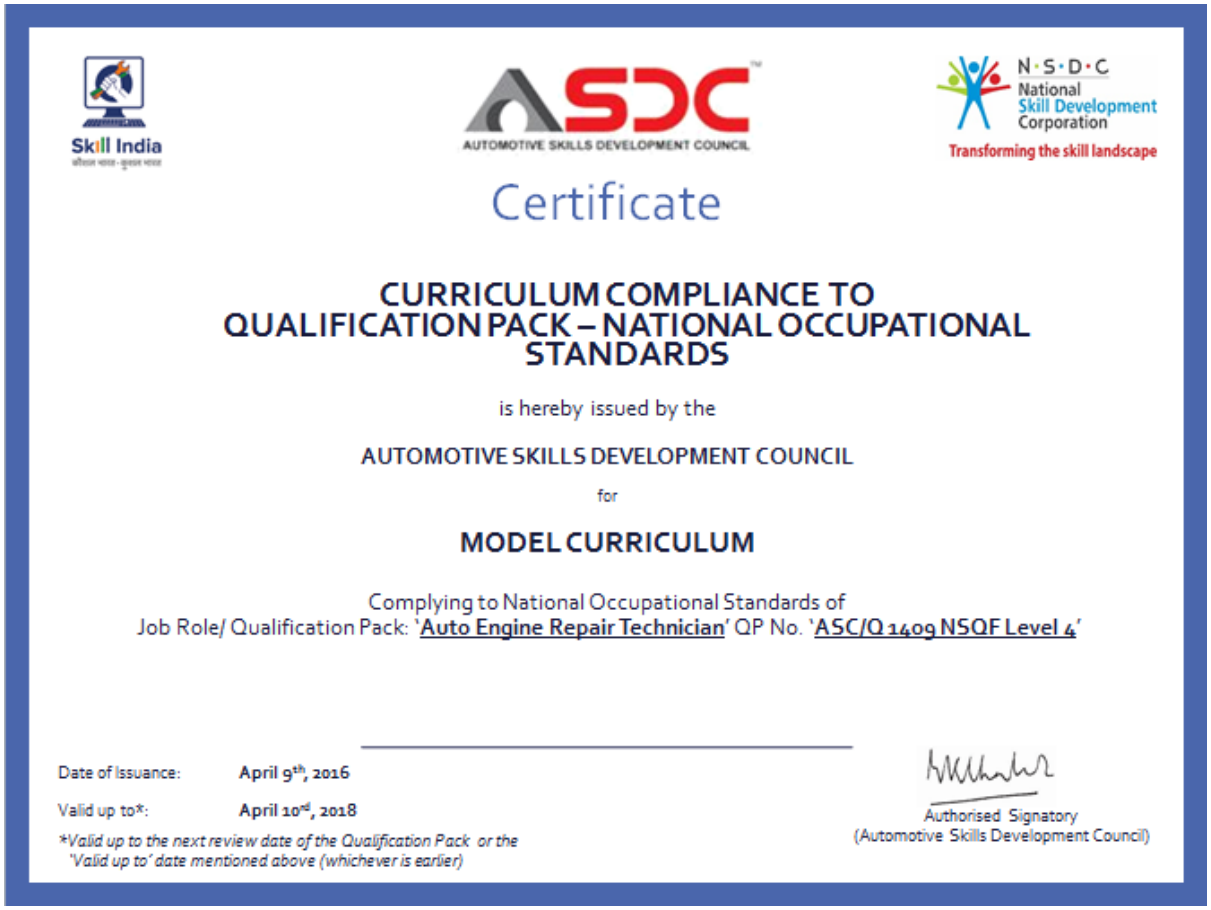
Model Curriculum

Auto Engine Repair Technician

SECTOR: AUTOMOTIVE
SUB-SECTOR: AUTOMOTIVE VEHICLE SERVICE
OCCUPATION: TECHNICAL SERVICE & REPAIR
REF ID: ASC/ Q 1409 Version 1.0
NSQF LEVEL: 4



Skill India

AUTOMOTIVE SKILLS DEVELOPMENT COUNCIL

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

AUTOMOTIVE SKILLS DEVELOPMENT COUNCIL

for

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**Auto Engine Repair Technician**' QP No. '**ASC/Q 1409 NSQF Level 4**'

Date of Issuance: **April 9th, 2016**

Valid up to*: **April 10nd, 2018**

**Valid up to the next review date of the Qualification Pack or the 'Valid up to' date mentioned above (whichever is earlier)*

