as perceived by the client
Promotion tools include:	• Networking and referrals • Seminars • Advertising • Press releases • Publicity and sponsorship • Newsletters (print and/or electronic) • Websites • Direct mail • Telemarketing/cold calling
Yield per existing client may be increased by:	• Raising charge out rates/fees • Packaging fees • Reduce discounts • Sell more services to existing clients

Evidence Guide	
Critical Aspects of Competence	The candidate must be able to demonstrate: • Ability to identify the key indicators of business performance • Ability to identify the key market data for the business • Knowledge of a wide range of available information sources • Ability to acquire information not readily available within a business • Ability to negotiate required improvements to ensure implementation • Ability to evaluate systems against practice requirements • And form recommendations and/or make recommendations • Ability to assess the accuracy and relevance of information
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Data analysis • Communication skills • Computer skills to manipulate data and present information • Negotiation skills • Problem solving • Planning skills • Marketing principles • Ability to acquire and interpret relevant data • Current product and marketing mix • Use of market intelligence • Development and implementation strategies of promotion and growth plans
Underpinning Skills	• Data analysis and manipulation • Ability to acquire and interpret required data • Current practice systems and structures • Sources of relevant benchmarking data • Methods of selecting relevant key benchmarking indicators • Communication skills • working and consulting with others when developing plans for the business • negotiation skills and problem solving • using computers to manipulate, present and distribute information • planning skills
Resources Implication	• access to relevant workplace or appropriately simulated environment where assessment can take place • materials relevant to the proposed activity or task

Assessment Methods	Competence may be assessed through: • Interview / Oral questioning / Written Test • Observation/Demonstration
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

TOP

Occupational Standard: Intermediate Biomedical Equipment Servicing	
Unit Title	**Maintain Quality System and Continuous Improvement Processes (Kaizen)**

Unit Code	EEL BES3 11 1012
Unit Descriptor	This unit of competence covers the skills and knowledge required to prevent process improvements in their own work from slipping back to former practices or digressing to less efficient practices. It covers responsibility for the day- to-day operation of the work/functional area and ensuring that quality system requirements are met and that continuous improvements are initiated and institutionalized.

Elements	Performance Criteria
1. Develop and maintain quality framework within work area	1.1 Distribute and explain information about the enterprise's quality system to personnel 1.2 Encourage personnel to participate in improvement processes and to assume responsibility and authority 1.3 Allocate responsibilities for quality within work area in accordance with quality system 1.4 Provide ***coaching and mentoring*** to ensure that personnel are able to meet their responsibilities and quality requirements
2. Maintain quality documentation	2.1 Identify required quality documentation, including records of improvement plans and initiatives 2.2 Prepare and maintain quality documentation and keep accurate data records 2.3 Maintain document control system for work area 2.4 Contribute to the development and revision of quality manuals and work instructions for the work area 2.5 Develop and implement inspection and test plans for quality controlled products
3. Facilitate the application of standardized procedures	3.1 Ensure all required procedures are accessible by relevant personnel 3.2 Assist personnel to access relevant procedures, as required 3.3 Facilitate the resolution of conflicts arising from job 3.4 Facilitate the completion of required work in accordance with standard procedures and practices

4. Provide training in quality systems and improvement processes	4.1 Analyze roles, duties and current competency of relevant personnel 4.2 Identify training needs in relation to quality system and ***continuous improvement processes (kaizen)*** 4.3 Identify opportunities for skills development and/or training programs to meet needs 4.4 Initiate and monitor training and skills development programs 4.5 Maintain accurate training record
5. Monitor and review performance	5.1 Review performance outcomes to identify ways in which planning and operations could be improved 5.2 Use the organization's systems and ***technology*** to monitor and review progress and to identify ways in which planning and operations could be improved 5.3 Enhance ***customer service*** through the use of quality improvement techniques and processes 5.4 Adjust plans and communicate these to personnel involved in their development and implementation
6. Build continuous improvement process	6.1 Organize and facilitate improvement team 6.2 Encourage work group members to routinely monitor ***key process indicators*** 6.3 Build capacity in the work group to critically review the relevant parts of the value chain 6.4 Assist work group members to formalize improvement suggestions 6.5 Facilitate relevant resources and assist work group members to develop implementation plans 6.6 Monitor implementation of improvement plans taking appropriate actions to assist implementation where required.
7. Facilitate the identification of improvement opportunities	7.1 Analyze the job completion process 7.2 Ask relevant questions of job incumbent 7.3 Encourage job incumbents to conceive and suggest improvements 7.4 Facilitate the trying out of improvements, as appropriate
8. Evaluate relevant components of quality system	8.1 Undertake regular audits of components of the quality system that relate to the work area 8.2 Implement improvements in the quality system in accordance with own level of responsibility and workplace procedures

