National Vocational Certificate Level 2 in Automotive Technology (Automobile Mechanics)

CBT Curriculum

NATIONAL VOCATIONAL & TECHNICAL TRAINING COMMISSION

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Contents

1. Introduction

Todays '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 reflects 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

<u>Module 8:</u> Maintain Drive Line Systems

<u>Module 9:</u> 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	Timeframe of modules
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.	**LU1:** Verify customer complain **LU2:** Prepare work estimate	**08**	**32**	**40**
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,	**LU1:** Verify vehicle specific maintenance schedule **LU2:** Conduct under vehicle inspection (e.g. exhaust system, fluid leaks) **LU3:** Inspect all lubricants of the vehicle **LU4:** Conduct road test of vehicle	**15**	**65**	**80**

[1]Learning hours in training provider premises
[2]Training 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.				
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.	**LU1:** Perform inspection & diagnosis of brakes **LU2:** Rebuild/ replace brake master cylinder of vehicle **LU3:** Rebuild/ replace wheel cylinders of vehicle **LU4:** Rebuild/replace calipers of vehicle **LU5:** Service parking brake system of vehicle **LU6:**Bleed brake system of vehicle **LU7:** Diagnose fault codes of ABS/TCS/VSA/VSC **LU8:** Service ABS/TCS/VSA/VSC systems of vehicle **LU9:** Conduct road test of vehicle to verify repair	**20**	**110**	**130**

Module Title and Aim	Learning Units	Theory[1] hours	Workplace[2] hours	Timeframe of modules
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, service gasket, engine seals, engine cooling system, engine lubrication system, valve train components and engine block components of vehicle, at workplace.	**LU1:** Diagnose engine problems of vehicle **LU2:** Service engine gaskets (e.g. head, manifold) of vehicle **LU3:** Service engine seals of vehicle **LU4:** Service engine cooling system (e.g. water pump, radiator, coolant flush) of vehicle **LU5:** Service engine lubrication system (e.g. oil pump) of vehicle **LU6:**Service valve train components of vehicle **LU7:** Service Engine Block Components of vehicle	**35**	**125**	**160**
Module 5: **Maintain Fuel System** **Aim:** This module identifies the competencies required to maintain fuel system of vehicle, at	**LU1:** Diagnose fuel system problems of vehicle **LU2:** Service fuel metering system (e.g. injectors, regulators, switching valve) of	**10**	**60**	**70**

Module Title and Aim	Learning Units	Theory[1] hours	Workplace[2] hours	Timeframe of modules
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.	vehicle			
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 to verify repair, at workplace.	**LU1:** Diagnose ignition system problems (e.g. scan tool, oscilloscope) of vehicle **LU2:** Service distributor and C.B point of ignition system **LU3:** Service spark plugs & wires of vehicle **LU4:** Service emission control system of vehicle **LU5:** Perform ignition road test of vehicle	**15**	**65**	**80**
Module 7: **Maintain Suspension/Steering Systems** **Aim:** This module identifies the competencies required to perform service of	**LU1:** Diagnose steering and/or suspension problems of vehicle **LU2:** Service suspension components of vehicle	**15**	**65**	**80**

Module Title and Aim	Learning Units	Theory[1] hours	Workplace[2] hours	Timeframe of modules
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.	**LU3:** Service steering system of vehicle			
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.	**LU1:** Service manual clutch system of vehicle **LU2:** Service automatic transmission of vehicle	**20**	**50**	**70**
Module 9: **Apply Safety Precautions and Guidelines at Workplace** **Aim:** This module identifies the competencies required to apply occupational health and safety	**LU1:** Identify hazards in workplace environment **LU2:** Comply with Occupational Health and Safety Precautions	**18**	**42**	**60**

Module Title and Aim	Learning Units	Theory[1] hours	Workplace[2] hours	Timeframe of modules
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.	**LU3:** Apply personal protective and safety equipment **LU4:** Practice safe work habits to ensure 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

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	**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	• Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		2.3 Conduct root cause analysis according to repair manual			
	3. Perform test drive to identify the problem	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			
		3.2 Perform road test to verify the customer complain			
	4. Arrange tools and equipment required to diagnose the problem	4.1 Describe usage of different tools and equipment for fault diagnoses e.g. scanners, CO testers, etc.			
		4.2 Demonstrate arrangement of various tools used for fault diagnostics			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	5. Follow safety precautions at workplace	5.1 Demonstrate safety precautions regarding personal health and workplace as per instructions			
	6. Finalize customer concern regarding complain as per organizational procedure	6.1 Explain how to perform test drive with the customer for complain resolution 6.2 Describe how to sign off the job completion card after complain resolution			
LU2: Prepare Work estimate	Trainee will be able to: 1. Prepare time estimate form based on diagnose result	1.1 Understanding Flat Rate Time (FRT) manual 1.2 Prepare time estimate form on the basis of (Flat Rate Time) manual	**Total 20** **Theory** 04 **Practical** 16	Repair manual, Flat Rate Time (FRT) manual, time and cost estimation forms	• Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	2. Prepare a cost estimate form based on diagnose result including: • Labour cost • Parts cost • Sublet cost	2.1 Explain market trends in pricing of ○ 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

