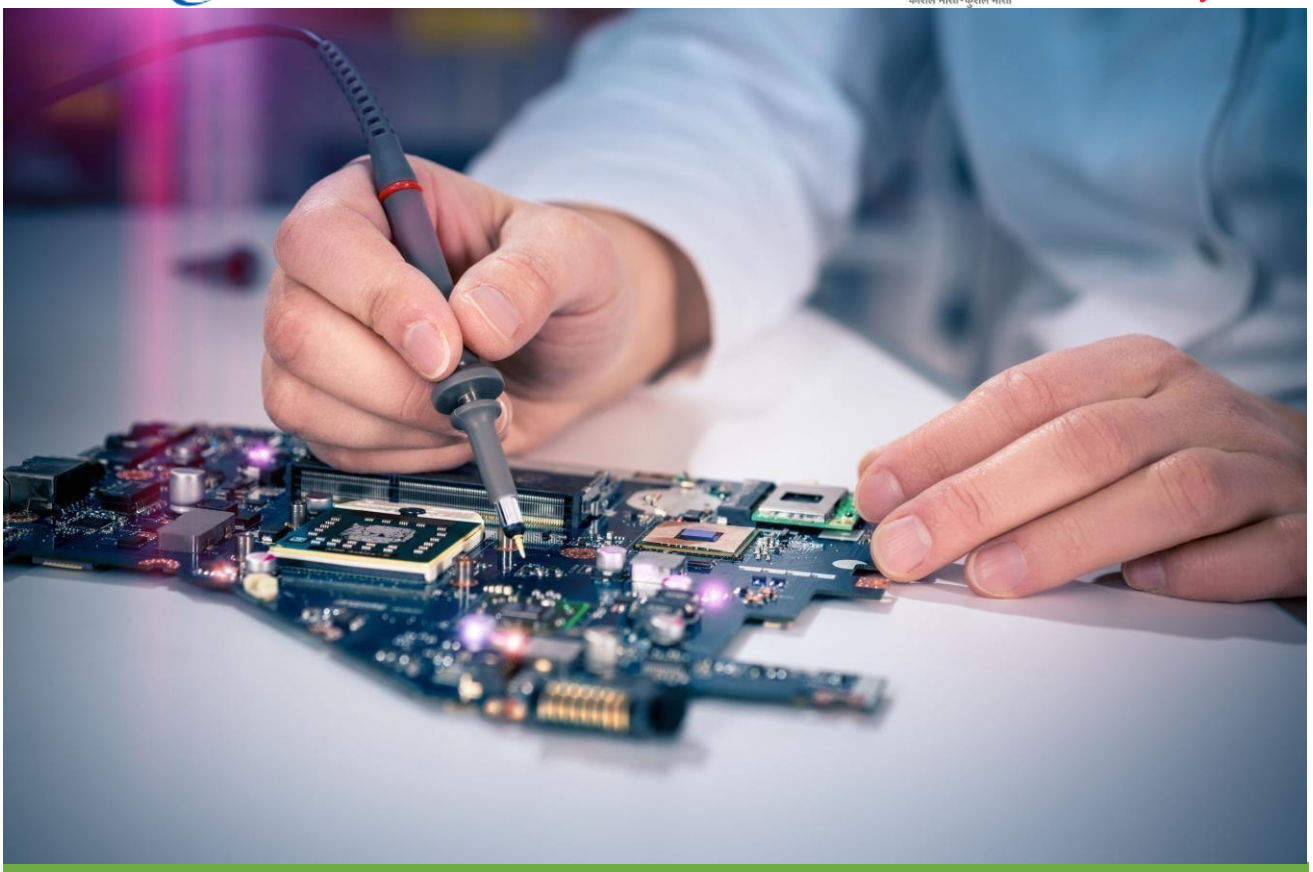

Model Curriculum

QP Name: Electronics Machine Maintenance Executive

QP Code: ELE/Q2501

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 3.0

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House, Okhla Industrial Area - Phase 3, New Delhi – 110020