	8.3 Facilitate the updating of standard procedures and practices 8.4 Ensure the capability of the work team aligns with the requirements of the procedure

Variable	Range
Coaching and mentoring	May refer to: • providing assistance with problem-solving • providing feedback, support and encouragement • teaching another member of the team, usually focusing on a specific work task or skill
Continuous improvement processes may include:	May include: • cyclical audits and reviews of workplace, team and individual performance • evaluations and monitoring of effectiveness • implementation of quality systems, such as International Standardization for Organization (ISO) • modifications and improvements to systems, processes, services and products • policies and procedures which allow the organization to systematically review and improve the quality of its products, services and procedures • seeking and considering feedback from a range of stakeholders • Kaizen • Enterprise-specific improvement systems
Technology	May include: • computerized systems and software such as databases, project management and word processing • telecommunications devices • any other technology used to carry out work roles and responsibilities
Customer service	May be: • internal or external • to existing, new or potential clients
Key process indicators	Key process indicators may include: • statistical process control data/charts • orders • lost time, injury and other OHS records • equipment reliability charts, etc.
Continuous improvement tools	May include: • statistics • cause and effect diagrams • fishbone diagram • Pareto diagrams

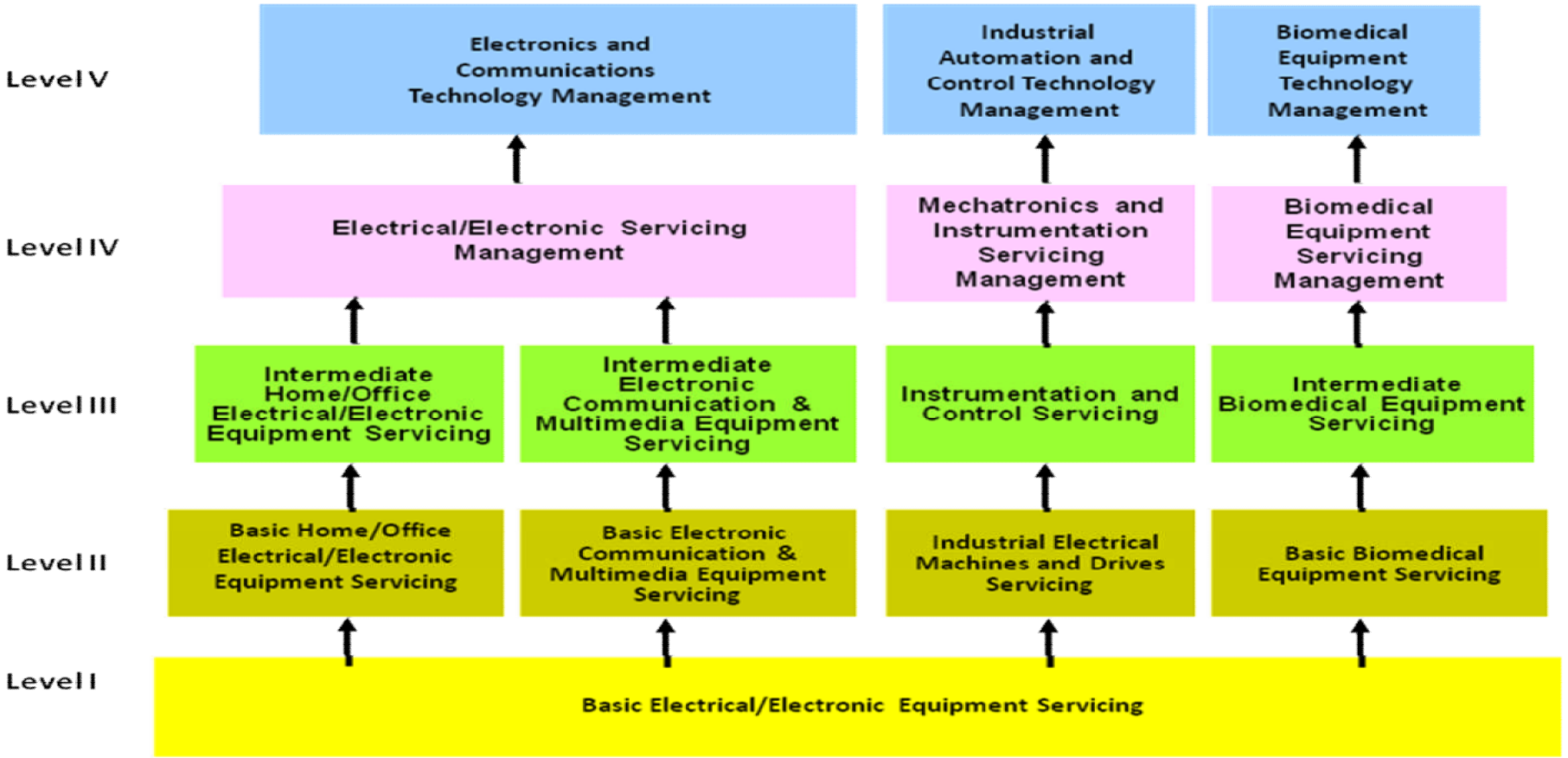
	• run charts • X bar R charts • PDCA • Sigma techniques • balanced scorecards • benchmarking • performance measurement • upstream and downstream customers • internal and external customers immediate and/or final

