Model Curriculum

QP Name: Automotive Engine Repair Technician

QP Code: ASC/Q1409

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 1.0

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

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Training Parameters

Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7213.0201
Minimum Educational Qualification & Experience	10th Class + 2 years ITI (Mechanic Motor Vehicle/Diesel Mechanic/Mechanic Auto Electrical and Electronics) OR 10th Class pass with 2 years relevant experience OR 12th Class pass with 1 year relevant experience OR Certificate-NSQF (Four Wheeler Service Assistant Level 3) with 2 Years of Experience
Pre-Requisite License or Training	Driving License
Minimum Job Entry Age	18 Years
Last Reviewed On	20/11/2020
Next Review Date	20/11/2025
NSQC Approval Date	20/11/2020
Version	2.0
Model Curriculum Creation Date	20/11/2020
Model Curriculum Valid Up to Date	20/11/2025
Model Curriculum Version	1.0
Minimum Duration of the Course	390 Hours, 0 Minutes
Maximum Duration of the Course	390 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.

- Perform service and repair of engine and other related mechanical aggregates in a vehicle.
- Work effectively and efficiently as per schedules and timelines while complying with the health and hygiene norms.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.
- Communicate effectively using interpersonal skills.

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 Automotive Engine Repair Technician *Bridge Module*	05:00	00:00	-	-	05:00
ASC/N9801 - Organize Work and Resources (Service) **NOS Version No. 1.0** **NSQF Level 4**	**15:00**	**30:00**	-	-	**45:00**
Module 2: Work effectively and efficiently	09:00	15:00	-	-	24:00
Module 3: Optimize resource utilization	06:00	15:00	-	-	21:00
ASC/N9802 – Interact Effectively with Colleagues, Customers and others **NOS Version No. 1.0** **NSQF Level 4**	**15:00**	**25:00**	-	-	**40:00**
Module 4: Communicate effectively and efficiently	15:00	25:00	-	-	40:00

ASC/N1418 – Carry out service, repair and overhaul of vehicle engine and allied aggregates NOS Version No. 1.0 NSQF Level 4	**90:00**	**210:00**	-	-	**300:00**
Module 5: Perform service and repair of engine/related mechanical aggregates in a vehicle	90:00	210:00	-	-	300:00
Total Duration	**125:00**	**265:00**	-	-	**390:00**

Module Details

Module 1

Introduction to the Role of Automotive Engine Repair Technician

Bridge Module

Terminal Outcomes:

- Discuss how to work as per the defined the role and responsibilities of an Automotive Engine Repair Technician.
- Discuss the scope of work of an Automotive Engine Repair Technician.

Duration: *05:00*	**Duration**: *0:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the role and responsibilities of an automotive engine repair technician. • List the basics of driving and parking 4 wheeler vehicle. • Identify the various parts / components of the vehicle. • List the activities to be performed for maintaining / managing the workshop, including tools and equipment. • List the standard operating procedures (SOP) with respect to (w.r.t.) inspection, diagnosis, service and repairs. • Identify the documentation involved in the process.	
Classroom Aids:	
Laptop, white board, marker, projector	
Tools, Equipment and Other Requirements	

Module 2

Work Effectively and Efficiently

Mapped to NOS ASC/N9801, v1.0

Terminal Outcomes:

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

Duration: ***09:00***	**Duration:** ***15:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Outline the organizational structure to be followed to report about health, safety and security breaches to the concerned authorities. • List the potential workplace related risks and hazards, their causes and preventions. • State the methods to keep the work area clean and tidy. • Discuss how to complete the given work within the stipulated time period. • Explain how to maintain a proper balance between team and individual goals. • Discuss epidemics and pandemics and their impact on society at large. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol-based hand sanitizers. • Discuss the use of proper PPE for maintaining health and hygiene at workplace and the process of wearing/discarding them. • Define self-quarantine or self-isolation. • Discuss the importance of identifying and reporting symptoms to the concerned authorities. • Explain the significance of following prescribed rules and guidelines during an epidemic or a pandemic. • Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps if any. • Discuss the ways of dealing with stress and anxiety during an epidemic or a pandemic.	• Perform routine cleaning of tools, equipment and machines. • Employ various techniques for checking malfunctions in the equipment as per Standard Operating Procedure (SOP). • Apply basic housekeeping practices to ensure that the work area is clean, such as mopping spills and leaks, cleaning grease stains etc. • Demonstrate how to evacuate the workplace in case of an emergency. • 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. • Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Demonstrate appropriate social and behavioural etiquette (greeting and meeting people, spitting/coughing/sneezing, etc.). • Prepare a list of relevant hotline/emergency numbers.
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 Sanitization kit, disinfectants, alcohol-based sanitizers, different types of face masks, shields, suits, etc.

