

AUTOMOBILE MECHANICS

CBT Curriculum

National Vocational
Certificate Level 2

Version 1 - July 2015

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1. Introduction

Today's 'World of Work' has undergone radical changes. The emergence of new technologies, global markets for products and services, and international competition require economies to upgrade and enhance the skill level of their human resources. Technical and Vocational Education and Training (TVET) systems all over the world are constantly challenged by this question that how to respond the demand of a knowledge-based economy. As TVET systems and their training programmes directly relate to the world of work in terms of quantity and quality output, the approach of TVET programmes need to focus on the acquisition of technical and non-technical skills, also referred to employability skills.

With the release of the National Skills Strategy 2009-2013 the Pakistan government has made skills development a political priority. The framework for skills development aims to:

- Change TVET education from time-bound, curriculum-based training to flexible, competency-based training;
- Bring about a shift from supply-led training to demand-driven (outcome-based) skills development by promoting the role of industry in designing and delivering TVET.

The curriculum for **Automobile Mechanic Level 2** aims to respond this demand. It has been developed as an outcome-based course designed to teach the employability skills needed to succeed in a high-performance work environment, as defined by labour market requirements.

1.1 Overall course objective

The objective of this course is to produce skilled **Automobile Mechanic** for the market. The course has been developed keeping in view the market needs as it has been developed after making a competency profile for an **Automobile Mechanic**. Major focus of this course is on equipping the trainees with core as well as technical competencies required to perform the job of an **Automobile Mechanic** efficiently and effectively.

The course is hence; designed in such a way that it has a major portion which is devoted to practical skills is aided by theory to gain maximum benefit. After completing the course, trainee will be able to work as a skilled worker in auto industry, or can start his own business.

This course can also be helpful for existing workers who want to improve their technical skills in this field.

1.2 Core competencies

Curriculum modules (training input) are clusters of competencies expressed in learning units, learning outcomes, and learning elements. After successful completion of curriculum modules of this course, the trainee will gain a range of competencies required to proceed in the world of work. The competencies stated below reflect industry requirements expressed in competency standards (training output).

- 1 **Complete Documentation Requirement.**
- 2 **Perform Preventive Maintenance.**
- 3 **Maintain Brake System.**
- 4 **Maintain Engine.**
- 5 **Maintain Fuel System.**
- 6 **Perform Ignition System Service.**
- 7 **Maintain Suspension/Steering Systems.**
- 8 **Maintain Drive Line Systems.**
- 9 **Apply Safety Precautions and Guidelines at Workplace.**

1.3 Job opportunities

The level 2 training course related to ***Automobile Mechanic*** transfers work-readiness skills (employability skills) and articulates with a number of level 3 training programmes. Based on the design and flexible approach, qualified trainees will find opportunities in a number of specialised areas to work in Automobile Service Workshop, Assembly Plants, Multinational Companies (MNCs) or Self Employed Business.

After completion of level 2 training programme qualified trainees can further progress and embark on a career till supervisory level, with job opportunities as Technician, & then to Floor/Shop Supervisor, in government, semi-government organizations or owner of a private enterprise.

Experienced Automobile Mechanic may advance through promotions with the same employer or by moving to more advanced positions with other employers.

1.4 Trainee entry level

Individuals who wish to enter this course of study have to comply against the following criteria:

- Grade 8 (Middle) or equivalent;
- Comfort level of English language and mathematics;
- Satisfactory completion of appropriate admission assessment test.

1.5 Trainer requirements

Trainers who wish to offer this programme should meet one of the following requirements:

- B-Tech (Hons) / B.Sc. Eng. Tech. in relevant Technology ; or
- Diploma Associate Engineer (DAE) and 3 years relevant work experience; or
- 2 Year Certificate as Auto Mobile Mechanic with 5 years relevant work experience

Trainers offering this programme must be computer literate and be conversant with the delivery of competency-based education and training (CBT). All legislative requirements applicable to carry out training and assessment, if any, must be complied with.

1.6 Teaching strategies in a competency-based environment

Training in a competency-based environment differs from the traditional method of training delivery. It is based on defined competency standards, which are industry oriented.

The traditional role of a trainer changes, & shifts towards facilitation of training. A facilitator in Competency Based Training (CBT) encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and are engaged in different activities. Few are conducting practical tasks in the workshop, while others are writing, & some are not even in the classroom or workshop but in another part of the building using specialized equipment, working on computers doing research on the Internet or in the library. As trainees learn at different pace, they might well be at different stages in their learning, thus learning must be tailored to suit individual needs.

The following facilitation methods (teaching strategies) are generally employed in CBT programs:

- **Direct Instruction Method:** This might be effective when introducing a new topic to a larger group of trainees in a relative short amount of time. In most cases this method relies on one-way communication, hence there are limited opportunities to get feedback on the trainee's understanding.
- **Discussion Method:** This allows trainees to actively participate in sharing knowledge and ideas. It will help the trainer to determine whether trainees understand the content of the topic. On the other hand, there is a possibility of straying off topic under discussion and some trainees dominating others on their views.
- **Small Group Method:** Pairing trainees to help and learn from each other often results in quick knowledge/skill transfer, than with the whole class. The physical arrangement of the classroom/workshop and individual assessment may be challenging also, hence using analogy method is recommended.
- **Problem Solving Method:** This is a very popular teaching strategy for Competency Based Training (CBT). Trainees are challenged and are usually highly motivated when they gain new knowledge and skills by solving problems (Contingency skills). Trainees develop critical thinking skills and the ability to adapt to new learning situations (Transfer

skills). It might be time consuming and because trainees sometimes work individually, they may not learn all the things that they are expected to learn.

- **Research Method:** This is used for workshops and laboratory tasks, field experiments, and case studies. It encourages trainees to investigate and find answers for themselves and to critically evaluate information. It however requires a lot of time and careful planning of research projects for the trainee.

1.7 Medium of instruction

Instructions will be provided in Urdu, local languages and/or English.

1.8 Sequence and delivery of the modules

The curriculum for **Automobile Mechanic** consists of nine (9) modules and should be delivered in the following sequence, (*Learning units within the modules can be delivered interchangeably as stand-alone modules or in a holistic approach*):

Module 1: Complete Documentation Requirement

Module 2: Perform Preventive Maintenance

Module 3: Maintain Brake System

Module 4: Maintain Engine

Module 5: Maintain Fuel System

Module 6: Perform Ignition System Service

Module 7: Maintain Suspension/Steering Systems

Module 8: Maintain Drive Line Systems

Module 9: Apply Safety Precautions and Guidelines at Workplace

All theoretical content related to the modules should be delivered, where possible, in an applied setting related to the Automobile Mechanic work environment.

2. Overview about the programme: Curriculum for Automobile Mechanic - NVQF

Module Title and Aim	Learning Units	Theory ¹ hours	Workplace ² hours	Timefram e of modules
<p>Module 1: Complete Documentation Requirement</p> <p>Aim: This module identifies the competencies required to complete documentation requirement, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be expected to verify customer complain and complete work estimate, at workplace.</p>	<p>LU1: Verify customer complain</p> <p>LU2: Prepare work estimate</p>	08	32	40
<p>Module 2: Perform Preventive Maintenance</p> <p>Aim: This module identifies the competencies required to perform preventive maintenance, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be expected to verify vehicle specific maintenance schedule, conduct under vehicle inspection,</p>	<p>LU1: Verify vehicle specific maintenance schedule</p> <p>LU2: Conduct under vehicle inspection (e.g. exhaust system, fluid leaks)</p> <p>LU3: Inspect all lubricants of the vehicle</p> <p>LU4: Conduct road test of vehicle</p>	15	65	80

¹Learning hours in training provider premises

²Training workshop, laboratory and on-the-job workplace

Module Title and Aim	Learning Units	Theory ¹ hours	Workplace ² hours	Timeframe of modules
inspect all lubricants, & conduct road test for diagnostics and job completion.				
<p>Module 3: Maintain Brake System</p> <p>Aim: This module identifies the competencies required to maintain brake system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be expected to perform inspection and diagnoses of brakes, rebuild/replace brake master cylinder, rebuild/replace wheel cylinders, rebuild/replace calipers, service parking brake system, bleed brake system, diagnose fault codes of ABS/TCS/VSA/VSC, service ABS/TCS/VSA/VSC systems of vehicle & road test vehicle to verify repair, at workplace.</p>	<p>LU1: Perform inspection & diagnosis of brakes</p> <p>LU2: Rebuild/ replace brake master cylinder of vehicle</p> <p>LU3: Rebuild/ replace wheel cylinders of vehicle</p> <p>LU4: Rebuild/replace calipers of vehicle</p> <p>LU5: Service parking brake system of vehicle</p> <p>LU6: Bleed brake system of vehicle</p> <p>LU7: Diagnose fault codes of ABS/TCS/VSA/VSC</p> <p>LU8: Service ABS/TCS/VSA/VSC systems of vehicle</p> <p>LU9: Conduct road test of vehicle to verify repair</p>	20	110	130