Evidence Guide	
Critical Aspects of Competence	Evidence of the following is essential: • taking active steps to implement, monitor and adjust plans, processes and procedures to improve performance • supporting others to implement the continuous improvement system/processes, and to identify and report opportunities for further improvement • knowledge of principles and techniques associated with continuous improvement systems and processes • assist others to follow standard procedures and practices • assist others make improvement suggestions • standardize and sustain improvements Assessors should ensure that candidates can: • implement and monitor defined quality system • requirements and initiate continuous improvements within the work area • apply effective problem identification and problem solving techniques • strengthen customer service through a focus on continuous improvement • implement, monitor and evaluate quality systems in the work area • initiate quality processes to enhance the quality of performance of individuals and teams in the work area • gain commitment of individuals/teams to quality principles and practices • implement effective communication strategies • encourage ideas and feedback from team members when developing and refining techniques and processes • analyze training needs and implement training programs • prepare and maintain quality and audit documentation
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • principles and techniques associated with: – benchmarking – best practice – change management

	– continuous improvement systems and processes – quality systems • range of procedures available and their application to different jobs • applicability of takt time and muda to jobs • identification and possible causes of variability in jobs • continuous improvement process for organization • questioning techniques • methods of conceiving improvements • suggestion and try out procedures • relevant OHS • quality measurement tools for use in continuous improvement processes • established communication channels and protocols • communication/reporting protocols • continuous improvement principles and process • enterprise business goals and key performance indicators • enterprise information systems management • enterprise organizational structure, delegations and responsibilities • policy and procedure development processes • relevant health, safety and environment requirements • relevant national and international quality standards and protocols • standard operating procedures (SOPs) for the technical work performed in work area • enterprise quality system
Underpinning Skills	Demonstrates skills to: • coach and mentor team members • gain the commitment of individuals and teams to continuously improve • innovate or design better ways of performing work • communicate with relevant people • prioritize and plan tasks related to encouraging and improving use of standardized procedures • negotiate with others to resolve conflicts and gain commitment to standardized procedures • facilitate other employees in improvement activities • implement and monitor defined quality system requirements • initiate continuous improvements within the work area • apply effective problem identification and problem solving techniques • strengthen customer service through a focus on continuous improvement • implement, monitor and evaluate quality systems • implement effective communication strategies • encourage ideas and feedback from team members when

	developing and refining techniques and processes • analyze training needs and implementing training programs • prepare and maintain quality and audit documentation
Resources Implication	Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the candidate • documentation and information in relation to production, waste, overheads and hazard control/management • enterprise quality manual and procedures • quality control data/records
Methods of Assessment	Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • suitable simulation • oral or written questioning to assess knowledge of procedures and contingency management; principles and techniques associated with change management • review of the audit process and outcomes generated by the candidates Those aspects of competence dealing with improvement processes could be assessed by the use of suitable simulations and/or a pilot plant and/or a range of case studies and scenarios. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competence which are difficult to assess directly.
Context of Assessment	Competence may be assessed in the work place or in a simulated workplace setting / environment.

Sector: Electrotechnology and Telecommunication
Sub-Sector: Electrotechnology



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