Model Curriculum

QP Name: Automotive Product Testing Technician

QP Code: ASC/Q8407

QP Version: 1.0

NSQF Level: 4

Model Curriculum Version: 1.0

Automotive Skills Development Council | 153, Gr Floor, Okhla Industrial Area, Phase – III, Leela Building, New Delhi – 110020

Table of Contents

Training Parameters

Sector	Automotive
Sub-Sector	Research & Development
Occupation	Automotive Product Testing and Validation
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7231.0201
Minimum Educational Qualification and Experience	10th Class + 2 years I.T.I (Fitter/Mechanic Motor Vehicle/Diesel Mechanic) OR 12th Class Pass with 1 year relevant experience OR 3 years Diploma (Mechanical/Automobile) (after 10th Class) from recognised regulatory body
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	28/04/2022
Next Review Date	28/04/2025
NSQC Approval Date	28/04/2022
QP Version	1.0
Model Curriculum Creation Date	28/04/2022
Model Curriculum Valid Up to Date	28/04/2024
Model Curriculum Version	1.0
Minimum Duration of the Course	390 Hours 00 Minutes
Maximum Duration of the Course	390 Hours 00 Minutes

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 various testing equipment, tools and gauges required during, inspection, testing and repairing process.
- Conduct inspection and repair of vehicle components.
- Perform steps to conduct various tests on vehicle in laboratory and on road to measure performance and identify defects.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

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					
Module 1: Introduction to the role of an Automotive Product Testing Technician	05:00	0:00			05:00
ASC/N9803 – Organize work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level – 3	**15:00**	**30:00**			**45:00**
Module 2: Organize work and resources according to safety and conservation standards	15:00	30:00			45:00
ASC/N9802 – Interact effectively with colleagues, customers and others NOS Version No. – 1.0 NSQF Level - 3	**15:00**	**25:00**			**40:00**
Module 3: Communicate effectively and efficiently	15:00	25:00			40:00
ASC/N8401 – Perform testing of vehicle NOS Version No. – 1.0 NSQF Level - 4	**90:00**	**210:00**			**300:00**
Module 5: Testing of vehicle	90:00	210:00			300:00

Total Duration	**125:00**	**265:00**			**390:00**

Module Details

Module 1: Introduction to the role of an Automotive Product Testing Technician

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Product Testing Technician.

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive Product Testing Technician. • Discuss the job opportunities for an Automotive Product Testing Technician in the automobile industry. • Explain about Indian automobile manufacturing market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. • Discuss the inspection, testing standards and procedures involved in vehicle testing.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 2: Organize work and resources according to safety and conservation standards

Mapped to ASC/N9803 v1.0

Terminal Outcomes:

- Employ appropriate ways to maintain safe and secure working environment.
- Perform work as per the quality standards.
- Apply conservation practices at the workplace.

Duration: *<15:00>*	**Duration**: *<30:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the potential workplace related risks and hazards, their causes and preventions. • Identify PPE to be used at workplace. • Identify various warning signs used at the workplace. • Describe appropriate strategies to deal with emergencies and accidents at the workplace. • Outline the organizational structure to be followed to report about health, safety and security breaches to the concerned authorities. • Discuss the importance of keeping work area clean and tidy. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap. • Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps if any to the concerned authorities. • Discuss the ways of dealing with stress and anxiety. • Discuss how to complete the given work within the stipulated time period. • Explain how to maintain a proper balance between team and individual goals. • Explain 5S guidelines at workplace. • List the various materials used at the workplace. • Explain organisational recommended procedure for storage of tools, equipment and material after completion of work. • Explain the ways to optimize usage of resources. • Discuss various methods of waste management and its disposal.	• Apply appropriate safety practices to ensure safety of people at the workplace • Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Demonstrate the use of fire extinguisher. • Apply basic first aid procedure in case of emergencies. • Perform routine cleaning of tools, equipment and machines. • Employ various techniques for checking malfunctions in the equipment as per Standard Operating Procedure (SOP). • Show how to sanitize and disinfect one's work area regularly. • Demonstrate the correct way of washing hands using soap and water. • Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs. • Demonstrate how to evacuate the workplace in case of an emergency. • Demonstrate sorting of materials, tools and equipment and spare parts after completion of work. • Demonstrate the steps involved in storage of tools, equipment and material after completion of work. • Perform basic checks to identify any spills and leaks and that need to be plugged /stopped. • Demonstrate different disposal techniques depending upon types of waste. • Employ different ways to check if equipment/machines are functioning as per requirements and report malfunctioning, if observed. • Employ ways for efficient utilization of material and water.