Module 9

Optimize Resource Utilization

Mapped to NOS ASC/N9801, v1.0

Terminal Outcomes:

- Use the resources efficiently.
- Apply conservation practices at the workplace.

Duration: *06:00*	**Duration: *15:00***
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the ways to optimize usage of resources. • Discuss various methods of waste management and its disposal. • 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 the common sources of pollution and ways to minimize it.	• Perform basic checks to identify any spills and leaks and that need to be plugged /stopped. • Demonstrate different disposal techniques depending upon different 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 • Use energy efficient electrical appliances and devices to ensure energy conservation
Classroom Aids:	
White board/black board marker/chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Different type of waste bins to collect and segregate waste for disposal	

Module

Communicate Effectively and Efficiently

Mapped to NOS 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 and customers. • 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:	
White board/black board marker/chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module

Perform Service and Repair of Engine/Related Mechanical Aggregates in a Vehicle

Mapped to NOS ASC/N1418, v1.0

Terminal Outcomes:

- Perform the steps to diagnose direct/indirect faults in vehicle's engine and allied systems.
- Employ appropriate procedures to disassemble/assemble vehicle's engine and its aggregates.
- Perform service, repair and overhaul of engine/related mechanical aggregates in a vehicle.

Duration: *90:00*	**Duration**: *210:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Summarise the specifications related to the various engine components/ aggregates in the vehicle. • Explain the basic technology and functioning of various types of engine such as: working cycle (2 stroke and 4 stroke), fuel type (petrol, diesel, CNG, LPG), engine management system. • List the causes and symptoms of operational faults and failures of engine components/aggregates of a vehicle. • Explain the functioning of tools and equipment required to repair engine and other aggregate components as per SOP recommended by OEM. • Identify the malfunctions in tools and equipment that need to be escalated to the supervisor. • Discuss the process of understanding work requirements by reviewing the job card. • Recall the process of assessing the fault by test driving the vehicle. • State the procedure to collect and check tools/equipment from concerned departments. • Discuss the process of repairing/replacing/calibrating/overhauling of engine/allied aggregates. • Explain standard operating procedures to carry out routine maintenance, service, repair and overhaul of the engine/allied aggregates. • Identify the repair issues beyond own scope or those which are economically and technically infeasible to be escalated further. • List the precautions to be taken to protect the vehicle and its other systems from any damage while working on it. • List the various post-repair activities to be performed including performance check, returning consumables, parts, tools, equipment etc. • Elucidate the importance of proper disposal of materials/components.	• Check the components related to the various engine components/ aggregates. • Perform the steps to diagnose direct and indirect faults at the precise location in vehicle's engine and allied systems • Apply suitable techniques to inspect components which require replacement due to wear and tear • Demonstrate how to use workshop tools/measuring devices/equipment required for the job • Employ appropriate steps to remove/dismantle engine/allied aggregates and report the additional repair requirements, if any • Perform steps to refill/replace coolants, engine oil and other lubricants/fluids as per OEM guidelines • Check that the correct spare parts, tools and equipment are available and in proper working order. • Demonstrate how to test drive the vehicle to assess the need for repairs. • Inspect any repair done from an outside source. • Demonstrate how to select the correct seals, sealants, fittings, gaskets, joints, fasteners, lubricants, coolant required for the job. • Perform scheduled checks, calibration and timely repairs for workshop tools, equipment and workstation • Perform routine maintenance and overhaul of the engine. • Demonstrate how to dismantle, repair and clean/replace and adjust,

