Model Curriculum

QP Name: Four Wheeler Service Master Technician

QP Code: ASC/Q1404

NSQF Level: 5

Automotive Skills Development Council
E-113, GF Floor, Okhla Industrial Area, Phase – III , New Delhi – 110020

Table of Contents

Training Parameters

Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3115.0602
Minimum Educational Qualification & Experience	10th Class + I.T.I (Machinist/Turner) with 3 Years of relevant experience OR 3 years Diploma (Mechanical/ Automobile) (after Class 10th) from a recognized body with relevant 1 Year of experience OR B.E/B.Tech (Mechanical/Automobile) with 1 year of relevant experience OR Certificate-NSQF (Four Wheeler Service Lead Technician Level 4) with 1.5 Years of relevant experience
Pre-Requisite License or Training	Permanent driving License
Minimum Job Entry Age	20 Years
Last Reviewed On	18/02/2025
Next Review Date	18/02/2028
NSQC Approval Date	18/02/2025
Model Curriculum Creation Date	18/02/2025
Model Curriculum Valid Up to Date	18/02/2028
Minimum Duration of the Course	570 Hours, 0 Minutes
Maximum Duration of the Course	720 Hours, 0 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.

- Plan and manage work and resources efficiently ensuring least wastage and optimal usage.
- Supervise team to ensure implementation safety practices.
- Communicate effectively and develop interpersonal skills with others.
- Display sensitivity towards all genders and differently abled people.
- Employ ways to assist while performing repair and overhauling in mechanical/electrical/electronic vehicle systems.
- Perform required post service/repair activities.
- Carry out inspection for faults in the vehicle to identify correct root cause and provide repair solutions.
- Supervise the team in ensuring periodic maintenance/monitoring of the tools and equipment including special purpose also.

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	**05:00**	**00:00**			**05:00**
Module 1: Introduction to the role of a Four Wheeler Service Master Technician *Bridge Module*	05:00	00:00	-	-	05:00
ASC/N9813 - Manage work and resources **NOS Version No. 1.0** **NSQF Level 5**	**25:00**	**30:00**	-	-	**55:00**
Module 2: Plan work effectively, implement safety practices and optimize resources	25:00	30:00	-	-	55:00
DGT/VSQ/N0102 -Employability Skills (60 hours) **NOS Version No. – 1.0** **NSQF Level – 5**	**24:00**	**36:00**	-	-	**60:00**
Module 3: Introduction to Employability Skills	0.5:00	1:00			1.5:00
Module 4: Constitutional values - Citizenship	0.5:00	1:00			1.5:00
Module 5: Becoming a Professional in the 21st Century	1:00	1.5:00			2.5:00
Module 6: Basic English Skills	4:00	6:00			10:00

Module 7: Career Development & Goal Setting	1:00	1:00			2:00
Module 8: Communication Skills	2:00	3:00			5:00
Module 9: Diversity & Inclusion	1:00	1.5:00			2.5:00
Module 10: Financial and Legal Literacy	2:00	3:00			5:00
Module 11: Essential Digital Skills	4:00	6:00			10:00
Module 12: Entrepreneurship	3:00	4:00			7:00
Module 13: Customer Service	2:00	3:00			5:00
Module 14: Getting ready for apprenticeship & Jobs	3:00	5:00			8:00
ASC/N1407: Perform advanced fault diagnosis on vehicle NOS Version No. 2.0 NSQF Level 4.5	**100:00**	**140:00**	-	-	**240:00**
Module 15: Advanced Fault Diagnosis on Vehicle	100:00	140:00	-	-	240:00
ASC/N1409: Assist lead technician in mechanical/ electrical/electronic repairs and overhauling NOS Version No. 2.0 NSQF Level 4.5	**25:00**	**95:00**	-	-	**120:00**
Module 16: Repairs and Overhauling Supervision	25:00	95:00	-	-	120:00
ASC/N1444: Maintain the tools and equipment NOS Version No. 1.0 NSQF Level 4.5	**20:00**	**70:00**	-	-	**90:00**
Module 17: Tools and Equipment Maintenance	20:00	70:00	-	-	90:00
Total Duration	**199:00**	**371:00**	-	-	**570:00**