Module Title and Aim	Learning Units	Theory ¹ hours	Workplace ² hours	Timeframe of modules
<p><u>Module 4:</u> Maintain Engine</p> <p>Aim: This module identifies the competencies required to maintain engine of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be expected to diagnose engine problems, service gasket, engine seals, engine cooling system, engine lubrication system, valve train components and engine block components of vehicle, at workplace.</p>	<p>LU1: Diagnose engine problems of vehicle</p> <p>LU2: Service engine gaskets (e.g. head, manifold) of vehicle</p> <p>LU3: Service engine seals of vehicle</p> <p>LU4: Service engine cooling system (e.g. water pump, radiator, coolant flush) of vehicle</p> <p>LU5: Service engine lubrication system (e.g. oil pump) of vehicle</p> <p>LU6:Service valve train components of vehicle</p> <p>LU7: Service Engine Block Components of vehicle</p>	35	125	160
<p><u>Module 5:</u> Maintain Fuel System</p> <p>Aim: This module identifies the competencies required to maintain fuel system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be</p>	<p>LU1: Diagnose fuel system problems of vehicle</p> <p>LU2: Service fuel metering system (e.g. injectors, regulators, switching valve) of vehicle</p>	10	60	70

Module Title and Aim	Learning Units	Theory ¹ hours	Workplace ² hours	Timeframe of modules
expected to diagnose fuel system problems & service fuel metering system of vehicle, at workplace.				
<p>Module 6: Perform Ignition System Service</p> <p>Aim: This module identifies the competencies required to perform service of ignition system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be expected to diagnose ignition system problems, service distributor and C.B point of ignition system, spark plugs & wires, emission control system and perform ignition road test of vehicle to verify repair, at workplace.</p>	<p>LU1: Diagnose ignition system problems (e.g. scan tool, oscilloscope) of vehicle</p> <p>LU2: Service distributor and C.B point of ignition system</p> <p>LU3: Service spark plugs & wires of vehicle</p> <p>LU4: Service emission control system of vehicle</p> <p>LU5: Perform ignition road test of vehicle</p>	15	65	80
<p>Module 7: Maintain Suspension/Steering Systems</p> <p>Aim: This module identifies the competencies required to perform service of suspension/steering system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization's approved guidelines and procedures. Trainee will be</p>	<p>LU1: Diagnose steering and/or suspension problems of vehicle</p> <p>LU2: Service suspension components of vehicle</p> <p>LU3: Service steering system of vehicle</p>	15	65	80

Module Title and Aim	Learning Units	Theory ¹ hours	Workplace ² hours	Timeframe of modules
<p>expected to diagnose suspension/steering system problems, service suspension/steering components and perform road test of vehicle to verify repair, at workplace.</p>				
<p>Module 8: Maintain Drive line systems</p> <p>Aim: This module identifies the competencies required to maintain drive line systems by Automobile Mechanic in accordance with the organization's approved guidelines and procedures. Trainee will be expected to service manual clutch system and automatic transmission of vehicle, at workplace.</p>	<p>LU1: Service manual clutch system of vehicle</p> <p>LU2: Service automatic transmission of vehicle</p>	20	50	70
<p>Module 9: Apply Safety Precautions and Guidelines at Workplace</p> <p>Aim: This module identifies the competencies required to apply occupational health and safety procedures at workplace by Automobile Mechanic in accordance with the organization's approved guidelines and procedures. Trainee will be expected to identify hazards in workplace, comply with health and safety</p>	<p>LU1: Identify hazards in workplace environment</p> <p>LU2: Comply with Occupational Health and Safety Precautions</p> <p>LU3: Apply personal protective and safety equipment</p> <p>LU4: Practice safe work habits to ensure</p>	18	42	60

Module Title and Aim	Learning Units	Theory ¹ hours	Workplace ² hours	Timefram e of modules
precautions, use of personal protective equipment and practice safe work habits at workplace at all times.	safety at workplace			

3. Auto Mechanic Curriculum Contents

Module 1: Complete Documentation Requirement

Aim: This module identifies the competencies required to complete documentation requirement, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to verify customer complain and complete work estimate, at workplace.

Duration:	Total Hours:40	Theory Hours:10	Practice Hours:30
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Verify customer complain	Trainee will be able to: 1. Record customer complain as per organizational procedure 2. Conduct root cause analysis to investigate customer complain	1.1 Describe various organizational complain recording procedures 1.2 Explain how to prepare job/repair order 2.1 Understanding approaches for problem analysis 2.2 Describe probable faults in vehicle systems 2.3 Conduct root cause	Total 20 Theory 04 Practical 16	Testers, scanners, sound detectors, digital multi-meters, analysers, gauges, job card/repair order, Use of multimedia projector, repair manual	<ul style="list-style-type: none"> • Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Perform test drive to identify the problem</p> <p>4. Arrange tools and equipment required to diagnose the problem</p>	<p>analysis according to repair manual</p> <p>3.1 Explain procedures to identify problems during test drive e.g. requirement of engine tuning, brake service, suspension and steering mechanism repair, etc. of vehicle</p> <p>3.2 Perform road test to verify the customer complain</p> <p>4.1 Describe usage of different tools and equipment for fault diagnoses e.g. scanners, CO testers, etc.</p> <p>4.2 Demonstrate arrangement of various tools used for fault diagnostics</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>5. Follow safety precautions at workplace</p> <p>6. Finalize customer concern regarding complain as per organizational procedure</p>	<p>5.1 Demonstrate safety precautions regarding personal health and workplace as per instructions</p> <p>6.1 Explain how to perform test drive with the customer for complain resolution</p> <p>6.2 Describe how to sign off the job completion card after complain resolution</p>			
<p>LU2: Prepare Work estimate</p>	<p>Trainee will be able to:</p> <p>1. Prepare time estimate form based on diagnose result</p> <p>2. Prepare a cost estimate form based</p>	<p>1.1 Understanding Flat Rate Time (FRT) manual</p> <p>1.2 Prepare time estimate form on the basis of (Flat Rate Time) manual</p> <p>2.1 Explain market trends in pricing of</p>	<p>Total 20</p> <p>Theory 04</p> <p>Practical 16</p>	<p>Repair manual, Flat Rate Time (FRT) manual, time and cost estimation forms</p>	<ul style="list-style-type: none"> • Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	on diagnose result including: <ul style="list-style-type: none"> • Labour cost • Parts cost • Sublet cost 	<ul style="list-style-type: none"> ○ Labour on the basis of flat rate time manual ○ Parts ○ Subletting to third party 2.2 Prepare cost estimate form on the basis of pricing trends & time estimate form			

3. Auto Mechanic Curriculum Contents

Module 2: Perform Preventive Maintenance

Aim: This module identifies the competencies required to perform preventive maintenance, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to verify vehicle specific maintenance schedule, conduct under vehicle inspection, inspect all lubricants, & conduct road test for diagnostics and job completion.

Duration:	Total Hours:80	Theory Hours:18	Practice Hours:62
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Verify vehicle specific maintenance schedule	<p>Trainee will be able to:</p> <p>1. Record time period/ mileage of vehicle for maintenance schedule</p> <p>2. Awareness about maintenance schedule</p>	<p>1.1 Explain the periodic maintenance schedule manual and its importance</p> <p>1.2 Demonstrate how to verify & record time period / mileage according to periodic maintenance schedule in owner’s manual</p> <p>2.1 Approaches to provide awareness to the customer regarding periodic maintenance</p>	<p>Total 20</p> <p>Theory 04</p> <p>Practical 16</p>	Repair manual, Owner’s manual	• Classroom

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		schedule given in owner's manual			
LU2: Conduct under vehicle inspection (e.g. exhaust system, fluid leaks)	Trainee will be able to: 1. Arrange tools and equipment required for vehicle inspection 2. Follow various organizational guidelines for inspection of vehicle	1.1 Explain how to read and interpret repair manual 1.2 Describe applications and importance of tools & equipment required for vehicle inspection 1.3 Demonstrate arrangement of different tools used for fault diagnostics 2.1 Describe how to identify the fault according to repair manual 2.2 Explain to identify leakage: <ul style="list-style-type: none"> • Oil seals • Oil sump • Transmission 	<p style="text-align: center;">Total 20</p> <p style="text-align: center;">Theory 04</p> <p style="text-align: center;">Practical 16</p>	Lifts, jacks, spanners, wrenches, hammers, socket set, screw driver, plier, filter spanner, special service tools (SSTs), Personal Protective Equipment	<ul style="list-style-type: none"> • Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		<ul style="list-style-type: none"> • sump • Power steering mechanism • Hose pipes • Brake lines • Fuel lines • Shock absorbers • Exhaust muffler • Radiator <p>2.3 Conduct under vehicle inspection according to repair manual</p> <p>3.1 Understanding of safety precautions regarding personal health and workplace according to instructions</p>			
LU3: Inspect all lubricants of the vehicle	<p>Trainee will be able to:</p> <p>1. Record time period/millage of vehicle for lubricant periodic maintenance schedule</p>	<p>1.1 Explain how to read periodic maintenance schedule from owner's manual</p> <p>1.2 Understanding repair manual for lubrication</p>	<p>Total 20</p> <p>Theory 03</p> <p>Practical 17</p>	Spanners, socket set, oil filler gun, oil transfer equipment, funnel, repair manual	<ul style="list-style-type: none"> • Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>2. Inspect the following lubricants according to repair manual :</p> <ul style="list-style-type: none"> • Transmission fluid • Brake & clutch fluid • Engine oil • Power steering fluid • Suspension fluid • Differential fluid <p>3. Follow safety precautions at</p>	<p>of vehicle</p> <p>1.3 Record time period / mileage according to lubricant periodic maintenance schedule given in owner's manual</p> <p>2.1 Explain types and uses of lubricants used in vehicle</p> <p>2.2 Explain levels, grading & viscosity of various lubricants e.g. transmission fluid, brake & clutch fluid, engine oil, power steering fluid, suspension fluid, differential fluid</p> <p>2.3 Explain the storage and disposal of lubricants</p> <p>2.4 Perform visual inspection of various engine lubricants</p> <p>3.1 Explain the safety</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	workplace	<p>precautions regarding personal health and workplace according to instructions</p> <p>3.2 Approaches to Identify the effects of lubricants on human health and environment e.g. brake fluid, used engine oil</p>			
<p>LU4: Conduct road test of vehicle</p>	<p>Trainee will be able to:</p> <p>1. Follow organizational policy regarding road test</p> <p>2. Verify below given key points during road test by following various organizational guidelines:</p>	<p>1.1 Describe various organizational rules, regulations and policies regarding road test</p> <p>1.2 Follow organization policy to conduct road test</p> <p>2.1 Explain the importance of driving licence for road test & local driving laws</p> <p>2.2 Describe</p>	<p>Total 20</p> <p>Theory 4</p> <p>Practical 16</p>	<p>Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor mats, driving license</p>	<ul style="list-style-type: none"> • Workplace / Road