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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		periodic maintenance 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: • Oil seals	**Total 20** **Theory** 04 **Practical** 16	Lifts, jacks, spanners, wrenches, hammers, socket set, screw driver, plier, filter spanner, special service tools (SSTs), Personal Protective Equipment	• Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		• Oil sump • Transmission sump • Power steering mechanism • Hose pipes • Brake lines • Fuel lines • Shock absorbers • Exhaust muffler • Radiator 2.3 Conduct under vehicle inspection according to repair manual 3.1 Understanding of safety precautions regarding personal health and workplace according to instructions			
	3. Follow safety precautions at workplace				
LU3: Inspect all lubricants of the vehicle	Trainee will be able to: 1. Record time period/millage of vehicle for lubricant periodic maintenance	1.1 Explain how to read periodic maintenance schedule from owner's manual	**Total 20** **Theory** 03	Spanners, socket set, oil filler gun, oil transfer equipment, funnel, repair	• Classroom • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	schedule	1.2 Understanding repair manual for lubrication of vehicle 1.3 Record time period / mileage according to lubricant periodic maintenance schedule given in owner's manual	**Practical** 17	manual	
	2. Inspect the following lubricants according to repair manual : • Transmission fluid • Brake & clutch fluid • Engine oil • Power steering fluid • Suspension fluid • Differential fluid	2.1 Explain types and uses of lubricants used in vehicle 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 2.3 Explain the storage and disposal of lubricants 2.4 Perform visual			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		inspection of various engine lubricants			
	3. Follow safety precautions at workplace	3.1 Explain the safety precautions regarding personal health and workplace according to instructions 3.2 Approaches to Identify the effects of lubricants on human health and environment e.g. brake fluid, used engine oil			
LU4: Conduct road test of vehicle	Trainee will be able to: 1. Follow organizational policy regarding road test 2. Verify below given	1.1 Describe various organizational rules, regulations and policies regarding road test 1.2 Follow organization policy to conduct road test 2.1 Explain the	**Total 20** **Theory** 4 **Practical** 16	Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor mats, driving license	• Workplace / Road

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	key points during road test by following various organizational guidelines: • Function of gauges • Drivability performance • Tracking performance • Braking performance • Noises • Vibrations • Harshness • Engine performance	importance of driving licence for road test & local driving laws 2.2 Describe organizational standard operating procedures (SOPs) for road test 2.3 Explain the functions of following: • Gauges • Drivability performance • Tracking performance • Braking performance • Steer ability • Engine performance 2.4 Understanding how to Identify different types of noises, vibrations& harshness during road test 2.5 Conduct road test to			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		verify problem			
	3. Follow safety precautions while driving	3.1 Explain the safety precautions regarding personal health and workplace according to instructions			