Optional Modules : Automotive Dianostics

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
ASC/N1322 - Carry out diagnosis of vehicle mechanical, Electrical and Advanced systems by diagnostic tools **NOS Version No. 1.0** **NSQF Level 5**	**25:00**	**125:00**	-	-	**150:00**
Module 18: Carry out diagnosis of vehicle mechanical, Electrical and Advanced systems by diagnostic tools	25:00	125:00	-	-	150:00
Total Duration	**25:00**	**125:00**	-	-	**150:00**

Module Details

Module 1: Introduction to the Role of a Four Wheeler Service Master Technician

Mapped to NOS ASC/N9813, v1.0

Terminal Outcomes:

- Discuss the role and responsibilities of **a** Four Wheeler Service Master Technician.

Duration: *05:00*	**Duration**: *00:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of **a** Four Wheeler Service Master Technician. • Explain about automotive industry in India, workshop structure and role and responsibilities of different people in the workshop. • Elaborate standard operating procedures (SOPs) regarding receiving vehicles, opening job card, allocation of work, invoicing, vehicle delivery, handling complaints etc. • Recall the documentation involved in the different processes as specified by OEM/ auto component manufacturer. • Discuss the importance of inspection and diagnosis of faults by optimum utilization of tools and equipment as per SOP. • Discuss the importance of working as per organisational policies, professional code of ethics and standards of practice. • Outline the safety, health and environmental policies and regulations for the work place as well as for automotive trade in general. • Discuss occupational health and safety measures (OSH) required for working on vehicles. • Discuss the legal regulations pertaining to vehicles.	
Classroom Aids:	
Laptop, white board, marker, projector	
Tools, Equipment and Other Requirements	

Module 2: Plan Work Effectively and Implement Safety Practices
Mapped to NOS ASC/N9813, v1.0

Terminal Outcomes:

- Employ appropriate ways to maintain a safe and secure working environment
- Perform work as per the quality standards
- Use the resources efficiently.

Duration: *25:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the potential workplace related risks and hazards, their causes and preventions. • Outline the organizational structure to be followed to report about health, safety and security breaches to the concerned authorities. • Describe the procedures to report accident and health related issues as per SOP • Identify the importance of standard operating procedures of the company w.r.t. privacy, confidentiality and security. • List and explain work requirements to be followed by the team. • List some common practices for efficient utilisation of energy, material and water. • Discuss the specified quality standards for work requirements and corrective action to be taken in case work fails to meet the requirements. • Discuss the importance of conducting trainings to develop work expertise. • Discuss the importance of working as per the agreed and assigned requirement. • Identify the issues with process flow improvements, quality of output, product defects received from previous process, repairs and maintenance of tools and machinery and handle them • Define ways to optimize usage of resources • Discuss different set of problems along with their causes and possible solutions.	• Apply appropriate techniques in the work process to save cost and time. • Employ ways to ensure that the team complies with organisation's health, safety policies and procedures. • Keep a check on the routine cleaning of tools, machine and equipment. • Employ different ways to ensure that the team periodically checks tools, equipment and machines. • Apply appropriate techniques to use the resources judiciously. • Demonstrate checking for malfunctions in equipment and report as per SOP • Employ ways to ensure that the team periodically checks for spills and leaks and plugs the same and keeps work area clean and tidy. • Demonstrate segregation of hazardous waste. • Show how to dispose non-recyclable waste and hazardous waste responsibly. • Demonstrate how to follow the organisation's emergency procedures for different emergencies. • Prepare a sample layout of the workshop depicting the location of all the electrical, hydraulic and thermal equipment used.

• Discuss the concept of waste management and methods of waste disposal • List the different categories of waste for the purpose of segregation • State the importance of timely completion of tasks • Discuss the significance of sanitizing the workplace, equipment etc. • Summarise hygiene and sanitation regulations. • Discuss the ways of helping team members deal with stress and anxiety • Explain various ways of time and cost management • Discuss the use of proper PPE for maintaining health and hygiene at workplace and the process of wearing/discarding them. • List some common electrical problems and practices of conserving electricity. • State the importance of using appropriate colour dustbins for different types of waste. • Discuss organizational procedures for minimizing waste. • Discuss the importance of maintaining quality and timely delivery of the services as per the goals set by the manager. • Discuss the common sources of pollution and ways to minimize it. • Discuss organisation's policies for maintaining personal health and hygiene at workplace. • Discuss the significance of greening. • List the requirements like running water, sanitizers, etc. to be checked beforehand at workplace. • Recall the key performance indicators for the new tasks.	