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<ul style="list-style-type: none"> • Function of gauges • Drivability performance • Tracking performance • Braking performance • Noises • Vibrations • Harshness • Engine performance <p>3. Follow safety precautions while driving</p>	<p>organizational standard operating procedures (SOPs) for road test</p> <p>2.3 Explain the functions of following:</p> <ul style="list-style-type: none"> • Gauges • Drivability performance • Tracking performance • Braking performance • Steer ability • Engine performance <p>2.4 Understanding how to Identify different types of noises, vibrations & harshness during road test</p> <p>2.5 Conduct road test to verify problem</p> <p>3.1 Explain the safety precautions regarding personal health and workplace according to instructions</p>			

3. Auto Mechanic Curriculum Contents

Module 3: Maintain Brake System

Aim: This module identifies the competencies required to maintain brake system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to perform inspection and diagnoses of brakes, rebuild/replace brake master cylinder, rebuild/replace wheel cylinders, rebuild/replace calipers, service parking brake system, bleed brake system, diagnose fault codes of ABS/TCS/VSA/VSC, service ABS/TCS/VSA/VSC systems of vehicle & road test vehicle to verify repair, at workplace.

Duration:	Total Hours:130	Theory Hours:20	Practice Hours:110
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Perform inspection & diagnosis of brakes	Trainee will be able to: 1. Perform road test to diagnose faults in brake 2. Analyse the faults during road test in brake:	1.1 Explain various organizational rules, regulations and policies regarding road test to check the brake system 1.2 Conduct road test as per Standard Operating Procedures (SOP's) 2.1 Explain how to read and interpret repair manual	Total 15 Theory 02 Practical 13	Scanner, SSTs, repair manual, Vernier calliper, dial indicator gauge, wheel spanner, spanner set, socket set, PPEs	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<ul style="list-style-type: none"> • Vibration on brake paddle • Abnormal Noise • Brake grip • Operation of Anti-lock brake system (ABS) • Left / right vehicle pulling during braking • Brake performance <p>3. Arrange tools and equipment required for brake inspection</p>	<p>2.2 Analyse & identify braking faults during road test by explaining following:</p> <ul style="list-style-type: none"> • Vibration on brake paddle • Abnormal Noise • Brake grip • Operation of Anti-lock brake system (ABS) • Left / right vehicle pulling during braking • Brake performance <p>2.3 Verify the faults during road test</p> <p>3.1 Describe applications and importance of measuring tools & SST's</p> <p>3.2 Demonstrate arrangement of tools & Special Service Tools (SST's) used for diagnosing faults</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>4. Inspect the followings at workplace according to repair manual:</p> <ul style="list-style-type: none"> • Brake oil • Disc pad and brake shoe thickness • Disc plate/brake drum surfaces • Brake callipers • ABS/VSS (vehicle speed sensor) sensors • Brake master cylinder • Wheel cylinders • Hand brake cables • Brake booster 	<p>in brake system</p> <p>4.1 Demonstrate how to inspect the following according to the repair manual:</p> <ul style="list-style-type: none"> • Brake oil • Disc pad and brake shoe thickness • Disc plate/brake drum surfaces • Procedure to check the run out of disc plate • Brake callipers • VSS (vehicle speed sensor) • To Check ABS sensors and modulator through scanner • Brake master cylinder • Wheel cylinders • Hand brake cables • Brake booster <p>4.2 Inspect the brake faults as per repair manual.</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	5. Follow safety precautions while driving at workplace	5.1 Explain local driving laws 5.2 Adopt safety precautions regarding personal health and workplace as per instructions			
LU2: Rebuild/replace brake master cylinder of vehicle	Trainee will be able to: 1 Follow the instructions of repair manual to rebuild/replace brake master cylinder 2 Arrange tools and equipment required to rebuild/replace brake master cylinder	1.1 Read and interpret repair manual to rebuild and replace master cylinder 2.1 Explain the usage of tools and equipment to rebuild/replace brake master cylinder 2.2 Demonstrate arrangement of tools and equipment to rebuild/replace brake master cylinder 2.3 Explain the method	Total 12 Theory 2 Practical 10	SSTs, spanners, repair manual, bleeding kit, bench vice, personal protective equipment (PPE)	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		<p>of replacement of ABS unit</p> <p>2.4 Repair / Replace brake master cylinder as per repair manual</p> <p>3 Follow safety precautions at workplace</p> <p>3.1 Explain the safety precautions regarding personal health and workplace as per instructions</p> <p>3.2 Understanding adverse effects of brake fluid on human health, vehicle body and workplace</p>			
LU3: Rebuild/replace wheel cylinders of vehicle	<p>Trainee will be able to:</p> <p>1 Follow the instructions of repair manual to rebuild/replace wheel cylinder</p> <p>2 Arrange tools and</p>	<p>1.1 Read and interpret repair manual to rebuild and replace wheel cylinder</p> <p>2.1 Explain the usage of</p>	<p>Total 13</p> <p>Theory 2</p> <p>Practical 11</p>	Jacks, safety stand, technician stretcher, spanners, socket set, SSTs, bleeding kit, repair manual, personal protective equipment (PPE)	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>equipment required to rebuild/replace wheel cylinder</p> <p>3 Follow safety precautions at workplace</p>	<p>tools and equipment to rebuild/replace brake wheel cylinder</p> <p>2.2 Demonstrate arrangement of tools and equipment to rebuild/replace brake wheel cylinder</p> <p>2.3 Repair / Replace brake wheel cylinder as per repair manual</p> <p>3.1 Adopt safety precautions regarding personal health and workplace as per instructions</p>			
<p>LU4: Rebuild/replace calipers of vehicle</p>	<p>Trainee will be able to:</p> <p>1 Follow the instructions of repair manual to rebuild/replace calipers</p>	<p>1.1 Read and interpret repair manual to rebuild and replace calipers</p>	<p>Total 14</p> <p>Theory 2</p> <p>Practical 12</p>	<p>Jacks, safety stand, spanners, socket set, SSTs, bleeding kit, back winding tool, bench vice, repair manual, personal protective equipment (PPE)</p>	<p>• Workplace</p>

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>2 Arrange tools and equipment required to rebuild/replace calipers</p> <p>3 Rebuild/replace calipers of vehicle</p> <p>4 Follow safety precautions at workplace</p>	<p>2.1 Explain the usage of tools and equipment to rebuild/replace calipers</p> <p>2.2 Demonstrate arrangement of tools and equipment to rebuild/replace calipers</p> <p>3.1 Repair / Replace brake calipers as per repair manual</p> <p>4.1 Explain the safety precautions regarding personal health and workplace as per instructions</p>			
LU5: Service parking brake system of vehicle	<p>Trainee will be able to:</p> <p>1 Follow the instructions of repair manual to service parking brake system</p>	<p>1.1 Read and interpret repair manual</p>	<p>Total 14</p> <p>Theory 2</p> <p>Practical</p>	<p>Jack, safety stand, Screw driver, spanners, amery paper, Personal protective equipment (PPE)</p>	<p>• Workplace</p>

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>2 Arrange tools and equipment required to service parking brake system</p> <p>3 Service parking brake system of vehicle</p> <p>4 Follow safety precautions at workplace</p>	<p>2.1 Explain the usage of tools and equipment to service parking brake system</p> <p>2.2 Demonstrate arrangement of tools and equipment to service parking brake system</p> <p>3.1 Service parking brake system as per repair manual</p> <p>4.1 Understanding safety precautions regarding personal health and workplace as per instructions</p>	12		
LU6: Bleed brake system of vehicle	<p>Trainee will be able to:</p> <p>1 Follow the instructions of repair manual to bleed brake system</p> <p>2 Arrange tools and equipment required to</p>	<p>1.1 Read and interpret repair manual</p> <p>2.1 Explain the usage of tools and equipment</p>	<p>Total 17</p> <p>Theory 2</p> <p>Practical</p>	Bleeding kit, scanners, SSTs, spanners, personal protective equipment (PPE), repair manual	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>bleed brake system</p> <p>3 Bleed brake system of vehicle</p> <p>4 Follow safety precautions at workplace</p>	<p>to bleed brake system</p> <p>2.2 Demonstrate arrangement of tools and equipment to bleed brake system</p> <p>3.1 Describe methods to bleeding brake system</p> <p>3.2 Understanding grading of brake fluid</p> <p>3.3 Demonstrate method of bleeding through diagnostic scanner</p> <p>3.4 Bleed brake system of vehicle as per repair manual</p> <p>4.1 Explain the safety precautions regarding personal health and workplace as per instructions</p>	15		