Table of Contents

Training Parameters

Sector	Electronics
Sub-Sector	Consumer Electronics & IT Hardware
Occupation	Maintenance
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8212.0400
Minimum Educational Qualification and Experience	8th Grade Pass + NTC (2 years after 8th) + 2 Year NAC/relevant Experience) OR 10th Grade pass + 2 Year NTC/NAC/ relevant experience OR Certificate-NSQF (Level-3 in Maintenance Technician) with 2 Years of relevant Experience OR 12th Class and 18 Years
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	24/02/2022
Next Review Date	24/06/2025
NSQC Approval Date	24/02/2022
QP Version	3.0
Model Curriculum Creation Date	24/02/2022
Model Curriculum Valid Up to Date	24/06/2025
Model Curriculum Version	3.0
Maximum Duration of the Course	600 Hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Identify the various equipment and machinery used in the maintenance process.
- Conduct maintenance of the electronics machines installed in the factory.
- Interact and coordinate with the supervisor and colleagues etc.
- Follow safe and healthy work practices.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**21:00**	**39:00**	**00:00**	**00:00**	**60:00**
Module 1: Introduction to the role of Electronics Machine Maintenance Executive	21:00	39:00	00:00	00:00	60:00
ELE/N2501 - Maintain machines and equipment	**120:00**	**180:00**	**150:00**	**00:00**	**450:00**
Module 2: Maintain machines and equipment	120:00	180:00	150:00	00:00	450:00
ELE/N1002 – Apply Health and Safety Practices at the Workplace	**15:00**	**15:00**	**00:00**	**00:00**	**30:00**
Module 3: Basic Health and Safety Practices	15:00	15:00	00:00	00:00	30:00
DGT/VSQ/N0102- Employability Skills (60 Hours)	**24:00**	**36:00**	**00:00**	**00:00**	**60:00**
Module 4: Employability Skills (60 Hours)	24:00	36:00	00:00	00:00	60:00
Total Duration	**180:00**	**270:00**	**150:00**	**00:00**	**600:00**

Module Details

Module 1: Introduction to the role of Electronics Machine Maintenance Executive

Bridge module

Terminal Outcomes:

- List the role and responsibilities of an Electronics Machine Maintenance Executive.

Duration: *21:00*	**Duration**: *39:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the size and scope of the electronics industry and its various sub-sectors. • Discuss the various opportunities for an Electronics Machine Maintenance Executive in the industry. • Define the basics of electronics and related concepts. • Discuss the role and responsibilities of an Electronics Machine Maintenance Executive. • Discuss organizational policies on incentives, delivery standards, personnel management and public relations (PR).	• Basic understanding of hardware of machinery • Familiarization with function of machinery • Familiarization with troubleshooting
Classroom Aids:	
Laptop, white board, marker, projector	
Tools, Equipment and Other Requirements	
NA	

Module 2: Maintain machines and equipment

Mapped to ELE/N2501

Terminal Outcomes:

- Identify tools and equipment required for preventive maintenance.
- Perform maintenance of electronic machines installed.