Classroom Aids:
White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector
Tools, Equipment and Other Requirements
Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher and first aid kit

Module 3: Introduction to Employability Skills

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Discuss about Employability Skills in meeting the job requirements

Duration: *<0.5:00>*	**Duration**: *<1:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the importance of Employability Skills in meeting the job requirements	• List different learning and employability related GOI and private portals and their usage
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 4: Constitutional values - Citizenship

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Discuss about constitutional values to be followed to become a responsible citizen

Duration: *<0.5:00>*	**Duration**: *<1:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.	• Show how to practice different environmentally sustainable practices
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 5: Becoming a Professional in the 21st Century

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Demonstrate professional skills required in 21st century

Duration: *<1:00>*	**Duration**: *<1.5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss 21st century skills. • Describe the benefits of continuous learning	• Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 6: Basic English Skills

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Practice basic English speaking.

Duration: *<4:00>*	**Duration**: *<6:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe basic communication skills • Discuss ways to read and interpret text written in basic English	• Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Read and interpret text written in basic English • Write a short note/paragraph / letter/e -mail using basic English
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 7: Career Development & Goal Setting

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Demonstrate Career Development & Goal Setting skills.

Duration: *<1:00>*	**Duration**: *<1:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss need of career development plan	• Demonstrate how to communicate in a well -mannered way with others. • Create a career development plan with well-defined short- and long-term goals
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 8: Communication Skills

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Practice basic communication skills.

Duration: *<2:00>*	**Duration**: *<3:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of active listening for effective communication • Discuss the significance of working collaboratively with others in a team	• Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 9: Diversity & Inclusion

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Describe PwD and gender sensitisation.

Duration: *<1:00>*	**Duration**: *<1.5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the significance of reporting sexual harassment issues in time	• Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 10: Financial and Legal Literacy

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Describe ways of managing expenses, income, and savings.

Duration: *<2:00>*	**Duration**: *<3:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the common components of salary and compute income, expenditure, taxes, investments etc. • Discuss the legal rights, laws, and aids	• Outline the importance of selecting the right financial institution, product, and service • Demonstrate how to carry out offline and online financial transactions, safely and securely
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 11: Essential Digital Skills

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Demonstrate procedure of operating digital devices and associated applications safely.

Duration: *<4:00>*	**Duration**: *<6:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the role of digital technology in today's life • Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely	• Show how to operate digital devices and use the associated applications and features, safely and securely • Create sample word documents, excel sheets and presentations using basic features • Utilize virtual collaboration tools to work effectively
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 12: Entrepreneurship

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Describe opportunities as an entrepreneur.

Duration: *<3:00>*	**Duration**: *<4:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the types of entrepreneurship and enterprises • Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan • Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement	• Create a sample business plan, for the selected business opportunity
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 13: Customer Service

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Describe ways of maintaining customer.

Duration: *<2:00>*	**Duration**: *<3:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the significance of identifying customer needs and addressing them. • Explain the significance of identifying customer needs and responding to them in a professional manner. • Discuss the significance of maintaining hygiene and dressing appropriately.	• Demonstrate how to maintain hygiene and dressing appropriately.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 14: Getting ready for apprenticeship & Jobs

Mapped to DGT/VSQ/N0102

Terminal Outcomes:

- Describe ways of preparing for apprenticeship & Jobs appropriately.

Duration: *<3:00>*	**Duration**: *<5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the significance of maintaining hygiene and confidence during an interview • List the steps for searching and registering for apprenticeship opportunities	• Create a professional Curriculum Vitae (CV) • Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively • Perform a mock interview
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 15: Advanced Fault Diagnosis on Vehicle
Mapped to NOS ASC/N1407, *v2.0*

Terminal Outcomes:

- Perform steps to inspect and validate faults in the vehicle to arrive at a root cause.
- Employ techniques for providing a repair solution for the faults.