• List the different categories of waste for the purpose of segregation • Differentiate between recyclable and non-recyclable waste • State the importance of using appropriate colour dustbins for different types of waste. • Discuss common practices for conserving electricity at workplace. • Discuss the common sources of pollution and ways to minimize it.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Housekeeping material: Cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel, fire extinguisher • Safety gears: Safety shoes, ear plug, goggles, gloves, helmet, first-aid kit	

Module 3: Communicate Effectively and Efficiently

Mapped to ASC/N9802 v1.0

Terminal Outcomes:

- Use effective communication and interpersonal skills.
- Apply sensitivity while interacting with different genders and people with disabilities.

Duration: *<15:00>*	**Duration**: *<25:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the organizational structure for communicating with colleagues, seniors and others. • Discuss the ways to adjust the communication styles to reflect sensitivity towards gender and persons with disability (PwD). • Explain the importance of respecting personal space of colleagues. • State the procedure to receive work instructions and report problems to the supervisor. • List the various organizational policies and procedures to be followed at the workplace. • Describe different ways to rectify commonly occurring errors. • Explain the importance of complying with the instructions/guidelines and procedures while performing tasks related to the job specifications. • Discuss the importance of PwD and gender sensitization.	• Employ different means of communication depending upon the requirement while interacting with others. • Demonstrate using new ways to maintain good relationships with colleagues and supervisor. • Prepare a sample report to send the work status to the supervisor. • Demonstrate how to communicate with different genders and persons with disability (PwD) in a sensitive manner.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 4: Testing of vehicle

Mapped to ASC/N8401, v2.0

Terminal Outcomes:

- Identify tools and equipment required for testing process.
- Demonstrate how to inspect and repair vehicle components and systems.
- Apply appropriate techniques to test vehicle in the laboratory and on road to observe the performance of its components and systems.

Duration: *<90:00>*	**Duration**: *<210:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List different components/aggregates of electric vehicle. • Discuss basic technology used, functioning and interconnections of various systems and components of the vehicle. • Recall fundamental terms, laws and principles of electricity used in EV. • Describe various symbols, units and terms used in wiring diagrams associated with electrical/electric systems/components of the vehicle. • Discuss the information collected from the vehicle drawings, testing sheet about the testing tasks and type of tests required to be conducted. • Discuss how to confirm the testing tasks and type of tests required to be conducted on the vehicle from the superior. • List testing equipment, measuring instruments, gauges, parts etc. required during the testing process. • Explain the selection criteria of testing equipment, measuring instruments, gauges, parts etc. required. • List the steps to be performed for arranging the testing equipment, measuring instruments, gauges, parts etc. required. • Summarise the steps to be performed for checking the tools, gauges and testing apparatus before use. • Discuss testing parameters need to be measured during the test. • Recall the necessary precautions to avoid any hazard and accident during inspection and testing process. • Recall legal regulations that need to be taken into account for handling electric vehicles.	• Apply appropriate ways to identify and select the testing equipment, measuring instruments, gauges, parts etc. required during the testing process. • Demonstrate organisational procedure for arranging the testing equipment, measuring instruments, gauges, parts etc. required during the testing process. • Demonstrate the standard operating procedure to use testing equipment, tools, gauges and measuring instruments required during job. • Apply appropriate ways to check the tools, gauges and testing apparatus for defects and calibration before use. • Show how to assess the vehicle for any repair, calibration or adjustment requirement through a test drive. • Demonstrate organisational specified procedure for dismantling and re-assembling the aggregates of vehicle. • Perform steps to visually check the bundled wiring, circuits, Integrated Circuits (IC's), Printed Circuit Boards (PCB's), wiring harnesses etc. for wear and tear, damage etc. • Apply appropriate ways to check the connections of the instruments, ECU, motors and other electronic circuits in the vehicle. • Show how to calibrate, align and adjust the settings of vehicle components as per the SOP. • Demonstrate how to set the test apparatus as per the selected testing process. • Perform steps to connect the various data capturing meters and gauges for capturing the data points with the vehicle.

