



Model Curriculum

QP Name: Maintenance Technician

QP Code: ELE/Q4501

QP Version: 3.0

NSQF Level: 3

Model Curriculum Version: 3.0

Electronics Sector Skills Council of India | | 155, 2nd Floor, ESC House, Okhla Industrial Area - Phase
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Training Parameters

Sector	Electronics
Sub-Sector	Consumer Electronics & IT Hardware
Occupation	Maintenance
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3113.0101
Minimum Educational Qualification and Experience	10th Grade Pass OR 8th Grade Pass + NTC (2 years after 8th) OR 8th Grade Pass + 2 years relevant experience 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	450 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 electrical and mechanical systems 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	20:00	10:00	00:00	00:00	30:00
Module 1: Introduction to the role of Maintenance Technician	20:00	10:00	00:00	00:00	30:00
ELE/N4501 - Perform periodical preventive maintenance	30:00	60:00	30:00	00:00	120:00
Module 2: Perform periodical preventive maintenance	30:00	60:00	30:00	00:00	120:00
ELE/N4502 - Perform breakdown maintenance	40:00	110:00	60:00	00:00	210:00
Module 3: Perform breakdown maintenance	40:00	110:00	60:00	00:00	210:00
ELE/N9972 – Work Effectively at the Workplace	15:00	15:00	00:00	00:00	30:00
Module 4: Soft Skills and Work Ethics	15:00	15:00	00:00	00:00	30:00
ELE/N1003 – Apply Health and Safety Practices at the Workplace	15:00	15:00	00:00	00:00	30:00
Module 5: Basic Health and Safety Practices	15:00	15:00	00:00	00:00	30:00
DGT/VSQ/N0101- Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Module 6: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	150:00	210:00	90:00	00:00	450:00

Module Details

Module 1: Introduction to the role of Maintenance Technician

Bridge module

Terminal Outcomes:

- List the role and responsibilities of a Maintenance Technician.

Duration: 20:00	Duration: 10:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Describe the size and scope of the electronics industry and its various sub-sectors. Discuss the various opportunities for a Maintenance Technician in the industry. Define the basics of electronics and related concepts. Discuss the role and responsibilities of a Maintenance Technician. Discuss organisational policies on incentives, delivery standards, personnel management and public relations (PR). 	<ul style="list-style-type: none"> Overview of the maintenance Overview about the safety tools Familiarization with the tools
Classroom Aids:	
Laptop, white board, marker, projector	
Tools, Equipment and Other Requirements	
NA	

Module 2: Perform periodical preventive maintenance

Mapped to ELE/N4501

Terminal Outcomes:

- Identify tools and equipment required for preventive maintenance.
- Perform preventive maintenance of electrical and mechanical systems installed.

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • 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. • 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. 	<ul style="list-style-type: none"> • 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 electrical, mechanical, electronics and utility equipment installed in factory as per maintenance checklist. • Demonstrate organizational specified procedure of dismantling and repairing/ replacing the consumables, spare parts and faulty components as per SOP. • Show how to lubricate the equipment using the right amount of lubricant suggested in the manual. • Show how to replace oil or grease as specified in maintenance procedure. • 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.

	<ul style="list-style-type: none"> • 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	
<ul style="list-style-type: none"> • Basic tool box, Work bench with vice • Allen key, spanner, torque wrench, plier, bearing puller, circlip plier, scraper, thermal indicators, dial test indicator, audio test devices, bench vice, machine vice, clamps, three jaw chuck, four jaw chuck, collet chuck, drive plate, jigs and fixtures, shafts, couplings, gears, clutch, bearings and seals, cams and followers, chains and sprockets, pulleys and belts, valves, solenoid operated cylinders • Measuring equipment: Vernier calliper, micrometer, feeler gauges, steel ruler, measuring tape, dial gauge etc. • Cables, nuts, bolts, fasteners, connectors. • Hydraulic/ pneumatic / electrical machines • Safety materials: Fire extinguisher, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit • Cleaning material: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel 	

Module 3: Perform breakdown maintenance

Mapped to ELE/N4502

Terminal Outcomes:

- Identify tools and equipment required for breakdown maintenance.
- Perform breakdown maintenance of electrical and mechanical systems installed.