Duration: 100:00	**Duration**: 140:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe different auto components/aggregates along with their manufacturer's specifications. • Analyse the job card and other details to verify fault information along with noting vehicle condition in case of temporary fault. • Describe the technology used and functioning of various electrical, mechanical systems of the vehicle and their integration with each other along with the effect of one system on other systems. • Discuss fundamental terms, laws/principles used in vehicles, automotive communication protocols and various electrical and electronic signals. • List the observations to recommend required assessments to check the performance of alleged component of vehicle system. • Explain how to inform about any new premature failure/malfunctions/repair without any previously available resolution by respective OEM or component manufacturer. • Discuss how to justify and confirm final plan for required repair/replacement, repairing process and time. • Discuss how to use appropriate measuring device/equipment and interpret mathematical calculations. • Explain symbols, units and terms used in wiring diagrams related to electrical/electric systems/components of the vehicle. • Discuss how to use computer, on-line application and OEM technical information/assistance portals.	• Demonstrate how to check the functioning of vehicle systems to identify the abnormalities due to recorded fault. • Implement ways to handle vehicle inspection/test drive for visual defects based on nature of fault which can validate the noted fault. • Demonstrate how to figure out symptoms and exact fault location in vehicle systems including proof collection such as photographs, audio/video recording, environmental data of electronic control units (ECUs) etc. • Supervise lead technician to conduct tests using various diagnostic tools to identify faulty component or root cause of the fault as per troubleshooting SOPs. • Manage lead technician to perform required vehicle inspections/troubleshooting documentation. • Suggest possible repair resolution by using vehicle or component specification, checklists, diagnostic manual, technical information, etc. • Demonstrate how to understand required inspection, measurement/test results and compare them with vehicle specifications and regulatory requirements. • Show how to check vehicle emission standards are under BS6 norms

• Discuss BS6 emission norms for the vehicles • Discuss how to use various available sources of information to evaluate service/repair requirements. • List industry standards essential for inspection and fault reporting in different formats. • Discuss common indications of regular faults and failures in vehicle systems. • List OEM safety requirements to work in hazardous environments and manage tool/equipment, hazardous substances. • Discuss Standard Operating Procedures (SOPs) of the organization/ dealership set by OEM/components manufacturer for vehicle fault inspection/diagnosis and using required tools/equipment for diagnosis/ troubleshooting. • Identify various types of errors or defects in the tools/equipment.	

Classroom Aids:
White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector
Tools, Equipment and Other Requirements
Reports, job cards, documents used in the dealership/workshop, repair/diagnosis tools/equipment

Module 16: Repairs and Overhauling Supervision
Mapped to NOS ASC/N1409, *v2.0*

Terminal Outcomes:

- Provide assistance to perform repair and overhauling in mechanical/electrical/electronic systems of the vehicle.
- Carry out post service/repair activities.

Duration: *25:00*	**Duration**: 95*:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Analyse the job card, vehicle service history, inspection report, etc. in order to confirm any repair requirement. • Explain use of PPE as per the job requirement. • Discuss required precautions while working to avoid any damage to the vehicle and its components. • Explain usage of tools/equipment related to mechanical electrical/electronic systems including special service tools, based diagnostic equipment, etc.as per OEM SOP. • Discuss OEM SOPs recommended for service, repair and overhauling of the vehicle aggregates. • Explain standard schedules and checklists suggested by the OEM/auto component manufacturer for vehicle component/aggregate servicing. • Discuss different methods removal, dismantling, cleaning, adjusting, reassembling and testing of vehicle components for their proper functioning. • Describe different types and quality of consumables/materials used in different processes.	• Demonstrate how to carry out visual inspection for defect assessment. • Supervise the lead technician to collect right service/repair manual and follow the required SOP. • Implement ways to handle collection of required workshop tools/measuring devices/equipment/spare parts/consumable as per calibration stated by respective OEM. • Manage proper placement of tools/equipment to maintain safe and organized workstation. • Supervise that OEM SOP and standard safety procedures are followed while working in hazardous environments and handling tool/equipment, vehicle component, fluids, hazardous substances. • Demonstrate how to remove parts appropriate to various aggregates along with their secure placement and post removal testing of components as per OEM SOP. • Manage cleaning of dismantled components before assembling, including mechanical and electrical aggregates. • Provide support to lead technician to carry out repair/replacement/calibration/overhauling of components/aggregate including power assisted braking & steering systems. • Demonstrate how to rectify indirect faults in mechanical aggregate due to another system/component. • Supervise the maintenance of vehicle repair/overhaul documentation. • Implement ways to verify post repair performance of vehicle/aggregate and