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU7: Diagnose fault codes of ABS/TCS/VSA	<p>Trainee will be able to:</p> <p>1 Follow the instructions of repair manual to diagnose ABS/TCS (traction control system)/VSA (vehicle stability assist)/VSC (vehicle stability control)trouble codes</p> <p>2 Arrange tools and equipment required to diagnose ABS fault codes</p> <p>3 Follow the Electric wiring diagram (EWD)</p>	<p>1.1 Read and interpret repair manual for trouble code diagnostics</p> <p>1.2 Read the trouble codes from scanner for on-board diagnostics</p> <p>1.3 Understanding trouble shooting of trouble codes from repair manual</p> <p>2.1 Explain the usage of tools and equipment for diagnosing faults in ABS</p> <p>2.2 Arrange tools for and equipment for diagnosing faults in ABS</p> <p>3.1 Read and interpret EWD</p>	<p>Total 18</p> <p>Theory 2</p> <p>Practical 16</p>	Scanners, spanners, electric wiring diagram (EWD), repair manual, multi-meter, test lamp, cutter plier, screw driver, PPE	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>for electrical diagnoses of ABS system</p> <p>4 Diagnose fault codes of ABS/TCS/VSA/VSC</p> <p>5 Follow safety precautions at workplace</p>	<p>4.1 Interpret fault codes of ABS/TCS/VSA/VSC from EWD repair manual</p> <p>5.1 Understanding safety precautions regarding personal health and workplace as per instructions</p>			
<p>LU8: Service ABS/TCS/VSA systems of vehicle</p>	<p>Trainee will be able to:</p> <p>1. Follow the instructions of repair manual to service ABS/TCS/VSA/VSC</p> <p>2. Arrange tools and equipment required to service ABS/TCS/VSA/VSC</p>	<p>1.1 Read and interpret repair manual to service ABS/TCS/VSA/VSC</p> <p>2.1 Explain the usage of tools and equipment to service ABS/TCS/VSA/VSC</p> <p>2.2 Demonstrate</p>	<p>Total 13</p> <p>Theory 3</p> <p>Practical 10</p>	<p>Scanners, spanners, EWD, repair manual, multi-meter, insulation tape, test lamp, cutter plier, screw driver, PPE</p>	<p>• Workplace</p>

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Service ABS/TCS/VSA/VSC systems of vehicle</p> <p>4. Follow safety precautions at workplace</p>	<p>arrangement of tools and equipment to service ABS/TCS/VSA</p> <p>3.1 Service ABS/TCS/VSA/VSC systems according to repair manual</p> <p>4.1 Adopt safety precautions regarding personal health and workplace as per instructions</p>			
<p>LU9: Conduct Road test of vehicle to verify repair</p>	<p>Trainee will be able to:</p> <p>1. Follow the organizational policy regarding road test</p> <p>2. Verify the followings on road test according to organizational</p>	<p>1.1 Explain organizational rules, regulations and policies regarding road test</p> <p>2.1 Analyse & verify the brake system during road test by</p>	<p>Total 14</p> <p>Theory 3</p> <p>Practical 11</p>	<p>Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor matts, driving license</p>	<p>• Workplace / Road</p>

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	guidelines: <ul style="list-style-type: none"> • Function of ABS • Drivability performance • Tracking performance • Braking performance • Parking brake performance • Noises • Vibrations • Harshness 3. Follow safety precautions while driving	describing following: <ul style="list-style-type: none"> • Function of ABS • Drivability performance • Tracking performance • Braking performance • Parking brake performance • Noises • Vibrations • Harshness 3.1 Understanding the importance of safety belt, driving licence for road test & local driving laws			

3. Auto Mechanic Curriculum Contents

Module 4: Maintain Engine

Aim: This module identifies the competencies required to maintain engine of vehicle, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to diagnose engine problems of vehicle, service engine gasket, engine seals, engine cooling system, engine lubrication system, valve train components and engine block components of vehicle, at workplace.

Duration:	Total Hours:160	Theory Hours:35	Practice Hours:125
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose engine problems of vehicle	<p>Trainee will be able to:</p> <ol style="list-style-type: none"> 1. Follow the instructions of repair manual to diagnose problems of engine 2. Arrange tools and equipment required to diagnose problems of engine 	<ol style="list-style-type: none"> 1.1 Read and interpret repair manual to diagnose problems of engine 2.1 Explain the usage of tools and equipment to diagnose engine problems 2.2 Demonstrate arrangement of tools and equipment to diagnose problems in engine 2.3 Explain how to use 	<p>Total 30</p> <p>Theory 7</p> <p>Practical 23</p>	Spanners, socket set, pliers, screw drivers, compression gauge, fuel pressure gauge, filler gauge, oil pressure gauge, scanner, off-car injector simulator, repair manual, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Inspect the following in engine of vehicle according to repair manual:</p> <ul style="list-style-type: none"> • Abnormal noises • Engine combustion • Ignition • Oil leakages • Vacuum and pressure leakages • Water leakages • Over heat • Drive belts • Fuel system 	<p>diagnostic scanner</p> <p>3.1 Explain the types of faults for troubleshooting in engine</p> <ul style="list-style-type: none"> • Abnormal noises • Engine combustion • Ignition • Oil leakages • Vacuum and pressure leakages • Water leakages • Over heat • Drive belts • Fuel system <p>3.2 Demonstrate how to inspect functions of various engine systems for fault diagnostics:</p> <ul style="list-style-type: none"> • Intake system • Exhaust system • Fuel system • Lubrication system • Cooling system • Ignition system 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4. Follow safety precautions at workplace	4.1 Understanding the significance of safety regarding personal health and workplace as per instructions			
LU2: Service engine gaskets (e.g. head, manifold) of vehicle	Trainee will be able to: 1. Follow the instructions of repair manual to service engine gaskets 2. Arrange tools and equipment required to service engine gaskets 3. Inspect the following gaskets of engine according to repair manual: <ul style="list-style-type: none"> • Head gasket 	1.1 Read and interpret repair manual 2.1 Describe the functions of gaskets 2.2 Explain the usage of tools and equipment to service engine gaskets 2.3 Demonstrate arrangement of tools and equipment to service engine gaskets 3.1 Explain the types of gaskets: <ul style="list-style-type: none"> • Head gasket • Intake manifold gasket • Exhaust manifold gasket 	Total 30 Theory 7 Practical 23	Spanners., socket set, torque wrench, T handles, screw drivers, scrappers, nose plier, repair manual, PPE	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<ul style="list-style-type: none"> • Intake manifold gasket • Exhaust manifold gasket • Tappet cover gasket • Oil pan gasket • Water pump gasket, etc. <p>4. Service engine gaskets (e.g. head, manifold) of vehicle</p> <p>5. Follow safety precautions at workplace</p>	<ul style="list-style-type: none"> • Tappet cover gasket • Oil pan gasket • Water pump gasket, etc. <p>3.2 Describe methods of visual inspection of gaskets.</p> <p>4.1 Service/replace engine gaskets according to owner's manual</p> <p>5.1 Understanding safety precautions regarding personal health and workplace as per instructions</p>			
<p>LU3: Service engine oil seals of vehicle</p>	<p>Trainee will be able to:</p> <ol style="list-style-type: none"> 1. Follow the instructions of repair manual to service engine oil seals of vehicle 2. Arrange tools and equipment required to service engine oil seals of vehicle 	<p>1.1 Read and interpret repair manual to service engine oil seals</p> <p>2.1 Explain the usage of tools and equipment to service engine oil seals</p>	<p>Total 15</p> <p>Theory 4</p> <p>Practical 11</p>	<p>SSTs, screw drivers, spanners, T handles, socket sets, plastic hammer, repair manual, torque wrench, PPE</p>	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Inspect the following oil seals of engine according to repair manual:</p> <ul style="list-style-type: none"> • Main oil seal • Crank shaft seal • Cam shaft seal • Distributor shaft seal • Valve seal • Oil pump seal • VVTI valve seal • Injector seal, etc. <p>4. Service engine oil seals of vehicle</p>	<p>2.2 Explain the usage of special service tools (SSTs) for removing and fixing oil seals</p> <p>2.3 Demonstrate arrangement of tools and equipment to service engine oil seals</p> <p>3.1 Describe the functions of oil seals</p> <p>3.2 Explain the specifications of oil seals</p> <p>3.3 Describe methods of visual inspection of oil seals.</p> <p>4.1 Perform service of engine oil seals according to repair manual</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	5. Follow safety precautions at workplace	5.1 Adopt safety precautions regarding personal health and workplace as per instruction			
LU4: Service engine cooling system (e.g. water pump, radiator, coolant flush) of vehicle	<p>Trainee will be able to:</p> <p>1. Follow the instructions of repair manual to Service engine</p> <p>2. Arrange tools and equipment required to service engine cooling system</p> <p>3. Inspect the level and quality of the coolant according to owner's</p>	<p>1.1 Read and interpret repair manual</p> <p>2.1 Explain the usage of tools and equipment to service engine cooling system</p> <p>2.2 Explain the usage of special service tools (SSTs) to service engine cooling system</p> <p>2.3 Demonstrate arrangement of tools and equipment to service engine cooling system</p> <p>3.1 Describe the properties of radiator coolant</p>	<p>Total 20</p> <p>Theory 4</p> <p>Practical 16</p>	SSTs, spanners, pliers, repair manual, screw drivers, thermometer, scanner, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>manual</p> <p>4. Inspect the following components of the cooling system of vehicle according to repair manual:</p> <ul style="list-style-type: none"> • Radiator • Hose pipes • Water pump • Water jacket • Thermostat valve • Radiator fan • Radiator pressure cap • Radiator reservoir 	<p>3.2 Explain the importance of coolant in engine coolant system</p> <p>3.3 Explain the methods of visual inspection to check the level of coolant</p> <p>3.4 Understanding the use of periodic maintenance schedule to change the coolant by verifying from maintenance schedule given in owner's manual</p> <p>4.1 Describe the functions of radiator hoses</p> <p>4.2 Describe the methods of inspection of engine cooling system components according to repair manual</p> <ul style="list-style-type: none"> • Radiator • Hose pipes • Water pump • Water jacket • Thermostat valve • Radiator fan 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<ul style="list-style-type: none"> • Radiator coolant fan switch • Temperature sensor • Drive belts • Hose pipes clamp <p>5. Service engine cooling system (e.g. water pump, radiator, coolant flush) of vehicle</p> <p>6. Follow safety precautions at workplace</p>	<ul style="list-style-type: none"> • Radiator pressure cap • Radiator reservoir • Radiator coolant • Automatic switch • Temperature sensor • Drive belts • Hose pipes clamp <p>5.1 Perform service of engine cooling system according to repair manual</p> <p>6.1 Adopt the safety precautions regarding personal health and workplace according to instructions</p>			
LU5: Service engine lubrication system (e.g., oil pump) of vehicle	<p>Trainee will be able to:</p> <p>1. Follow the instructions of repair manual to Service engine lubrication system</p>	<p>1.1 Read and interpret repair manual to service engine lubrication system</p>	<p>Total 25</p> <p>Theory 04</p> <p>Practical 21</p>	SSTs, spanners, socket set, torque wrench, funnel, repair manual, PPE	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>2. Arrange tools and equipment required to Service engine lubrication system</p> <p>3. Inspect the level and quality of lubricants used in vehicle, according to repair manual</p> <p>4. Inspect the following components of the</p>	<p>2.1 Explain the usage of tools and equipment for servicing engine lubrication system</p> <p>2.2 Explain the usage of special service tools (SSTs) for engine lubrication system</p> <p>2.3 Demonstrate arrangement of tools and equipment to service engine lubrication system</p> <p>3.1 Describe the properties of engine oil</p> <p>3.2 Describe the function of oil and oil filter according to owner's manual</p> <p>3.3 Understanding visual inspection methods to check the level of various lubricants</p> <p>4.1 Describe the working of following lubricating</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	lubricating system of vehicle according to repair manual: <ul style="list-style-type: none"> • Oil pump • Oil galleries • Oil filter • Oil pressure switch • Oil pan • Oil pump strainer • Engine oil 5. Service engine lubrication system (e.g., oil pump) of vehicle	system components of vehicle: <ul style="list-style-type: none"> • Oil pump • Oil galleries • Oil filter • Oil pressure switch • Oil pan • Oil pump strainer • Engine oil 4.2 Understanding the use of periodic maintenance schedule to service engine lubrication system			
LU6: Service valve	Trainee will be able to:		Total	Spanner set, screw	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
train components of vehicle	<ol style="list-style-type: none"> 1. Follow the instructions of repair manual to Service valve train components 2. Arrange tools and equipment required to Service valve train components 3. Inspect the following components of the valve train components according to repair manual: <ul style="list-style-type: none"> • Intake valves • Exhaust valves • Valve guides 	<ol style="list-style-type: none"> 1.1 Read and interpret repair manual to service valve train components of vehicle. 2.1 Explain the usage of tools, equipment to service valve train components 2.2 Explain the usage of special service tools (SSTs) to service valve train components 2.3 Demonstrate arrangement of tools and equipment to service valve train components 3.1 Describe the following components of valve train components: <ul style="list-style-type: none"> • Intake valves • Exhaust valves • Valve guides • Valve springs 	<p style="text-align: center;">15</p> <p style="text-align: center;">Theory 5</p> <p style="text-align: center;">Practical 10</p>	drivers, socket set, filler gauge, SSTs, repair manual, plier, bench vice, PPE	

