



Model Curriculum

QP Name: HVAC (Heating, Ventilation, and Air Conditioning) Technician

QP Code: ELE/Q3112

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 3.0

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Training Parameters

Sector	Electronics
Sub-Sector	Consumer Electronics & IT Hardware
Occupation	After Sales Support
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3115.1100
Minimum Educational Qualification and Experience	12 th grade or equivalent OR 10 th grade or equivalent with 3 years of relevant experience OR Certificate-NSQF (Level-3 in Maintenance Technician) with 3 Years of relevant Experience # Relevant Experience in Consumer Electronics & IT Hardware
Pre-Requisite License or Training	NA
Minimum Job Entry Age	NA
Last Reviewed On	07/10/2025
Next Review Date	07/10/2028
NSQC Approval Date	07/10/2025
QP Version	3.0
Model Curriculum Creation Date	07/10/2025
Model Curriculum Valid Up to Date	07/10/2028
Model Curriculum Version	3.0
Minimum Duration of the Course	510 Hours
Maximum Duration of the Course	510 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:

- Discuss how to engage with customer for service of HVAC System
- Demonstrate the Process of Servicing, troubleshooting and repairing a HVAC system (chillers)
- Explain the importance of following inclusive practices for all genders and PwD at work.
- Demonstrate various practices to be followed to maintain health and safety at work.

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 (Recommended)	On-the-Job Training Duration (Mandatory)	Total Duration
ELE/N3192: Engage with customer for service of HVAC system	60:00	30:00	00:00	30:00	120:00
Module 1: Engage with customer for service of HVAC System	60:00	30:00	00:00	30:00	120:00
ELE/N3140: Service, troubleshoot and repair a HVAC system (chillers)	30:00	60:00	00:00	60:00	150:00
Module 2: Process of Servicing, troubleshooting and repairing a HVAC system (chillers)	30:00	60:00	00:00	60:00	150:00
ELE/N3141: Service, troubleshoot and repair packaged type HVAC ducted system	60:00	90:00	00:00	60:00	210:00
Module 3: Process of servicing, troubleshooting and repairing packed type HVAC ducted system	60:00	90:00	00:00	60:00	210:00
DGT/VSQ/N0101- Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Module 4: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	180:00	180:00	00:00	150:00	510:00

Module Details

Module 1: Engage with customer for service of HVAC System

Mapped to ELE/N3192

Terminal Outcomes:

- Introduction to the roles and responsibility of HVAC Technician.
- Explain the importance of interacting with the client prior to initiating work.
- Describe the process of collating the work requirements.
- Demonstrate the process of providing possible solutions to the client.

Duration: 60:00	Duration: 30:00
Theory - Key Learning Outcomes	Practical - Key Learning Outcomes
● Describe the roles and responsibility of HVAC Technician. ● Identifying the requirement of service and repair by interacting with the client and supervisors. ● Interact with the client to list the issues and/or requirements and Connect with customer use mobile CRM tools, digital service forms, and IoT-based customer data to schedule visits. ● Analyse the drawings and layouts of site ● Identify the possible solutions and suggest to client ● Plan work schedule and collect tools equipment from store ● Deliver quality work to get client satisfaction and positive feedback	● Demonstrate effective communication while interacting with the customer supervisor to get work requirement and work schedule
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
HVAC system specification document, Warranty and service details	

Module 2: Service, troubleshoot and repair a HVAC system (chillers)

Mapped to ELE/N3140

Terminal Outcomes:

- Demonstrate the process of performing maintenance of the system.
- Demonstrate the process of troubleshooting and repairing the system.
- Explain the importance of checking the performance after service and/or repair.

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Perform maintenance of a cooling tower and chiller • Use proper equipment to clean duct work, AHU and FCU • Analyse and check water pipelines and pumps for any damage • Devise solutions to fix faults in electrical control panels and supply boxes • Analyse customer input or complain to identify the issue • Identify and fix the faulty units in chiller and cooling tower • Identify and fix faults in the AHU, FCU and ducts for faults • Evaluate and repair the electrical connections, Earthing and motor issues • Examine the air flow through ducts and temperature range in different regions • Identify the fault and perform replacement of faulty modules such as condenser, evaporator, filter and so on • Examine the system performance as per ISHRAE/ASHRAE and contract standards. • Examine the air flow and electrical parameters to calculate efficiency of the system	• Comply with the service and maintenance documents of HVAC system • Use appropriate tools and equipment for maintenance and service • Prepare maintenance and service records • Perform basic troubleshooting steps to identify issues in chiller and cooling tower • Record and report the repair work done
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	