	report supervisor/service advisor in case of any other requirement of inspection/repair. ● Verify completion of all allotted tasks before releasing the vehicle for the next process. ● Supervise disposal of materials/scrap of four-wheeler as per organisation's policies ● Manage scheduled checks, calibration and timely repairs for workshop tools, equipment and workstations along with their removal from the work site on work completion. .
Classroom Aids:	
White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Reports, job cards, documents used in the dealership/workshop, hand tools, power tools, special service tools, measuring instruments, workshop equipment, demo vehicle, aggregates etc.	

Module 17: Tools and Equipment Maintenance

Mapped to NOS **ASC/N1444, *v1.0***

Terminal Outcomes:

- Perform steps to carry out tools and equipment maintenance activity.
- Carry out monitoring of special purpose tools/equipment usage.

Duration: *20:00*	**Duration**: *70:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify and report shortfall/ missing/damage tools or equipment, new product launch and vehicular population in the workshop. • Discuss Standard Operating Procedures (SOPs) of the organisation/dealership for tools/equipment inspection and operation within suggested tolerance levels. • Explain how to maintain different tools and equipment including hand and power tools, specialist tool, etc. as per SOPs of manufacturer/dealership. • Discuss the various methods of gauging and fault assessment in tools and equipment. • Explain operating process and usage of tools/equipment at required place. • Describe the process and workshop protocols followed for schedule maintenance or ordering of any tools and equipment.	• Create a list of available tools and equipment in the workshop as recommended by OEM. • Carry out tools and equipment inspection to check for any losses, defects, wear or breakage. • Prepare timelines document required for calibration of tools/equipment. • Manage required re-calibration of the tools/equipment in workshop or by external vendor within specified timelines and service schedules as per the manufacturer guidelines. • Implement ways to maintain budget within given limit along with records of tools/equipment expenses. • Demonstrate how to label special purpose tool/equipment location with details such as number, application and their total items/child parts, etc. • Supervise placement/storage of clean tools/equipment safely at specified location, mark and report out of order tools/equipment to the concerned person. • Manage issuance of correct special purpose tools/equipment based on vehicle model/aggregate and nature of the job. • Demonstrate how to maintain special purpose tools/equipment usage documentation on daily basis and report in case of any discrepancy.
Classroom Aids:	
White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Reports, job cards, documents used in the dealership/workshop, hand tools, power tools, special service tools, measuring devices and workshop equipment.	

Module 18: Carry out diagnosis of vehicle mechanical, Electrical and Advanced systems by diagnostic tools

Mapped to ASC/N1322, v1.0

Terminal Outcomes:

- Perform the steps of diagnosing faults in different components and systems of an automobile