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<ul style="list-style-type: none"> • Valve springs • Retainer washers • Rocker arms • Rocker arm shafts • Cam shaft • VVTI / V-Tec solenoid valves • Camshaft position sensors <p>4. Service valve train components of vehicle</p>	<ul style="list-style-type: none"> • Retainer washers • Rocker arms • Rocker arm shafts • Cam shaft • VVTI / V-Tec solenoid valves • Camshaft position sensors <p>3.2 Demonstrate how to check & adjust valve clearance</p> <p>3.3 Explain the function of cam sensor</p> <p>3.4 Understanding various clearance measurements of components according to repair manual</p> <p>3.5 Demonstrate how to inspect valve train components according to repair manual</p> <p>4.1 Perform service of valve train components according to repair manual</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	5. Follow safety precautions at workplace	5.1 Explain the safety precautions regarding personal health and workplace			
LU7: Service Engine Block Components of vehicle	The trainee will be able to 1. Follow the instructions of repair manual to Service engine block components 2. Arrange tools and equipment required to Service engine block components 3. Inspect the following components of the engine block	1.1 Read and interpret repair manual to service engine block components. 2.1 Explain the usage of tools, SSTs and equipment to service engine block components 2.2 Demonstrate arrangement of tools required to service engine block components 3.1 Describe the following components of the engine block	Total 25 Theory 4 Practical 21	SSTs, ring compressor, torque wrench, screw drivers, repair manual, socket set, plastic hammer, PPEs	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>components according to repair manual:</p> <ul style="list-style-type: none"> • Piston • Connecting rods • Main shell bearings • Big ends bearings • Thrust washers • Crank shaft • Crank shaft sensor • Crank shaft pulser • Block sleeves • Rod bush <p>4. Service Engine Block Components of vehicle</p>	<p>components</p> <ul style="list-style-type: none"> • Piston • Connecting rods • Main shell bearings • Big ends bearings • Thrust washers • Crank shaft • Crank shaft sensor • Crank shaft pulser • Block sleeves • Rod bush <p>3.2 Identify the noises of main bearings, connecting rods and piston pins</p> <p>3.3 Demonstrate how to inspect engine block components according to repair manual</p> <p>4.1 Perform service of engine block components of vehicle according to repair manual</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	5. Follow safety precautions at workplace	5.1 Explain the safety precautions regarding personal health and workplace as per instructions			

3. Auto Mechanic Curriculum Contents

Module 5: Maintain Fuel System

Aim: This module identifies the competencies required to maintain fuel system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to diagnose fuel system problems & service fuel metering system of vehicle, at workplace.

Duration:	Total Hours:70	Theory Hours:10	Practice Hours:60
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose fuel system problems of vehicle	<p>The trainee will be able to</p> <ol style="list-style-type: none"> Follow the instructions of repair manual to service fuel metering System (e.g. injectors, regulators, switching valve) of vehicle Arrange tools and equipment required to diagnose fuel system problems 	<ol style="list-style-type: none"> 1.1 Explain how to read and interpret repair manual to service fuel metering system (e.g. injectors, regulators, switching valve) of vehicle 2.1 Understanding usage of tools and equipment to diagnose fuel system faults 2.2 Explain the usage of special service tools 	<p>Total 20</p> <p>Theory 3</p> <p>Practical 17</p>	<p>Repair manual, spanner, gauges, sockets set, pliers, SST ,lock pliers, scanner , off car injector simulator, PPE</p>	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Diagnose fuel system problems</p> <p>4. Inspect the following components of fuel system according to repair manual:</p> <ul style="list-style-type: none"> • Fuel pump • Fuel pump motor • Fuel pressure regulator • Fuel damper • Fuel injectors • Supply lines 	<p>(SSTs) for fuel system fault diagnosis</p> <p>2.3 Demonstrate arrangement of tools and equipment required to diagnose faults in fuel system</p> <p>3.1 Describe the properties of gasoline</p> <p>3.2 Describe how to diagnose problems in fuel system</p> <p>4.1 Understanding the following components of fuel system:</p> <ul style="list-style-type: none"> • Fuel pump • Fuel pump motor • Fuel pressure regulator • Fuel damper • Fuel injectors • Supply lines 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<ul style="list-style-type: none"> Fuel filter Fuel gauge Fuel injector gallery O rings <p>5. Follow safety precautions at workplace</p>	<ul style="list-style-type: none"> Fuel filter Fuel gauge Fuel injector gallery rings <p>4.2 Demonstrate how to inspect components of fuel system using repair manual</p> <p>5.1 Explain the safety precautions regarding personal health and workplace as per instructions</p>			
<p>LU2: Service fuel metering System (e.g. injectors, regulators, switching valve) of vehicle</p>	<p>The trainee will be able to</p> <p>1. Follow the instructions of repair manual to service fuel metering system</p> <p>2. Arrange tools and equipment required to service fuel metering system</p>	<p>1.1 Read and interpret repair manual to service fuel metering system of vehicle</p> <p>2.1 Explain the usage of tools and equipment to service fuel metering system</p>	<p>Total 50</p> <p>Theory 7</p> <p>Practical 43</p>	<p>SSTs, Scanner, multi meter, off car injector simulator, screw drivers, spanners, pliers, socket set, repair manual, star Allen keys, PPEs</p>	<ul style="list-style-type: none"> Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Inspect the following components of fuel metering system according to repair manual:</p> <ul style="list-style-type: none"> • Engine control module (ECM) • Air flow sensor • Heated oxygen sensor • Map sensor • In take air temperature sensor (IAT) • Throttle position sensor • Coolant temperature 	<p>2.2 Understanding use of special service tools (SSTs) to service fuel metering system</p> <p>2.3 Demonstrate arrangement of tools and equipment to service fuel metering system</p> <p>3.1 Demonstrate the use of diagnostics scanner</p> <p>3.2 Describe following components of fuel metering system</p> <ul style="list-style-type: none"> • Engine control module (ECM) • Air flow sensor • Heated oxygen sensor • Map sensor • In take air temperature sensor (IAT) • Throttle position sensor 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>sensor</p> <ul style="list-style-type: none"> • In take air control valve (IACV) <p>4. Service fuel metering System (e.g. injectors, regulators, switching valve) of vehicle</p> <p>5. Follow safety precautions at workplace</p>	<ul style="list-style-type: none"> • Coolant temperature sensor • In take air control valve (IACV) <p>3.3 Demonstrate how to inspect components of fuel metering system using repair manual</p> <p>4.1 Perform service of fuel metering system according to repair manual</p> <p>5.1 Understanding safety precautions regarding personal health and workplace as per instructions</p>			