Basic tool kit: Philips screw driver, plier set, flashlight, wrench set, Clamp meter, anemometer, Personal protective equipment: Safety shoes, gloves, mask, helmet, goggles
Dx chiller package, cooling tower, AHU, FCU, duct work, water pipes and motors, electrical panels, Logbooks, maintenance and service records, Basic tool kit: Philips screw driver, plier set, flashlight, wrench set, Clamp meter, anemometer, Personal protective equipment: Safety shoes, gloves, mask, helmet, goggles

Module 3: Process of servicing, troubleshooting and repairing packed type HVAC ducted system

Mapped to ELE/N3141

Terminal Outcomes:

- Demonstrate the process of performing service repair of duct system.
- Demonstrate the process of performing service repair of packaged type HVAC system.
- Demonstrate the process of checking performance of ducts and packaged system required.

Duration: 60:00	Duration: 90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Identify the components of a packaged type HVAC ducted system. • Ensure safety while repairing and filling gas • Identify any fault in beam clamp, conduit, dampers, pipe hanger, duct hanger and the refrigeration system • Inspect return air, supply air and duct sizes	• Perform maintenance of compressor, condenser, evaporator and motor • Perform cleaning of coils, fan and filter • Replace the faulty modules • Check refrigerant leakage • Document and report about the work done • Check bend, kink or crack in ducts • Perform cleaning of ducts by robotic/manual methods • Tighten all insulation and acoustic seals
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Packaged type HVAC system, Duct system, refrigerant gas filling apparatus, Logbooks, maintenance and service records, Basic tool kit: Philips screw driver, plier set, flashlight, wrench set, Clamp meter, anemometer, Personal protective equipment: Safety shoes, gloves, mask, helmet, goggles	

Module 4: 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
• 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	

Module 5: On-the-Job Training

Mapped to HVAC (Heating, Ventilation, and Air Conditioning) Technician

Mandatory Duration: 150:00	Recommended Duration 00:00
Location: On Site	
Terminal Outcomes 1. Explain the importance of interacting with the client to list the issues and/or requirements. 2. Explain how to plan the daily route based on number of client visits and client locations. 3. Check the warranty status and annual maintenance contract of the system based on the client's information. 4. Analyze the conditions and requirements of the site for the problem identified to arrive at solution. 5. Explain how to Inform the client about the time and cost involved. 6. Collect appropriate tools and equipment for maintenance and service. 7. Explain how to identify issues and troubleshoot low-side components such as air handling unit (AHU), fan and filter. 8. Demonstrate how to repair faulty insulation, if any, in refrigerant lines and water pipes	

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	Electrical/ Electronics/ Mechanical	1	HVAC Technician	1	Electronics	

Trainer Certification	
Domain Certification	Platform Certification
“HVAC (Heating, Ventilation, and Air Conditioning) Technician”, “ELE/Q3112, v3.0”, Minimum accepted score is 80%	Recommended that the Trainer is certified for the HVAC (Heating, Ventilation, and Air Conditioning) 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	Electrical/ Electronics/ Mechanical	2	HVAC Technician	1	Electronics	

Assessor Certification	
Domain Certification	Platform Certification
“HVAC (Heating, Ventilation, and Air Conditioning) Technician”, “ELE/Q3112, v3.0”, Minimum accepted score is 80%	Recommended that the Assessor is certified for the HVAC (Heating, Ventilation, and Air Conditioning) Technician “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
- The assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment

To ensure a conducive environment for conducting a test, the trainer will:

- 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 10 a.m. and 5 p.m. respectively
- Ensure there are 2 Assessors if the batch size is more than 30.
- 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
- The assessor must be ToA certified and the trainer must be ToT Certified
- The 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:

To verify the details submitted by the training centre, the assessor will undertake:

- A surprise visit to the assessment location
- A random audit of the batch
- A random audit of any candidate

6. Method for assessment documentation, archiving, and access

To protect the assessment papers and information, the assessor will ensure:

- 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 on the Hard drive

References

Glossary

Term	Description
Declarative knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training .
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module . A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
ISO	International Organization for Standardization
NCO	National Occupational Standards
NOS	National Skills Qualification Committee
NSQF	National Skills Qualification Framework
OJT	On-the-Job Training
OMR	Optical Mark Recognition
PC	Performance Criteria
PwD	Persons with Disabilities
QP	Qualification Pack
SDMS	Skill Development & Management System
SIP	Skill India Portal
SME	Small and Medium Enterprises
SOP	Standard Operating Procedure
SSC	Sector Skill Council
TC	Trainer Certificate
ToA	Training of Assessors
ToT	Training of Trainers
TP	Training Provider