Duration: *120:00*	**Duration**: *180:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define maintenance. • Classify various types of maintenance. • Discuss the information derived from the instruction sheet/ job card, maintenance log book/ card/ sheet and instructions from supervisor. • Recall the information mentioned in the maintenance schedule and checklist regarding the maintenance work. • List tools, equipment, accessories, consumables and spare parts required during the maintenance work. • Describe the organisational process of collecting and arranging consumables, spare parts, tools etc. from the store. • List the steps to be performed for dismantling the equipment for inspection, cleaning, repairing or replacing the consumables, spare parts and faulty components as per SOP. • Explain the process of checking the internal conditions of the equipment with the specified quality standards. • Discuss breakdown maintenance process. • Explain methods of inspecting the charge leakage, short circuit in parts, breakage of wires and clamps, unusual contact of electrical wires with moving parts, erratic/problematic etc. in the equipment. • Discuss the necessary precautions to avoid any hazard and accident during maintenance activities. • List the steps to be performed for assembling back the equipment as per SOP. • Summarise the documents, records and information to be maintained related to the maintenance and repairing done. • Explain the process of evaluating the equipment specified parameters for no abnormalities at full power/speed/flow.	• Read the instruction sheet/ job card, maintenance log book/ card/ sheet, specifications, manufacturers' manuals, maintenance manual, checklist etc. for identifying the information about the equipment used for service and repairing. • Read the maintenance schedule and equipment layout for planning of the schedule for maintenance activities. • Demonstrate the standard operating procedures for using tools and equipment required during job. • Read the maintenance checklist and discuss it with the superior for confirming the maintenance tasks. • Demonstrate how to check the basic health and condition of electronics equipment installed as per maintenance checklist. • Demonstrate organizational specified procedure of dismantling and repairing/ replacing the consumables, spare parts and faulty components as per SOP. • Employ appropriate ways of checking the internal conditions of wiring, motherboards etc. to test the working status and expected conditions of equipment. • Show how to conduct breakdown maintenance and inspect the charge leakage, short circuit in parts, breakage of wires and clamps, unusual contact of electrical wires with moving parts etc. in the equipment. • Apply appropriate ways to improve, debug and optimize set ups and change over. • Perform the steps of cleaning, repairing or replacing the electrical and electronic system of the equipment. • Show how to dispose waste as per organisational guidelines.

	• Demonstrate organizational specified procedure of assembling back the equipment and preparing it for trials as per SOP. • Employ appropriate ways for conducting trials and running the equipment at full power/speed/flow for checking any abnormalities in its functioning. • Show how to change the maintenance due/status sticker on the equipment. • Show how to fill the daily, weekly and monthly maintenance/defect sheets as per organisational procedures. • Prepare a report for the superiors about the maintenance activity done. • Employ appropriate practices to clean and store the tools, equipment and process auxiliaries safely.
Classroom Aids:	
Whiteboard, marker pen, computer or laptop attached to LCD projector, scanner, computer speakers	
Tools, Equipment and Other Requirements	
• PPTs of wiring diagrams and mechanical drawings • **Hand Tools**: Hammer ball peen, screw driver set, files, torque, wrenches, drills, taps. • **Measuring equipment**: Vernier calliper, micrometer, feeler gauges, steel ruler, measuring tape, multimeter. • **Electrical testing equipment**: volt meter, ammeters ohm meter, battery testing equipment, neon light and oscilloscope • Wire stripper, crimping tool, soldering gun. • **Electronic components**: resistor, capacitor, diode, IC, cables, fasteners, connectors. • Controls, sensors, fuses, Programable Logic Controller (PLC) • **PPE:** Gloves, safety shoes, goggles, ear plugs, safety helmet	

Module 3: Basic Health and Safety Practices

Mapped to ELE/N1002

Terminal Outcomes:

- Apply health and safety practices at the workplace.

Duration: *15:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss job-site hazards, risks and accidents. • Explain the organizational safety procedures for maintaining electrical safety, handling tools and hazardous materials. • Elaborate electronic waste disposal procedures. • Describe the process of disposal of hazardous waste • List the name and location of concerned people, documents and equipment for maintaining health and safety in the workplace. • Describe how to interpret warning signs while accessing sensitive work areas. • Explain the importance of good housekeeping. • Describe the importance of maintaining appropriate postures while lifting heavy objects. • List the types of fire and fire extinguishers. • Explain the importance of efficient utilisation of water, electricity and other resources. • List the common sources of pollution and ways to minimize it. • Describe the concept of waste management and methods of disposing hazardous waste. • Explain various warning and safety signs. • Describe different ways of preventing accidents at the	• Demonstrate the use of protective equipment suitable as per tasks and work conditions. • Prepare a report to inform the relevant authorities about any abnormal situation/behaviour of any equipment/system. • Administer first aid in case of a minor accident. • Demonstrate the steps to free a person from electrocution safely. • Administer Cardiopulmonary Resuscitation (CPR). • Demonstrate the application of defined emergency procedures such as raising alarm, safe/efficient, evacuation, moving injured people, etc. • Prepare a sample incident report. • Use a fire extinguisher in case of a fire incident. • Demonstrate the correct method of lifting and handling heavy objects.
Classroom Aids	
Training kit (Trainer guide, Presentations), White board, Marker, projector, laptop, flipchart.	
Tools, Equipment and Other Requirements	
Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher, first aid kit, fire extinguishers and warning signs.	