3. Auto Mechanic Curriculum Contents

Module 6: Perform Ignition System Service

Aim: This module identifies the competencies required to perform service of ignition system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to diagnose ignition system problems, service distributor and C.B point of ignition system, spark plugs & wires, emission control system and perform ignition road test of vehicle

Duration:	Total Hours:80	Theory Hours:15	Practice Hours:65
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose ignition system problems (e.g. scan tool, oscilloscope) of vehicle	<p>The trainee will be able to</p> <p>1. Follow the instructions of repair manual to diagnose ignition system problems</p> <p>2. Arrange tools and equipment required to diagnose ignition system problems</p>	<p>1.1 Explain how to read and interpret repair manual to diagnose ignition system problems</p> <p>2.1 Explain the usage of tools and equipment to diagnose ignition system problems</p> <p>2.2 Understanding use of special service tools (SSTs) for diagnosing ignition system problems</p>	<p>Total 20</p> <p>Theory 4</p> <p>Practical 16</p>	Scanner, repair manual, multi meter, oscilloscope, lamp tester, spanners, socket set, T-handles, magnetic stick, hydro meter, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3. Inspect the following components of ignition system according to repair manual:</p> <ul style="list-style-type: none"> • Ignition switch • Ignition coil • Spark plug wires • Spark plug • Battery • Distributor • Contact breaker point (CB) • Resistance • Condenser • Crank sensor • Cam sensor • Electronic control module (ECM) 	<p>2.3 Demonstrate arrangement of tools and equipment to diagnose faults in ignition system</p> <p>3.1 Describe the following components of ignition system:</p> <ul style="list-style-type: none"> • Ignition switch • Ignition coil • Spark plug wires • Spark plug • Battery • Distributor • Contact breaker point (CB) • Resistance • Condenser • Crank sensor • Cam sensor • Electronic control module (ECM) <p>3.2 Demonstrate how to inspect components of ignition system using repair manual</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4. Follow safety precautions at workplace	4.1 Adopt safety precautions regarding personal health and workplace as per instructions			
LU2: Service Distributor and C.B point of ignition system	<p>The trainee will be able to</p> <p>1 Follow the instructions of repair manual to service distributor and C.B point</p> <p>2 Arrange tools and equipment required to service distributor and C.B point</p>	<p>1.1 Explain how to read and interpret repair manual to service distributor and C.B point</p> <p>2.1 Explain the usage of tools and equipment to service distributor and C.B point</p> <p>2.2 Understanding use of special service tools (SSTs) to service distributor and C.B point</p> <p>2.3 Demonstrate arrangement of tools and equipment to service distributor</p>	<p>Total 10</p> <p>Theory 2</p> <p>Practical 8</p>	Repair manual, ignition timing gun, spanner, filler gauge, star Allen keys, analyser, screw drivers, plier, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3 Inspect the following components of distributor according to repair manual:</p> <ul style="list-style-type: none"> • Contact breaker (C.B) point • Condenser • Router • Distributor cap • Router shaft • Advance plate • Governor weights • Advance vacuum mechanism <p>4 Service Distributor and C.B point of ignition system</p> <p>5 Follow safety precautions at workplace</p>	<p>and C.B point</p> <p>3.1 Describe the following components of distributor</p> <ul style="list-style-type: none"> • Contact breaker (C.B) point • Condenser • Router • Distributor cap • Router shaft • Advance plate • Governor weights • Advance vacuum mechanism <p>4.1 Demonstrate how to service distributor and C.B point of ignition system as per repair manual</p> <p>5.1 Adopt safety precautions regarding personal health and workplace as per instructions</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
<p>LU3: Service spark plugs & wires of vehicle</p>	<p>The trainee will be able to</p> <p>1 Follow the instructions of repair manual to service spark plugs and wires</p> <p>2 Arrange tools and equipment required to service spark plugs and wires</p> <p>3 Service spark plugs & wires of vehicle</p>	<p>1.1 Explain how to read and interpret repair manual to service spark plugs and wires</p> <p>2.1 Explain the usage of tools and equipment to service spark plugs and wires</p> <p>2.2 Understanding use of multi meter</p> <p>2.3 Demonstrate arrangement of tools and equipment to service spark plugs & wires</p> <p>3.1 Identify the types and range of spark plugs</p> <p>3.2 Describe the</p>	<p>Total 10</p> <p>Theory 2</p> <p>Practical 8</p>	<p>Multi meter, filler gauge, socket set, plug cleaner, T handles, repair manual, PPE</p>	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4 Follow safety precautions at workplace	clearance of spark plugs 3.3 Explain the resistance of spark plug wires 3.4 Demonstrate how to service spark plugs & wires of vehicle as per repair manual 4.1 Understanding safety precautions regarding personal health and workplace as per instructions			
LU4: Service emission control system of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to service emission control system 2 Arrange tools and equipment required to service emission	1.1 Explain how to read and interpret repair manual to service emission control system 2.1 Explain the usage of tools and equipment to service emission	Total 20 Theory 4 Practical 16	SSTs, Scanner, repair manual, exhaust gas analyser, back pressure tester, spanners, socket set, screw drivers, vacuum tester, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>control system</p> <p>3 Inspect the following components of distributor:</p> <ul style="list-style-type: none"> • Catalytic convertor • Charcoal canister • Purge valve • Positive crankcase ventilation valve (PCV) • Fuel tank • Fuel tank lid • Exhaust gases recirculation valve (EGR) • Heated oxygen sensors (H2OS) 	<p>control system</p> <p>2.2 Understanding use of special service tools (SSTs) for servicing emission control system</p> <p>2.3 Demonstrate arrangement of tools and equipment to service emission control system</p> <p>3.1 Describe the following components of distributor:</p> <ul style="list-style-type: none"> • Catalytic convertor • Charcoal canister • Purge valve • Positive crankcase ventilation valve (PCV) • Fuel tank • Fuel tank lid • Exhaust gases recirculation 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>4 Service emission control System of vehicle</p> <p>5 Follow safety precautions at workplace</p>	<p>valve (EGR)</p> <ul style="list-style-type: none"> • Heated oxygen sensors (H2OS) <p>4.1 Demonstrate how to service emission control system of vehicle as per repair manual</p> <p>5.1 Explain the safety precautions regarding personal health and workplace as per instructions</p>			
LU5: Perform ignition road test of vehicle	<p>The trainee will be able to</p> <p>1 Follow the organizational policy regarding road test</p> <p>2 Verify following on road test according to</p>	<p>1.1 Explain organizational rules, regulations and policies regarding road test</p> <p>2.1 Describe local driving laws</p>	<p>Total 20</p> <p>Theory 3</p> <p>Practical 17</p>	Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor matts, driving license	<ul style="list-style-type: none"> • Workplace / Road

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	organizational guidelines: <ul style="list-style-type: none"> • Pick up • Juttring • Drivability 	2.2 Demonstrate methods of checking performance of vehicle during road test 2.3 Perform road test according to company policy			
	3 Follow precautions driving safety while	3.1 Understanding safety precautions regarding test drive 3.2 Explain importance of safety belt, driving licence for road test & local driving laws			

3. Auto Mechanic Curriculum Contents

Module 7: Maintain Suspension/Steering Systems

Aim: This module identifies the competencies required to perform service of suspension/steering system of vehicle, at workplace by Automobile Mechanic, in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to diagnose suspension/steering system problems, service suspension/steering components and perform road test of vehicle to verify repair, at workplace.