Authorised Signatory
(Automotive Skills Development Council)

TABLE OF CONTENTS

Auto Engine Repair Technician

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Auto Engine Repair Technician", in the "Automotive" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Auto Engine Repair Technician Level-4**		
Qualification Code	ASC/ Q 1409		
Version No.	1.0	**Version Update**	24–01– 2017
Pre-requisites to Training	ITI in Automobile		
Training Outcomes	**After completing this programme participant will be able to** **GAIN Knowledge of automotive Engine (2W, 3W and 4w of all types):-** Know different types of engines and its technical features, auto component manufactures specification, calibrate, align and adjust settings of the engine and related mechanical aggregates **Carry out repairs of the engine and the aggregates:-** Carry out service, maintenance, diagnostic checks, disassembly and assembly of the engines and its aggregates and taking action, post root cause analysis to repair the vehicles. **Plan and organise work to meet expected out comes :-** plan and understand work content and output required in a given time, maintain set quality standards, identify and manage organizational resources efficiently and effectively. **Work effectively in a Team** Know and follow the organizations policies and procedures for working with colleagues **Maintain a Healthy, safe and secure working environment:-** Know prevailing environmental norms, government policies and work to eliminate common breaches in health and safety.		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of "Auto Engine Repair Technician4" Qualification Pack "ASC Q1409" issued by "Automotive Skills Development Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) **Corresponding NOS Code** ASC/ N 1418	• Brief outlines about the course and the scope • Familiarization about various auto manufactures • Knowledge of service process of an automotive workshop • Responsibilities of repair technician and customer expectations • Job opportunities for an engine repair technician	White board, projector, screen, marker, computer
2	**Carry out repairs of engine and other related mechanical aggregates** **Theory Duration** (hh:mm) 120:00 **Practical Duration** (hh:mm) 130:00 **Corresponding NOS Code** ASC/ N 1418	At the end of the module the learner will be able to :- • Explain the basic technology used for various types of engine and allied aggregates • Understand the functioning of various components and component systems in the engine and its aggregates • List out and explain the tools used for carrying out repair activities • Gain knowledge on the auto component manufacturer specifications associated to the various engine components and aggregates in the vehicle • Understand the various precautions to be taken to avoid damage to the vehicle and its components while working • Follow SOP's for using workshop tools and equipment for service and repairs of engine and its aggregates • Handle test drives to assess need for repairs, calibration or any other adjustments in the engine and its related mechanical aggregates • Review the job card and understand work to be carried out in the engine and related aggregates • Ensure that the correct spare parts, lubricants, tools and other materials required have been procured • Calibrate, align and adjust settings, alignment and other tolerance levels relevant to the Allied engine aggregates, i.e. air intake and exhaust systems, cooling & lubrication system, fuel ignition system, transmission system, steering system, clutch and brake assembly, electrical and electronic components • Repair and replace the components like	Laptop White board, Marker, Projector, Stationery, screen • **Pressure indicators**: Fuel pressure testers, Manifold gauge sets, Oil pressure gauges and Tire pressure gauges • **Pullers**: Ball joint Separators, Bearing pullers, Gear puller tools and Slide hammers • **Specialty wrenches**: Torque Wrenches, Alignment wrenches, Chain wrenches, Locking wrenches and Lug wrenches master wrench for calibrations • **Measuring equipment**: Vernier callipers, Micrometer, Feeler gauges, Multimeter, Hydrometer, Flow meter, Temperature gauge, and Dial gauges, surface plate, height gauge & V blocks with clamp, angle plate