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

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	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	**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
	brake: • Vibration on brake paddle • Abnormal Noise • Brake grip • Operation of Anti-lock brake system (ABS) • Left / right vehicle pulling during braking • Brake performance	manual 2.2 Analyse & identify braking faults during road test by explaining following: • Vibration on brake paddle • Abnormal Noise • Brake grip • Operation of Anti-lock brake system (ABS) • Left / right vehicle pulling during braking • Brake performance 2.3 Verify the faults during road test			
	3. Arrange tools and equipment required for brake inspection	3.1 Describe applications and importance of measuring tools & SST's 3.2 Demonstrate arrangement of tools			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		& Special Service Tools (SST's) used for diagnosing faults in brake system			
	4. Inspect the followings at workplace according to repair manual: • 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	4.1 Demonstrate how to inspect the following according to the repair manual: • 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			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		4.2 Inspect the brake faults as per repair manual.			
	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 re-build 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	**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
		to rebuild/replace brake master cylinder 2.3 Explain the method of replacement of ABS unit 2.4 Repair / Replace brake master cylinder as per repair manual			
	3 Follow safety precautions at workplace	3.1 Explain the safety precautions regarding personal health and workplace as per instructions 3.2 Understanding adverse effects of brake fluid on human health, vehicle body and workplace			
LU3: Rebuild/ replace wheel cylinders of vehicle	Trainee will be able to: 1 Follow the instructions	1.1 Read and interpret	**Total 13**	Jacks, safety stand, technician stretcher, spanners, socket set,	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	of repair manual to rebuild/replace wheel cylinder	repair manual to re-build and replace wheel cylinder	**Theory** 2 **Practical** 11	SSTs, bleeding kit, repair manual, personal protective equipment (PPE)	
	2 Arrange tools and equipment required to rebuild/replace wheel cylinder	2.1 Explain the usage of tools and equipment to rebuild/replace brake wheel cylinder 2.2 Demonstrate arrangement of tools and equipment to rebuild/replace brake wheel cylinder 2.3 Repair / Replace brake wheel cylinder as per repair manual			
	3 Follow safety precautions at workplace	3.1 Adopt safety precautions regarding personal health and workplace as per instructions			
LU4: Rebuild/replace	Trainee will be able to:		**Total** **14**	Jacks, safety stand, spanners, socket set,	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
calipers of vehicle	1 Follow the instructions of repair manual to rebuild/replace calipers	1.1 Read and interpret repair manual to re-build and replace rebuild/replace calipers	**Theory** 2 **Practical** 12	SSTs, bleeding kit, back winding tool, bench vice, repair manual, personal protective equipment (PPE)	
	2 Arrange tools and equipment required to rebuild/replace calipers	2.1 Explain the usage of tools and equipment to rebuild/replace calipers			
		2.2 Demonstrate arrangement of tools and equipment to rebuild/replace calipers			
	3 Rebuild/replace calipers of vehicle	3.1 Repair / Replace brake calipers as per repair manual			
	4 Follow safety precautions at workplace	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
LU5: Service parking brake system of vehicle	Trainee will be able to: 1 Follow the instructions of repair manual to service parking brake system 2 Arrange tools and equipment required to service parking brake system 3 Service parking brake system of vehicle 4 Follow safety precautions at workplace	1.1 Read and interpret repair manual 2.1 Explain the usage of tools and equipment to service parking brake system 2.2 Demonstrate arrangement of tools and equipment to service parking brake system 3.1 Service parking brake system as per repair manual 4.1 Understanding safety precautions regarding personal health and workplace as per instructions	**Total 14** **Theory** 2 **Practical** 12	Jack, safety stand, Screw driver, spanners, amery paper, Personal protective equipment (PPE)	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU6: Bleed brake system of vehicle	Trainee will be able to: 1 Follow the instructions of repair manual to bleed brake system 2 Arrange tools and equipment required to bleed brake system 3 Bleed brake system of vehicle	1.1 Read and interpret repair manual 2.1 Explain the usage of tools and equipment to bleed brake system 2.2 Demonstrate arrangement of tools and equipment to bleed brake system 3.1 Describe methods to bleeding brake system 3.2 Understanding grading of brake fluid 3.3 Demonstrate method of bleeding through diagnostic scanner 3.4 Bleed brake system	**Total 17** **Theory** 2 **Practical** 15	Bleeding kit, scanners, SSTs, spanners, personal protective equipment (PPE), repair manual	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		of vehicle as per repair manual			
	4 Follow safety precautions at workplace	4.1 Explain the safety precautions regarding personal health and workplace as per instructions			
LU7: Diagnose fault codes of ABS/TCS/VSA	Trainee will be able to: 1 Follow the instructions of repair manual to diagnose ABS/TCS (traction control system)/VSA (vehicle stability assist)/VSC (vehicle stability control)trouble codes	1.1 Read and interpret repair manual for trouble code diagnostics 1.2 Read the trouble codes from scanner for on-board diagnostics 1.3 Understanding trouble shooting of trouble codes from repair manual	**Total 18** **Theory** 2 **Practical** 16	Scanners, spanners, electric wiring diagram (EWD), repair manual, multi-meter, test lamp, cutter plier, screw driver, PPE	• Workplace
	2 Arrange tools and equipment required to	2.1 Explain the usage of tools and equipment			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	diagnose ABS fault codes	for diagnosing faults in ABS			
		2.2 Arrange tools for and equipment for diagnosing faults in ABS			
	3 Follow the Electric wiring diagram (EWD) for electrical diagnoses of ABS system	3.1 Read and interpret EWD			
	4 Diagnose fault codes of ABS/TCS/VSA/VSC	4.1 Interpret fault codes of ABS/TCS/VSA/VSC from EWD repair manual			
	5 Follow safety precautions at workplace	5.1 Understanding safety precautions regarding personal health and workplace as per instructions			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU8: Service ABS/TCS/VSA systems of vehicle	Trainee will be able to: 1. Follow the instructions of repair manual to service ABS/TCS/VSA/VSC 2. Arrange tools and equipment required to service ABS/TCS/VSA/VSC 3. Service ABS/TCS/VSA/VSC systems of vehicle 4. Follow safety precautions at workplace	1.1 Read and interpret repair manual to service ABS/TCS/VSA/VSC 2.1 Explain the usage of tools and equipment to service ABS/TCS/VSA/VSC 2.2 Demonstrate arrangement of tools and equipment to service ABS/TCS/VSA 3.1 Service ABS/TCS/VSA/VSC systems according to repair manual 4.1 Adopt safety precautions regarding personal health and	**Total 13** **Theory** 3 **Practical** 10	Scanners, spanners, EWD, repair manual, multi-meter, insulation tape, test lamp, cutter plier, screw driver, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		workplace as per instructions			
LU9: Conduct Road test of vehicle to verify repair	Trainee will be able to: 1. Follow the organizational policy regarding road test 2. Verify the followings on road test according to organizational guidelines: • Function of ABS • Drivability performance • Tracking performance • Braking performance • Parking brake performance • Noises • Vibrations • Harshness	1.1 Explain organizational rules, regulations and policies regarding road test 2.1 Analyse & verify the brake system during road test by describing following: • Function of ABS • Drivability performance • Tracking performance • Braking performance • Parking brake performance • Noises • Vibrations • Harshness	**Total 14** **Theory** 3 **Practical** 11	Scanner, seat covers protector, steering wheel cover, hand brake cover, gear lever cover, floor matts, driving license	• Workplace / Road