Module 4: Employability Skills (60 Hours)
Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Discuss about Employability Skills in meeting the job requirements
- Describe opportunities as an entrepreneur.
- Describe ways of preparing for apprenticeship & Jobs appropriately.

Duration: 24:00	**Duration: 36:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain constitutional values, civic rights, responsibility towards society to become a responsible citizen • Discuss 21st century skills • Explain use of basic English phrases and sentences. • Demonstrate how to communicate in a well-behaved manner • Demonstrate how to work with others • Demonstrate how to operate digital devices • Discuss the significance of Internet and Computer/ Laptops • Discuss the need for identifying business opportunities • Discuss about types of customers. • Discuss on creation of biodata • Discuss about apprenticeship and opportunities related to it.	• List different learning and employability related GOI and private portals and their usage • Show how to practice different environmentally sustainable practices. • Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, etc. • Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Demonstrate how to communicate in a well-mannered way with others. • Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette • Utilize virtual collaboration tools to work effectively • Demonstrate how to maintain hygiene and dressing appropriately. • Perform a mock interview
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer, UPS, Scanner, Computer Tables, LCD Projector, Computer Chairs, White Board OR Computer Lab	

Module 5: On-the-Job Training

Mapped to Electronics Machine Maintenance Executive

Mandatory Duration: *150:00*	**Recommended Duration**: *00:00*
Location: On Site	

Terminal Outcomes

1. Explain the fundamental concepts of electronics and electronics components
2. Identify tools and equipment required for preventive maintenance.
3. Perform maintenance of electronic machines installed
4. Check the electronics equipment installed as per maintenance checklist.
5. Repair/ replace the consumables, spare parts and faulty components as per SOP.
6. Conduct breakdown maintenance and inspect the equipment.
7. Interact and coordinate with supervisor and colleagues
8. Work as per the given timeline and quality standards

   Maintain a safe, healthy and secure work environment

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Diploma/ ITI/ Certified in relevant CITS Trade	Electronics	2	Maintenance	1	Trainer	

Trainer Certification	
Domain Certification	**Platform Certification**
"Electronics Machine Maintenance Executive, ELE/Q2501, version 3.0". Minimum accepted score is 80%.	Recommended that the Trainer is certified for the **Electronics Machine Maintenance Executive** "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, V2.0", with minimum score of 80%

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Diploma/ ITI/ Certified in relevant CITS Trade	Electronics	3	Maintenance	2	Assessor	

Assessor Certification	
Domain Certification	**Platform Certification**
"Electronics Machine Maintenance Executive, ELE/Q2501, version 3.0". Minimum accepted score is 80%.	Recommended that the Assessor is certified for the **Electronics Machine Maintenance Executive** "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701, V2.0", with minimum score of 80%

Assessment Strategy

1. Assessment System Overview:
    - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
    - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
    - Assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records

2. Testing Environment:
    - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
    - Check the duration of the training.
    - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
    - If the batch size is more than 30, then there should be 2 Assessors.
    - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
    - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
    - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
    - Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:
    - Question papers created by the Subject Matter Experts (SME)
    - Question papers created by the SME verified by the other subject Matter Experts
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
    - Assessor must be ToA certified & trainer must be ToT Certified
    - Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Centre photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.

Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
IPR	Intellectual Property Rights