Duration: *<27:00>*	**Duration**: *<58:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe repairs and diagnostic process • List six steps of diagnostic process • List diagnostic terminology in automobile industry • Discuss the information obtained from field reports, DMS data, vehicle drawings, work instruction's, fault reports etc. related to faults/failures and diagnosis process need to done • List different diagnostic tools, testing tools, simulation tools, software testing tools, hand tools, measuring tools, measuring instruments, gauges, etc. required • Discuss the testing parameters which need to be measured during the diagnosis procedure • List the steps to be performed for dismantling and reassembling the aggregates of vehicle for fault diagnosis • Describe different steering and suspension geometry angles • Describe different tread wear pattern and causes of it • Describe Root cause analysis process and Fishbone diagram • Describe various mechanical diagnostics techniques • Describe engine fault diagnosis table of symptom possible cause and remedies • List different types of noises and possible source of them • Describe cooling system leakage test, antifreeze content test, operating temperature test using cooling fault diagnosis tables • Describe lubrication system diagnosis using lubrication fault diagnosis tables • Describe Steering and wheels diagnosis using steering fault diagnosis table and tire fault diagnostic table	• Show how to set the diagnostic apparatus and connect the various data capturing meters and gauges, data collection systems and data loggers to capture the required failure data • Apply appropriate ways to dismantle and reassemble aggregates of vehicle for fault diagnosis • Demonstrate six steps of diagnostic process • Demonstrate root cause analysis of faults in a vehicle. • Apply appropriate diagnostic techniques to diagnose engine noise • Demonstrate steps of cylinder leak detection by compression tester and cylinder leakage tester • Demonstrate steps of cooling system leakage test, antifreeze content test, operating temperature test using cooling fault diagnosis tables • Demonstrate steps of lubrication system diagnosis with oil pressure testing kit using lubrication fault diagnosis tables • Demonstrate steps of lubrication system diagnosis using brake fluid diagnosis table • Demonstrate steps of steering and wheels diagnosis using steering fault diagnosis table and tire fault diagnostic table • Demonstrate steps of suspension diagnosis using suspension fault diagnosis table • Demonstrate steps of clutch diagnosis using clutch fault diagnosis table • Demonstrate steps of automatic gearbox diagnosis using automatic gear box fault diagnosis table • Apply appropriate ways to record and collate all the results in the required formats • Employ appropriate ways to analyse and compare the results with the standard

• Describe Suspension diagnosis using suspension fault diagnosis table • Describe Clutch diagnosis using clutch fault diagnosis table • Describe Automatic gearbox diagnosis using automatic gear box fault diagnosis table • Discuss the reports and documents need to be prepare and maintain related to diagnosis process	values, regulatory norms and benchmarked values • Show how to identify causes of faults and suggest preventive measures to repair or avoid the faults in vehicle • Demonstrate organisational procedure of submitting the report to concerned department for rectification of faults in vehicle
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
ıgnostic tools, testing tools, simulation tools, software testing tools, hand tools, measuring tools, measuring instruments, gauges	

Trainer Requirements

Annexure

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI (Mechanic Motor Vehicle)	Automobile Engineering/ Mechanical Engineering	5	Two/Four Wheeler Service	1	Two/Four Wheeler Service	NA
Diploma (Automobile Engineering/ Mechanical Engineering)	Automobile Engineering/ Mechanical Engineering	4	Two/Four Wheeler Service	1	Two/Four Wheeler Service	NA
BE/ B. Tech (Automobile Engineering/ Mechanical Engineering)	Automobile Engineering/ Mechanical Engineering	3	Two/Four Wheeler Service	1	Two/Four Wheeler Service	NA

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Four Wheeler Service Master Technician " "ASC/Q1401, v1.0", Minimum accepted score is 80%	Recommended that the trainer is certified for the job role "Trainer (VET and Skills)", Mapped to Qualification Pack: MEP/Q2601, V2.0" Minimum accepted score is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI (Mechanic Motor Vehicle)	Automobile Engineering/ Mechanical Engineering	6	Two/Four Wheeler Service	1	Two/Four Wheeler Service	NA
Diploma (Automobile Engineering/ Mechanical Engineering)	Automobile Engineering/ Mechanical Engineering	5	Two/Four Wheeler Service	1	Two/Four Wheeler Service	NA
BE/ B. Tech (Automobile Engineering/ Mechanical Engineering)	Automobile Engineering/ Mechanical Engineering	4	Two/Four Wheeler Service	1	Two/Four Wheeler Service	NA

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Four Wheeler Service Master Technician " "ASC/Q1401, v1.0", Minimum accepted score is 80%	Recommended that the Accessor is certified for the job role "Assessor (VET and Skills)", Mapped to Qualification Pack: MEP/Q2701, V2.0" Minimum accepted score is 80%.

Assessment Strategy

1. Assessment System Overview:

   - Batches assigned to the assessment agencies for conducting the assessment on 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 – The assessor should:

   - 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 are created by the Subject Matter Experts (SME)
   - Question papers created by the SME are 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
PwD	Persons with Disability
OEM	Original Equipment Manufacturer