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		cylinder block, cylinder head, piston liner, piston, crankshaft, camshaft, connecting rod, air compressor, flywheel, fuel systems, exhaust system, steering system and various lubrication systems connected to the engine • Carry out repair activities on the engine aggregates safely to ensure no damage • Dismantle, assess, repair, clean, replace, adjust and reassemble vehicle mechanical engine aggregates • Identify and change engine components subjected to continuous wear and tear • Ensure all dismantled engine components are cleaned and conditioned prior to reassembly • Ensure disposal of materials in accordance with the organization's policies and procedures of environment control • Refill correct grade of coolants, lubricants, engine oil and other fluids in the engine aggregates as per OEM guidelines • Record all service and repairs carried out on the engine and allied aggregates • Ensure completeness of tasks assigned before releasing vehicle for the next repair or maintenance procedure • Carry out scheduled checks, calibration and timely repairs to ensure all workshop tools, equipment and workstations are adequately maintained • Ensure any malfunctions observed in tools and equipment are communicated to the concerned persons • Report to Supervisor/ Service Advisor if required for further inspection by other specialists • Measure/ inspect the machining or any other repair done from an outside source/ local machining garages for ensuring quality. • Ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are enhanced	• **Other tools and equipment's:** Hand tools -Screw drivers, Pliers, Air Ratchet, Power tools, Lifting and jacking equipment, Test light and Electric drill, Ring & U type spanner set, set of files, drills and taps of different size, work benches Vacuum gauge, hammer, ball peen, mallets • Engine management systems sensors and actuators, petrol injector, fuel injection pumps, petrol and diesel engines of all types 2w,3w and 4w and other engine aggregates with MPFI, cut models of petrol & diesel engine, compression testing gauge, test bench for testing and repairing different types of fuel injection pumps, tachometer, carburettors, Engine scanners • Fender Cover, Cleaning cloth, Cotton waste, Waste container, Dust pan & brush set, Liquid soap, Hand towel and Rugs, lubricants • Air compressor, bench drill, bench grinder. • Different types of gaskets seals, bearings, air, compressor. • Chain and pulley block

Sr. No.	Module	Key Learning Outcomes	Equipment Required
3	**Plan and organise work to meet expected outcomes** **Theory Duration** (hh:mm) 25:00 **Practical Duration** (hh:mm) 24:00 **Corresponding NOS Code** ASC/ N 0001	At the end of the module the learner should be able to • Perform the job within given time as per quality standards/work schedule • Identify and manage resource and use it efficiently and effectively • Perform in accordance with the organisational policies and procedures • Manage his/her time effectively at work • Apply best practices to keep workplace clean • Acquire knowledge and understanding required for planning & organising	Whiteboard/ Markers, Computer, Projector, screen typical 5 S literature
4	**Work effectively in a team** **Theory Duration** (hh:mm) 25:00 **Practical Duration** (hh:mm) 22:00 **Corresponding NOS Code** ASC/ N 0002	At the end of the module the learner should be able to • Interact & communicate effectively with colleagues including members in the own group as well as in the other groups • Use all forms of verbal and non-verbal communication to communicate clearly and effectively with other colleagues, supervisors,customers and other stakeholders • Judge customers' body language and accordingly use an appropriate approach to deal with them • Apply the best practices for grooming to look presentable and make good impressionon on the customers • Use proper personal etiquettes at work place • Acquire knowledge and understanding required for good team working	Whiteboard/ Markers, Computer, Projector , screen, case studies.
5	**Maintain a healthy, safe and secure working environment** **Theory Duration** (hh:mm) 25:00 **Practical Duration** (hh:mm) 24:00 **Corresponding NOS Code** ASC/ N 0003	• Perform as per organisation policies & procedures to maintain a safe, secure working environment • Use best practice to remove potenial hazards from the workplace and prevent accidents • Apply appropriate strategies to deal with emergencies at workplace • Apply relevant norms to the vehicles and spare parts so that they do'not cause any damage to the environment.	Whiteboard/ Markers, Computer, Projector,screen Fire extinguisher, Personal protection equipments, chemical resistant gloves, safety shoes, safety signs, SOP Charts on safety norms and drills, charts for Does and Do'not for the workplace

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Total Duration **Theory Duration 200:00** **Practical Duration 200:00**	**Unique Equipment Required:** Laptop White board, Marker, Projector, Stationery, screen • **Pressure indicators**: Fuel pressure testers, Manifold gauge sets, Oil pressure gauges and Tyre pressure gauges • **Pullers**: Ball joint Separators, Bearing pullers, Gear puller tools and Slide hammers • **Specialty wrenches**: Torque Wrenches, Alignment wrenches, Chain wrenches, Locking wrenches and Lug wrenches master wrench for calibrations • **Measuring equipment**: Vernier callipers, Micrometer, Feeler gauges, Multimeter, Hydrometer, Flow meter, Temperature gauge, and Dial gauges, surface plate, height gauge & V blocks with clamp, angle plate • **Other tools and equipment's:** Hand tools -Screw drivers, Pliers, Air Ratchet, Power tools, Lifting and jacking equipment, Test light and Electric drill, Ring & U type spanner set, set of files reamers, drills and taps of different size, work benches, Vacuum gauge, hammer ball peen, mallets • Engine management systems sensors and actuators, petrol injector, fuel injection pumps, petrol and diesel engines of all types(2w,3w and 4w) other engine aggregates with MPFI cut sections of petrol & diesel engine, compression testing gauge, test bench for testing and repairing different types of fuel injection pumps, tachometer, carburettors, Engine scanners • Fender Cover, Cleaning cloth, Cotton waste, Waste container, Dust pan & brush set, Liquid soap, Hand towel and Rugs, lubricants • Air compressor, bench drill, bench grinder. Different types of gaskets seals, bearings, air, compressor chain and pulley block	