Duration: 40:00	Duration: 110:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the information derived from the instruction sheet/ job card, maintenance log book/ card/ sheet and instructions from supervisor. • Discuss how to check the equipment and collect information from operator or supervisor about the unusual conditions noticed in equipment. • 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 commonly occurring faults/failures in the equipment and corrective actions taken to resolve them. • Discuss breakdown maintenance process. • Explain methods of inspecting the equipment for problems and defects. • Identify different methods for disposing off waste material and scrap. • 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. 	<ul style="list-style-type: none"> • 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. • Demonstrate the standard operating procedures for using tools and equipment required during job. • Demonstrate organizational specified procedure of dismantling and assembling the equipment. • Employ appropriate ways of checking the systems of the equipment to find out root cause of the problems. • Apply appropriate methods for conducting breakdown maintenance and rectifying the faults as per SOP. • Show how to relate previous reports/ records of similar fault conditions. • Employ appropriate ways for evaluate the likely risk of running the equipment and the effects the fault. • Demonstrate organizational procedure of reporting the problem to appropriate person if the problem is beyond the competence. • Employ appropriate ways for cleaning, repairing or replacing the components in the equipment • Show how to dispose waste as per organisational guidelines. • 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.

	<ul style="list-style-type: none"> • 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.
Classroom Aids:	
Whiteboard, marker pen, computer or laptop attached to LCD projector, scanner, computer speakers	
Tools, Equipment and Other Requirements	
<ul style="list-style-type: none"> • Basic tool box, Work bench with vice • Allen key, spanner, torque wrench, plier, bearing puller, circlip plier, scraper, thermal indicators, dial test indicator, audio test devices, bench vice, machine vice, clamps, three jaw chuck, four jaw chuck, collet chuck, drive plate, jigs and fixtures, shafts, couplings, gears, clutch, bearings and seals, cams and followers, chains and sprockets, pulleys and belts, valves, solenoid operated cylinders • Measuring equipment: Vernier calliper, micrometer, feeler gauges, steel ruler, measuring tape, dial gauge etc. • Cables, nuts, bolts, fasteners, connectors. • Hydraulic/ pneumatic / electrical machines • Safety materials: Fire extinguisher, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit • Cleaning material: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel 	

Module 4: Soft Skills and Work Ethics

Mapped to ELE/N9972

Terminal Outcomes:

- Work effectively at the workplace.
- Implement the practices related to gender and PwD sensitization.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • State the importance of work ethics and workplace etiquette • State the importance of effective communication and interpersonal skills. • Explain ways to maintain discipline at the workplace. • Discuss the common reasons for interpersonal conflict and ways of managing them effectively. • Discuss the importance of following organisational guidelines for dress code, time schedules, language usage and other behavioural aspects. • Explain the importance of working as per the workflow of the organisation to receive instructions and report problems. • Explain the importance of conveying information/instructions as per defined protocols to the authorised persons/team members. • Explain the common workplace guidelines and legal requirements on non-disclosure and confidentiality of business-sensitive information. • Describe the process of reporting grievances and unethical conduct such data breach, sexual harassment at the workplace, etc. • Explain the concept and importance of gender sensitivity and equality. • Discuss ways to create sensitivity for different genders and Persons with Disabilities (PwD). • Discuss ways of dealing with 	<ul style="list-style-type: none"> • Develop a sample plan to achieve organisational goals and targets. • Create a sample feedback form to obtain feedback from customers, colleagues etc. • Roleplay to demonstrate the use of professional language and behaviour that is respectful of PwD and all genders. • Apply organisational protocol on data confidentiality and sharing only with the authorised personnel.
Classroom Aids	
Training kit (Trainer guide, Presentations), White board, Marker, projector, laptop, flipchart.	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 5: Basic Health and Safety Practices

Mapped to ELE/N1003

Terminal Outcomes:

- Apply health and safety practices at the workplace.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 6: Employability Skills (30 Hours) Mapped to DGT/VSQ/N0101

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: 30:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • 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. 	
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	

Mandatory Duration: 90:00	Recommended Duration: 00:00
Location: On Site	
<p>Terminal Outcomes</p> <ol style="list-style-type: none"> 1. Explain the fundamental concepts of electronics and electronics components 2. Identify tools and equipment required for preventive maintenance. 3. Perform preventive maintenance of electrical and mechanical systems installed 4. Check the electrical and mechanical 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 9. Maintain a safe, healthy and secure work environment 	

Annexur

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
“Maintenance Technician, ELE/Q4501, version 3.0”. Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Maintenance Technician “Trainer (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, V2.0”, with minimum score of 80%

Assessor Requirements

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
“Maintenance Technician, ELE/Q4501, version 3.0”. Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Maintenance Technician “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, V2.0”, with minimum score of 80%

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

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