Duration:	Total Hours:80	Theory Hours:15	Practice Hours:65
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose steering and/or suspension problems of vehicle	<p>The trainee will be able to</p> <p>1 Follow the instructions of repair manual to diagnose steering/suspension problems</p> <p>2 Arrange tools and equipment required to diagnose steering/suspension problems</p>	<p>1.1 Explain how to read and interpret repair manual to diagnose steering/suspension problems</p> <p>2.1 Explain the usage of tools and equipment for diagnosing steering/suspension problems</p> <p>2.2 Explain the usage of special service tools (SSTs) for diagnosing steering/suspension problems</p> <p>2.3 Demonstrate arrangement of tools and equipment for fault diagnostics in suspension steering system</p>	<p>Total 20</p> <p>Theory 3</p> <p>Practical 17</p>	<p>Jack, safety stand, Wheel aligner, wheel balancer, hammers, ball joint opener, tire lever, wheel spanner, spanner set, SSTs, air pressure gauge, sockets, screw drivers, lift, PPE</p>	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3 Inspect the following components of steering/suspension system according to repair manual:</p> <ul style="list-style-type: none"> • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power motor (EPS) • Power steering pump • Shock absorbers • Lower control arms • Upper control arms • Ball joints • Rack end set • Tie rod end set • Stabilizer bar • Z links • Coil springs • Leaf springs • Shock mounting 	<p>3.1 Describe the following components of steering/suspension system according to repair manual:</p> <ul style="list-style-type: none"> • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power motor (EPS) • Power steering pump • Shock absorbers • Lower control arms • Upper control arms • Ball joints • Rack end set • Tie rod end set • Stabilizer bar • Z links • Coil springs • Leaf springs • Shock mounting 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4 Follow safety precautions at workplace	3.2 Demonstrate how to perform inspection of components of suspension / steering system 4.1 Adopt safety precautions regarding personal health and workplace as per instructions			
LU2: Service suspension components of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to service suspension components 2 Arrange tools and equipment required to service suspension components	1.1 Explain how to read and interpret repair manual to service suspension components 2.1 Explain the usage of tools and equipment to service suspension components 2.2 Describe use of	Total 40 Theory 7 Practical 33	Jack, safety stand, hammers, ball joint opener, tire lever, wheel spanner, spanner set, scanner, SSTs, sockets, screw drivers, lift, bench vice, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3 Service the following components of suspension system according to repair manual:</p> <ul style="list-style-type: none"> • Hub knuckle • Wheel hub • hub stud • Springs • Shock absorber • Sway bar • Stabilizer bar • Z link • Control arm • Ball joints 	<p>special service tools (SSTs) for service suspension components</p> <p>2.3 Demonstrate the arrangement of tools and equipment to service suspension components</p> <p>3.1 Explain the methods to service following components of suspension system :</p> <ul style="list-style-type: none"> • Hub knuckle • Wheel hub • hub stud • Springs • Shock absorber • Sway bar • Stabilizer bar • Z link • Control arm • Ball joints <p>3.2 Service components of suspension system according to repair manual</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4 Follow safety precautions at workplace	4.1 Explain the safety precautions regarding personal health and workplace as per instructions			
LU3: Service steering system of vehicle	<p>The trainee will be able to</p> <p>1 Follow the instructions of repair manual to service steering system of vehicle</p> <p>2 Arrange tools and equipment required to service steering system of vehicle</p>	<p>1.1 Explain how to read and interpret repair manual to service steering system of vehicle</p> <p>2.1 Explain the usage of tools and equipment for servicing steering system of vehicle</p> <p>2.2 Describe use of special service tools (SSTs) for servicing steering system of vehicle</p> <p>2.3 Demonstrate arrangement of tools and equipment to</p>	<p>Total 20</p> <p>Theory 5</p> <p>Practical 15</p>	<p>Jack, safety stand, Wheel aligner, wheel balancer, hammers, wheel spanner, spanner set, SSTs, air pressure gauge, sockets, screw drivers, lift, PPE</p>	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3 Service the following components of steering system according to repair manual:</p> <ul style="list-style-type: none"> • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power steering (EPS) • Power steering pump <p>4 Follow safety</p>	<p>service steering system of vehicle</p> <p>3.1 Explain the methods to service following steering system:</p> <ul style="list-style-type: none"> • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power steering (EPS) • Power steering pump <p>3.2 Describe the importance of power steering fluid</p> <p>3.3 Service components of steering system according to repair manual</p> <p>4.1 Adopt safety</p>			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	precautions at workplace	precautions regarding personal health and workplace as per instructions			

3. Auto Mechanic Curriculum Contents

Module 8: Maintain Drive Line Systems

Aim This module identifies the competencies required to maintain drive line systems by automobile mechanic in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to service manual clutch system and automatic transmission of vehicle, at workplace.

Duration:	Total Hours:70	Theory Hours:20	Practice Hours:50
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Service manual clutch system of vehicle	<p>The trainee will be able to</p> <p>1 Follow the instructions of repair manual to service manual clutch system of vehicle</p> <p>2 Arrange tools and equipment required to service manual clutch system of vehicle</p>	<p>1.1 Explain how to read and interpret repair manual to service manual clutch system of vehicle</p> <p>2.1 Understanding use of tools and equipment to service manual clutch system of vehicle</p> <p>2.2 Explain the usage of special service tools (SSTs) to service manual clutch system of vehicle</p> <p>2.3 Demonstrate</p>	<p>Total 30</p> <p>Theory 5</p> <p>Practical 25</p>	Jack, safety stand, lift, spanner set, socket set, oil gun, SSTs, repair manual, screw drivers, hammers, lock pliers, PPE	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>3 Service the following components of manual clutch system according to repair manual:</p> <ul style="list-style-type: none"> • Clutch master cylinder (CMC) • Clutch plate • Pressure plate • Clutch release bearing • Clutch release fork • Fly wheel • Clutch cable • Gear shifting lever and linkage • Vehicle speed sensor • Synchronizer • Differential • Drive shafts • Gear oil • Gear box seals 	<p>arrangement of tools and equipment to service manual clutch system of vehicle</p> <p>3.1 Explain the methods to service following components of manual clutch system:</p> <ul style="list-style-type: none"> • Clutch master cylinder (CMC) • Clutch plate • Pressure plate • Clutch release bearing • Clutch release fork • Fly wheel • Clutch cable • Gear shifting lever and linkage • Vehicle speed sensor • Synchronizer • Differential • Drive shafts • Gear oil • Gear box seals 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4 Follow safety precautions at workplace	<p>3.2 Describe grading of fluid used in clutch system</p> <p>3.3 Explain how to check the efficiency of clutch plate</p> <p>3.4 Perform service of manual clutch components according to repair manual</p> <p>4.1 Understanding safety precautions regarding personal health & workplace as per instructions</p>			
LU2: Service automatic Transmission of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to service automatic transmission of vehicle	1.1 Explain how to read and interpret repair manual to service automatic transmission of vehicle	<p>Total 40</p> <p>Theory 15</p> <p>Practical 25</p>	Jack, safety stand, lift, scanner, spanner set, socket set, fluid filler gun, SSTs, repair manual, screw drivers, stall speed test gauge, hammers, lock pliers, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>2 Arrange tools and equipment required to service automatic transmission of vehicle</p> <p>3 Service the following components of automatic transmission according to repair manual:</p> <ul style="list-style-type: none"> • Torque convertor • Gear shifting lever and linkage • Vehicle speed sensor • Gear shifting Solenoid 	<p>2.1 Explain the usage of tools and equipment for servicing automatic transmission of vehicle</p> <p>2.2 Describe use of special service tools (SSTs) to service automatic transmission of vehicle</p> <p>2.3 Demonstrate arrangement of tools and equipment to service automatic transmission</p> <p>3.1 Explain the methods to service following components of automatic transmission:</p> <ul style="list-style-type: none"> • Torque convertor • Gear shifting lever and linkage • Vehicle speed sensor 			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	valve <ul style="list-style-type: none"> • Differential • Valve body • Drive shafts • Automatic transmission fluid (ATF) • Gear box seals • Continuous variable transmission (CVT) • Electronic transmission (ECT) 4 Follow safety precautions at workplace	<ul style="list-style-type: none"> • Gear shifting Solenoid valve • Differential • Valve body • Drive shafts • Automatic transmission fluid (ATF) • Gear box seals • Continuous variable transmission (CVT) • Electronic transmission (ECT) 3.2 Demonstrate how to conduct stall speed test 3.3 Perform service of automatic transmission of vehicle according to repair manual 4.1 Explain the safety precautions regarding personal health and workplace as per instructions			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place

3. Auto Mechanic Curriculum Contents

Module 9: Apply Safety Precautions and Guidelines at Workplace

Aim: This module identifies the competencies required to apply occupational health and safety procedures at workplace by Automobile Mechanic in accordance with the organization’s approved guidelines and procedures. Trainee will be expected to identify hazards in workplace, comply with health and safety precautions, use of personal protective equipment and practice safe work habits at workplace at all times.