• State the importance of maintaining proper records and documentation pertaining to inspection, servicing and repairs of the components. • Outline the flow of work processes from receiving vehicle to delivery along with workshop structure and departments involved. • List the different types of components /aggregates with manufacturer's specifications. • Discuss common faults and failures in engine, allied aggregates and other related units as well as their rectification procedures. • List the safety requirements for equipment and components prescribed by the OEM. • Discuss organisational and professional code of ethics and standards of practice. • Discuss the general safety, health and environmental policies and regulations applicable for work place. • List the various sources of information available for assessing engine, allied aggregate, including diagnostic displays, visual inspections, etc. • Identify the types of errors/defects in tools and equipment. • Identify the symptoms that necessitate replacement of parts/aggregates post dismantling. • Discuss the identification codes, nomenclature of various engine components and aggregates in a vehicle. • Explain the basic technology and functioning of various systems and components of the vehicle other than engine and allied aggregates such as transmission system, brake system, steering system, etc. • Describe the process of inspecting the repair done from an outside source/local machining garages on the various engine aggregates. • Discuss the corrective action to be taken for common faults and failures in engine, allied aggregate and related systems.	reassemble and test the components for correct operation. • Perform post-repair activities such as performance check and determine if further inspection is required. • Dispose replaced defective components and changed oil, lubricant, grease properly. • Demonstrate using computer applications required for maintaining records related to different processes involved
Classroom Aids:	
Laptop, white board, marker, projector	
Tools, Equipment and Other Requirements	
Vehicle, various body parts, engine, tools and equipment, material, mechanical and electrical components / aggregates, lubricants, grease, oil, etc. Feeler gauges, torque wrench, multimeter, engineering rule (scale), battery charger, tester, hydrometer, tachometer etc. Fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges etc., and ball joint separators, bearing pullers, gear puller tools, slide hammers etc.	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Mechanic Motor Vehicle/ Mechanic Auto Electrical and Electronics/ Diesel Mechanic	4	Four Wheeler Service	1	Four Wheeler Service	**NA**
ITI	Mechanic Motor Vehicle/ Mechanic Auto Electrical and Electronics/ Diesel Mechanic	5	Four Wheeler Service	0	Four Wheeler Service	**NA**
Diploma	Automobile Engineering/ Mechanical Engineering	3	Four Wheeler Service	1	Four Wheeler Service	**NA**
Diploma	Automobile Engineering/ Mechanical Engineering	4	Four Wheeler Service	0	Four Wheeler Service	**NA**
Certificate- NSQF Level-6	Four WheelerMaster Technician Level-6	3	Four Wheeler Service	1	Four Wheeler Service	**NA**

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Engine Repair Technician", QP: "ASC/Q1409", minimum accepted score is 80%	"Trainer", "MEP/Q2601" with scoring of minimum 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Mechanic Motor Vehicle/ Mechanic Auto Electrical and Electronics/ Diesel Mechanic	5	Four Wheeler Service	1	Four Wheeler Service	**NA**
ITI	Mechanic Motor Vehicle/ Mechanic Auto Electrical and Electronics/ Diesel Mechanic	6	Four Wheeler Service	0	Four Wheeler Service	**NA**
Diploma	Automobile Engineering/ Mechanical Engineering	4	Four Wheeler Service	1	Four Wheeler Service	**NA**
Diploma	Automobile Engineering/ Mechanical Engineering	5	Four Wheeler Service	0	Four Wheeler Service	**NA**
Certificate- NSQF Level-6	Four WheelerMaster Technician Level-6	4	Four Wheeler Service	1	Four Wheeler Service	**NA**

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Engine Repair Technician", QP: "ASC/Q1409", minimum accepted score is 80%	"Assessor", "MEP/Q2701" with scoring of minimum 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
CNG	Compressed Natural Gas
LPG	Liquefied Petroleum Gas