Grand Total Course Duration: 400Hours, 0 Minutes

*(This syllabus/ curriculum has been approved by **(Automotive Skills Development Council)***

Trainer Prerequisites for Job role: "Auto Engine Repair Technician Level 4" mapped to Qualification Pack: "ASC/Q1409, Version 1.1"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "ASC/Q1409, Version 1.1".
2	**Personal Attributes**	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well- organized and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	**Minimum Educational Qualifications**	ITI/ Diploma Engineer (mechanical engineering) from a recognized institute
4a	**Domain Certification**	Certified for Job Role: "Auto Engine Repair Technician Level 4" mapped to QP: "ASC/Q1409". Minimum accepted score as per ASDC guidelines is 80%.
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "SSC/ Q1402". Minimum accepted score as per ASDC guidelines is 80%.
5	**Experience**	▪ Minimum 3 years of experience in Automotive Service Industry for ITI ▪ Minimum 2 years of experience in Automotive Service Industry for Diploma/ Engineer (mechanical engineering) ▪ Working experience on latest tools and equipments used for vehicle servicing

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Auto Engine Repair Technician
Qualification Pack	ASC/Q1409, V1.1
Sector Skill Council	Automotive Skills Development Council

Sr. No.	Guidelines for Assessment
1	Assessment to be conducted by ASDC as per competency output defined in the NOS/QP and the assessment criteria provided in the NOS/QP
2	Assessment to be carried out by a third party Assessment Body duly affiliated to the SSC.
3	ASDC assessments will be comprehensive and cover all aspects of acquired knowledge, Practical skills and also basic ability to communicate.Accordingly, evaluation process would include: i. Theory/Knowledge test ii. Practical demonstration test iii. Face to Face Viva-Voce
4	Theory/Knowledge assessment will be carried out on line through a link provided for each assessment that generates a random paper from a bank of questions available at the back end. - Exception to an online test in favour of Paper Test would be subject to non - availability of requisite broad band and/or hardware. -On line test would be conducted in the presence of an ASDC assessor till web enabled proctoringis deployed.
5	ASDC assessor would be conducting Practical and Viva as per the criteria provided in the NOS/QP.
6	Cut off criteria for certification 80 %

Criteria for assessment of Trainees

JOB ROLE	Auto Engine Repair Technician Level 4
Qualification Pack	ASC/Q1409
No. Of NOS	1 Role specific ,3 generic

NOS Title /NOS Elements	NOS & Performance Criterion Description	Marks allocatio	
ASC/N1418	**Carryout repair to engine & associated mechanical**	**Viva**	**Practical**
Carry out the repair and assemble/disassemble of the engine & related aggregates	To be competent, the user/individual on the job must be able to: PC1.Understand the auto component manufacturer specifications related to the various engine components/ aggregates in the vehicle (including turbocharger) PC2. Follow standard operating procedures for using workshop tools and equipment for service and repairs of engine and its aggregates PC3. Conduct test drives to assess need for repairs, calibration or any other adjustments in the engine and its related mechanical aggregates PC4. Review the job card and understand work to be carried out in the engine and related aggregates PC5. In case of non-routine service or repair, confirm tasks to be carried out with superior PC6. Ensure that the correct spare parts, lubricants, tools and other materials required have been obtained PC7. Calibrate, align and adjust settings, alignment and other tolerance levels relevant to the following engine and allied aggregates: • Engine and aggregates(including fly wheel) • Allied engine aggregates (like radiator etc.) • Air intake and exhaust systems like (like turbo charger, inter cooler etc.) • Cooling & lubrication system • Fuel ignition system (like injectors, fuel injection high pressure lines etc.) • Transmission system (including gear box, differential, propeller shaft and axles) • Steering system • Clutch and brake assembly • Electrical and electronic components (related to engine Including alternator, wire harness etc.)	10 30	20 60