• List the steps to be performed for dismantling and re-assembling the aggregates of vehicle. • Discuss various sources of information available for assessing service and repair requirements of the vehicle. • Recall typical symptoms of common faults and failures in vehicle systems. • List the mandatory checks required to be conducted on the Electric Vehicle before trial run. • Explain ways for checking the connections of the instruments, ECU, motors and other electronic circuits in the vehicle. • Discuss the importance of maintaining part clearances as specified in the Work Instructions (WI)/Standard Operating Processes (SOP). • List steps for preparing test apparatus and connecting the various data capturing meters and gauges for testing process. • Discuss methods for diagnosing faults in the vehicle components and aggregates. • Describe Automotive Industry Standard (AIS) 38, 39, 40, 41, 48, 49. • List the steps to be performed for conducting tests as per Automotive Industry Standard (AIS), short circuit/open circuit test and battery tests. • Recall various types of tests like vehicle level test, component level test, EMI/EMC test, Accelerated/Highly Accelerated Life Test (HALT/HASS) and battery tests like abuse, altitude, electrochemical impedance spectroscopy (SoH). • List the steps to be performed for observing any deviations, noise or vibrations in vehicle during the testing process. • List the steps to be performed for changing or repairing the vehicle components. • Describe soldering or welding process. • Discuss various defects related to running automobiles and their potential impact on the working of the final vehicle. • List various sources and potential causes of noises and vibrations in the vehicle. • Elaborate ways for checking the vehicle components, safety features and system warning indicators before starting on road testing and during the on road testing of vehicle.	• Apply appropriate ways to diagnose faults in the vehicle components and aggregates. • Perform steps to conduct tests as per Automotive Industry Standard (AIS), short circuit/open circuit test and battery tests on the vehicle. • Prepare a sample record of observations/ readings of tests as mentioned in the testing manual/WI. • Demonstrate organisational procedure to make minor modification in test setup/ vehicle/component under testing as per the requirement. • Prepare a sample report on deviations, noise or vibrations observed in vehicle during the testing process for the Electric Vehicle Test Supervisor. • Demonstrate how to change or repair the vehicle components as per requirement. • Apply appropriate ways to check the motor, battery charge, oil/lubricant and cooling water level, tyre pressure etc. before starting the on road testing of the vehicle as per the checklist and testing manual. • Apply appropriate ways to check the safety features and system warning indicators during on road testing of the vehicle as per the checklist and testing manual. • Prepare a report about malfunctions/ repairs in the vehicle, beyond own scope. • Demonstrate the organisational procedure involved in cleaning and storing the tools, equipment and process auxiliaries after completion of work • Show how to dispose waste as per organisational guidelines. • Apply appropriate ways to check, calibrate and repair the workshop tools, equipment and workstations as per schedule.

• Discuss test results, data log etc. needed to be maintained and updated for vehicle testing as per SOP. • Recall organisational recommended procedure for cleaning and storing the tools, equipment and process auxiliaries after completion of work • List the steps to be performed to check, calibrate and repair the workshop tools, equipment and workstations.	

Classroom Aids:

Whiteboard, marker pen, projector

Tools, Equipment and Other Requirements

- Basic tool box, Work bench with vice, DC – DC Convertor, DC Fast charger , High voltage battery, onboard charger & EVSE , In vehicle power electronics, Riveting machine, drilling machine, riveting guns, pneumatic guns, fasteners, rubber seals, soldering iron, jigs, fixtures, adhesives, vernier calliper, micrometre, compass, divider, scriber, T Square, bevel protractor, pin set, torque meter
- Hand book, job orders, work order, completion material requests, and Technical Reference Books.
- Safety materials: Fire extinguisher, welding helmet, Leather sleeves, 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

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E/B.Tech	Mechanical/Electrical/ Automobile	2	Mechanical/Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
B.E/B.Tech	Mechanical/Electrical/ Automobile	3	Mechanical/Electrical/ Automobile	0	Mechanical/ Electrical/	NA
Diploma	Mechanical/Electrical/ Automobile	3	Mechanical/Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
Diploma	Mechanical/Electrical/ Automobile	4	Mechanical/Electrical/ Automobile	0	Mechanical/ Electrical/ Automobile	NA

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Product Testing Technician, ASC/Q8401, version 2.0". Minimum accepted score is 80%.	"Trainer, MEP/Q2601 v1.0" Minimum accepted score is 80%.

Assessor Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E/B.Tech	Mechanical/Electrical/ Automobile	3	Mechanical/Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
B.E/B.Tech	Mechanical/Electrical/ Automobile	4	Mechanical/Electrical/ Automobile	0	Mechanical/ Electrical/	NA
Diploma	Mechanical/Electrical/ Automobile	4	Mechanical/Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
Diploma	Mechanical/Electrical/ Automobile	5	Mechanical/Electrical/ Automobile	0	Mechanical/ Electrical/ Automobile	NA

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Product Testing Technician, ASC/Q8401, version 2.0". Minimum accepted score is 80%.	"Assessor; MEP/Q2701 v1.0" Minimum accepted score is 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

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 Outcome	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 task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
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

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
WI	Work Instructions
PPE	Personal Protective equipment