Duration:	Total Hours:60	Theory Hours:18	Practice Hours:42
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Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Identify hazards in workplace environment	<p>The trainee will be able to</p> <p>1 Read and interpret work processes and procedures correctly to identify risk of hazards at workplace</p> <p>2 Recognize processes, tools, equipment and consumable materials that have the potential to cause harm</p> <p>3 Identify any potential</p>	<p>1.1 Explain how to read and interpret work processes and procedures correctly to identify risk & hazards at workplace</p> <p>2.1 Describe processes, tools, equipment and consumable materials that have the potential to cause harm</p> <p>3.1 Understanding</p>	<p>Total 15</p> <p>Theory 4</p> <p>Practical 11</p>	Health and safety manual.	<ul style="list-style-type: none"> • Class room • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	hazards and take appropriate action to minimize the risk	potential hazards and appropriate actions to minimize risks 3.2 Demonstrate how to identify potential hazards at workplace and minimize risks			
LU2: Comply with Occupational Health and Safety Precautions	The trainee will be able to 1 Work safely at all times, complying with health and safety precautions, regulations and other relevant guidelines 2 Identify health and safety hazards in the workplace, so that the potential for personal injury, damage to equipment or the workplace is prevented, and corrective action is taken	1.1 Explain how to work safely by following health and safety precautions, regulations and other relevant guidelines 2.1 Approaches how to identify health and safety hazards at workplace, in order to prevent personal injury, damage to equipment or workplace, and take corrective action accordingly	Total 15 Theory 4 Practical 11	Safety shoes, Safety gloves, Safety goggles, Safety helmet, Fire extinguisher, Smoke alarm, First aid box, Wheel chair, stretcher	<ul style="list-style-type: none"> • Class room • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	3 Deal with problems which are within your control, and report those that cannot be resolved to safety officer	3.1 Explain how to deal with problems which are controllable 3.2 Understand how to report unresolvable problems to safety officer			
LU3: Apply Personal Protective and Safety Equipment	The trainee will be able to 1 Select personal protective equipment in terms of type and quantity according to work orders. 2 Wear, adjust, and maintain personal protective equipment to ensure correct fit and optimum protection in compliance with company procedures.	1.1 Explain the types of personal protective equipment 1.2 Understanding use, types and quantity of personal protective equipment according to job requirement 2.1 Demonstrate how to use and maintain personal protective equipment in order to ensure proper fit & optimum protection in compliance with	<p style="text-align: center;">Total 15</p> <p style="text-align: center;">Theory 5</p> <p style="text-align: center;">Practical 10</p>	Safety shoes, Safety gloves, Safety goggles, Safety helmet, face mask	<ul style="list-style-type: none"> • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	3 Ensure personal protective equipment is cleaned and stored in proper place.	company procedures. 3.1 Demonstrate how to clean and store personal protective equipment properly			
LU4: Practice safe work habits to ensure safety at workplace	The trainee will be able to 1 Wear required clothing (not loose or torn), confine long hair, and remove jewellery in accordance with company procedures. 2 Apply work procedures and approaches that ensure personal safety as well as others safety. 3 Demonstrate good housekeeping in the workplace by cleaning	1.1 Explain Importance of safety at workplace and its implications. 1.2 Describe work safety procedures and guidelines. 2.1 Explain how to apply work procedures and approaches for personal & others safety 3.1 Understanding approaches to maintain good	Total 15 Theory 5 Practical 10	Fire extinguisher, tool box/bins, Safety covers, first aid box, safety equipment	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	<p>up spills or leaks.</p> <p>4 Keep work area clean and clear of obstructions, and storing tools or equipment, so that the potential for accident or injury is prevented.</p> <p>5 Ensure tools or equipment are in place and available in proper place as per company procedures.</p>	<p>housekeeping at workplace adopting various organizational procedures</p> <p>4.1 Describe how to keep work area clean and clear to minimize potential for accident or injury</p> <p>5.1 Demonstrate proper storage of tools and equipment as per standard procedures</p>			

4. Assessment guidance

Competency-based assessment is the process of gathering evidence to confirm the candidate's ability to perform according to specified outcomes articulated in the competency standard(s).

4.1 Types of assessment

a) Sessional assessment

The goal of sessional assessment is to monitor student progress in order to provide constant feedback. This feedback can be used by the trainers to improve their teaching and by learners to improve their learning.

More specifically, sessional assessments Help learners to identify their strengths and weaknesses and Help trainers to recognize where learners are struggling and address problems immediately

Examples of sessional assessments include:

- Observations
- Presentations
- Activity sheets
- Project work
- Oral questions

b) Summative (final) assessment

The goal of summative (final) assessment is to evaluate learning progress at the end of a training programme by comparing it against, e.g. set of competency standards.

Examples of summative assessments include:

- Direct observation of work activities
- Final project
- Written questions

4.2 Principles of assessment

When conducting assessment or developing assessment tools, trainers/assessors need to ensure that the following principles of assessment are met:

Validity

- Indicates if the assessment outcome is supported by evidence. The assessment outcome is valid if the assessment methods and materials reflect the critical aspects of evidence required by the competency standards (Competency units, performance criteria, knowledge and understanding).

Reliability

- Indicates the level of consistency and accuracy of the assessment outcomes. The assessment is reliable if the assessment outcome will produce the same result for learners with equal competence at different times or places, regardless of the trainer or assessor conducting the assessment.

Flexibility

- Indicates the opportunity for learners to discuss certain aspects of their assessment with their trainer or assessor, such as scheduling the assessment. All learners should be made aware of the purpose of assessment, the assessment criteria, the methods and tools used, and the context and proposed timing of the assessment well in advance. This can be achieved by drawing up a plan for assessment.

Fair assessment

- Fair assessment does not advantage or disadvantage particular learners because of status, race, beliefs, culture and/or gender. This also means that assessment methods may need to be adjusted for learners with disabilities or cultural differences. An assessment should not place unnecessary demands on learners that may prevent them from demonstrating competence.

4.3 Assessment template – Sessional and Summative assessment

Learning Units	Tentative Assessment Hours	Recommended form of assessment	
		Sessional	Summative
Complete Documentation Requirement	3	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	Integrated assessment: <ul style="list-style-type: none"> • Project • Demonstration • Role play • Oral and written questions
Perform Preventive Maintenance	4	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	
Maintain Brake System	4	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	
Maintain Engine	5	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	
Maintain Fuel System	4	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written 	

		<ul style="list-style-type: none"> questions • Demonstration 	
Perform Ignition System Service Maintain Suspension/Steering Systems	4	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	
Maintain Drive Line systems	3	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	
Apply Safety Precautions and Guidelines at Workplace	3	<ul style="list-style-type: none"> • Observation • Activity sheets • Simulation • Oral and written questions • Demonstration 	

5. List of Tools, Machinery & Equipment

Occupational title	Automobile Mechanic	
Duration	6 months	
Class Size	20 ~ 25 students	
Sr. No.	Name of Item/ Equipment / Tools	Quantity
1.	Testers	5
2.	Diagnostic scanners	2
3.	Sound detectors	5
4.	Digital multi-meters	5
5.	Analysers	2
6.	Gauges	30
7.	Job card/repair order	As per requirement
8.	Repair manual	As per requirement
9.	Flat rate time (FRT)	As per requirement
10.	Estimation forms	As per requirement
11.	Lifts	02
12.	Hydraulic Jacks – 5 tons	2
13.	Safety stand	8
14.	Spanners set	5
15.	Adjustable wrenches	12
16.	Hammers	5
17.	Socket set	5
18.	Screw driver set	5
19.	Pliers	25
20.	Filter spanner	5
21.	Special service tools (SSTs)	As per requirement
22.	Oil filler gun	5
23.	Oil transfer equipment	5
24.	Funnel	5

25.	Seat covers protector	5
26.	Steering wheel cover	5
27.	Hand brake cover	5
28.	Gear lever cover	5
29.	Floor mats	5
30.	Vernier calipers	5
31.	Dial indicator gauge	5
32.	Wheel spanner	5
33.	Bleeding kit	5
34.	Bench vice	5
35.	Technician stretcher	5
36.	Winding tool	5
37.	Emery paper	As per requirement
38.	Electric wiring diagram (EWD) manual	As per requirement
39.	Multi-meter	5
40.	Test lamp 12 V	5
41.	Cutter plier	5
42.	Insulation tape	As per requirement
43.	Compression gauge	5
44.	Fuel pressure gauge	5
45.	Filler gauge	5
46.	Oil pressure gauge	5
47.	Off-car injector simulator	5
48.	Torque wrench 10 – 500 Nm	5
49.	T-handles 8, 10, 12mm	5
50.	Scrappers	5
51.	Nose plier	5
52.	Plastic hammer	5
53.	Thermometer	5
54.	Ring Compressor	5
55.	Compression gauge	5
56.	Star Allen Keys set	5
57.	Oscilloscope	1

58.	Lamp tester	1
59.	Magnetic stick	5
60.	Hydro meter	5
61.	Ignition timing gun	5
62.	Analyser	1
63.	Plug cleaner	1
64.	Exhaust gas analyser,	1
65.	Back pressure tester	1
66.	Vacuum tester	1
67.	Wheel aligner	1
68.	Wheel balancer	1
69.	Hammers 5kg	5
70.	Ball joint opener	5
71.	Tire lever	5
72.	Wheel spanner	5
73.	Oil gun	5
74.	Fluid filler gun	5
75.	Stall speed test gauge	5
76.	Lock pliers	5
77.	Safety manual	5
78.	Safety shoes	25
79.	Safety gloves	25
80.	Safety goggles	25
81.	Face mask	25
82.	Safety helmet	25
83.	Fire extinguisher	3
84.	Smoke alarm	2
85.	First aid box (equipped)	1
86.	Fire blanket	5

6. List of Consumable Supplies

Occupational title	Automobile Mechanic
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Duration	6 months
Class Size	20 ~ 25 students

Sr. No.	Name of Consumable Supplies	Quantity
1.	Waste cloths	200Kg
2.	Cotton gloves	100 Dozen
3.	Kerosene oil	100 Litters
4.	Gasoline (petrol)	100 Litters
5.	Diesel	100 Litters
6.	Solution tapes	05 Dozen
7.	Emery paper	100 pcs
8.	Coolant	20 Litters
9.	Mobil oil	50 Litters
10.	Manual transmission fluid	10 Litters
11.	Automatic transmission fluid (ATF)	20 Litters
12.	Grease	05 Kg
13.	Power steering fluid	10 Litters
14.	Brake fluid	02 Litters
15.	Distilled water for battery top-up	20 Litters
16.	Bath soap	10 Dozen
17.	Fuses 5,10,15,20,30, amperes	20 each
18.	Embry paste	As per requirement
19.	Grinding disks	10 nos.
20.	Engine - petrol	05
21.	Engine - diesel	05
22.	Car	01

National Vocational and Technical Training Commission (NAVTTTC)

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