	PC8. Repair and replace: • Cylinder block • Cylinder head • Piston liner • Piston (including piston rings) • Crankshaft (including main and BE journal) • Camshaft • Connecting rod • Air compressor • Flywheel (including ring gear and damper) • Fuel systems (diesel, petrol, electrical, gas etc.) • Radiator • Emission and exhaust system • Steering system • various lubrication systems connected to the engine PC9. Carry out repair activities on the engine aggregates safely to ensure: • No damage to the vehicle or other vehicles • No damage to vehicle components and systems • No contact with hazardous materials PC10. Dismantle, assess, repair, clean, replace, adjust and reassemble vehicle mechanical engine aggregates PC11. Identify and change engine components requiring change due to continuous wear and tear (including oil and air filters) PC12. Ensure all dismantled engine components are cleaned and conditioned prior to reassembly PC13. Ensure disposal of materials (including waste oil, scrap of failed parts/aggregates) in accordance with the organisation's policies PC14. Refill correct grade of coolants, lubricants, engine oil and other fluids in the engine aggregates as per OEM guidelines PC15. Understand the various precautions to be taken to avoid damage to the vehicle and its components while working on the engine aggregates and sub-assemblies PC16. Record all service and repairs carried out on the engine and allied aggregates and ensure completeness of tasks assigned before releasing vehicle for the next repair or maintenance procedure PC17. Ensure all work shop tools, equipment and work stations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary PC18. Ensure any malfunctions observed in tools and equipment are reported to the concerned persons	20	25

	PC19. Ensure any other repair requirements observed in the other components/ aggregates systems (like engine, gear box etc.) while repairing/ overhauling of braking systems are reported to Supervisor/ Service Advisor for further inspection by other specialists PC20. Use resources responsibly (e.g. use of grease and other consumables) PC21. Measure/ inspect the machining or any other repair done from an outside source/ local machining garages PC22.Recognise when to seek assistance from a senior technician in case of diagnosis of the engine related aggregates PC23. Ensure that trainings organized by the OEM from time-to- time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes) PC24. Drive a relevant 2/3/4 wheeler vehicle which is an important part of the diagnosis of the type of vehicle that is dealt by the relevant OEM	5	30
	subtotal	**65**	**135**
ASC/N0001	**Plan & organize work to meet expected outcome**	**Viva**	**Practical**
Work requirements including various activities within the given time and set quality standards	To be competent, the user/individual on the job must be able to: PC1. Keep immediate work area clean and tidy PC2. Treat confidential information as per the organisation's guidelines PC3. Work in line with organisation's policies and procedures PC4. Work within the limits of job role PC5. Obtain guidance from appropriate people, where necessary PC6. Ensure work meets the agreed requirements	15	30
Appropriate use of resources	PC7. Establish and agree on work requirements with appropriate people PC8. Manage time, materials and cost effectively PC9. Use resources in a responsible manner	25	50
	subtotal	**40**	**80**
ASC/N0002	**Work effectively in a team**	**Viva**	**Practical**
Interact & communicate effectively with colleagues including member in the own group as well as other groups	To be competent, the user/individual on the job must be able to: PC1. Maintain clear communication with colleagues (by all means including face-to-face, telephonic as well as written)		

	PC2. Work with colleagues to integrate work PC3. Pass on information to colleagues in line with organisational requirements both through verbal as well as non-verbal means PC4. Work in ways that show respect for colleagues PC5. Carry out commitments made to colleagues PC6. Let colleagues know in good time if cannot carry out commitments, explaining the reasons PC7. Identify problems in working with colleagues and take the initiative to solve these problems PC8. Follow the organisation's policies and procedures for working with colleagues	30	70
	subtotal	**30**	**70**
ASC/N0003	**Maintain safe, healthy environment friendly work place**	**Viva**	**Practical**
Resources needed to maintain a safe, secure working environment	To be competent, the user/individual on the job must be able to: PC1. Comply with organisation's current health, safety and security policies and procedures PC2. Report any identified breaches in health, safety, and security policies and procedures to the designated person PC3. Coordinate with other resources at the workplace to achieve the healthy, safe and secure environment for all incorporating all government norms esp. for emergency situations like fires, earthquakes etc. PC4. Identify and correct any hazards like illness, accidents, fires or any other natural calamity safely and within the limits of individual's authority PC5. Report any hazards outside the individual's authority to the relevant person in line with organisational procedures and warn other people who may be affected PC6. Follow organisation's emergency procedures for accidents, fires or any other natural calamity PC7. Identify and recommend opportunities for improving health, safety, and security to the designated person PC8. Complete all health and safety records are updates and procedures well defined	25	55
	Subtotal	**25**	**55**
	Total	**160**	**340**