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	3. Follow safety precautions while driving	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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose engine problems of vehicle	Trainee will be able to: 1. Follow the instructions of repair manual to diagnose problems of engine 2. Arrange tools and equipment required to diagnose problems of engine	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	**Total 30** **Theory** 7 **Practical** 23	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
		2.3 Explain how to use diagnostic scanner			
	3. Inspect the following in engine of vehicle according to repair manual: • Abnormal noises • Engine combustion • Ignition • Oil leakages • Vacuum and pressure leakages • Water leakages • Over heat • Drive belts • Fuel system	3.1 Explain the types of faults for troubleshooting in engine • Abnormal noises • Engine combustion • Ignition • Oil leakages • Vacuum and pressure leakages • Water leakages • Over heat • Drive belts • Fuel system 3.2 Demonstrate how to inspect functions of various engine systems for fault diagnostics: • 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	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:	**Total 30** **Theory** 7 **Practical** 23	Spanners., socket set, torque wrench, T handles, screw drivers, scrappers, nose plier, repair manual, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	according to repair manual: • Head gasket • Intake manifold gasket • Exhaust manifold gasket • Tappet cover gasket • Oil pan gasket • Water pump gasket, etc. 4. Service engine gaskets (e.g. head, manifold) of vehicle 5. Follow safety precautions at workplace	• Head gasket • Intake manifold gasket • Exhaust manifold gasket • Tappet cover gasket • Oil pan gasket • Water pump gasket, etc. 3.2 Describe methods of visual inspection of gaskets. 4.1 Service/replace engine gaskets according to owner's manual 5.1 Understanding safety precautions regarding personal health and workplace as per instructions			
LU3: Service engine oil seals of vehicle	Trainee will be able to: 1. Follow the instructions of repair manual to service engine oil seals of vehicle	1.1 Read and interpret repair manual to service engine oil seals	**Total 15** **Theory** 4	SSTs, screw drivers, spanners, T handles, socket sets, plastic hammer, repair manual, torque wrench, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
			Practical		
	2. Arrange tools and equipment required to service engine oil seals of vehicle	2.1 Explain the usage of tools and equipment to service engine oil seals 2.2 Explain the usage of special service tools (SSTs) for removing and fixing oil seals 2.3 Demonstrate arrangement of tools and equipment to service engine oil seals	11		
	3. Inspect the following oil seals of engine according to repair manual: • Main oil seal • Crank shaft seal • Cam shaft seal • Distributor shaft seal • Valve seal • Oil pump seal • VVTI valve seal • Injector seal, etc.	3.1 Describe the functions of oil seals 3.2 Explain the specifications of oil seals 3.3 Describe methods of visual inspection of oil seals.			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	4. Service engine oil seals of vehicle	4.1 Perform service of engine oil seals according to repair manual			
	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	Trainee will be able to: 1. Follow the instructions of repair manual to Service engine 2. Arrange tools and equipment required to service engine cooling system	1.1 Read and interpret repair manual 2.1 Explain the usage of tools and equipment to service engine cooling system 2.2 Explain the usage of special service tools (SSTs) to service engine cooling system 2.3 Demonstrate arrangement of tools and equipment to	**Total 20** **Theory** 4 **Practical** 16	SSTs, spanners, pliers, repair manual, screw drivers, thermometer, scanner, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		service engine cooling system			
	3. Inspect the level and quality of the coolant according to owner's manual	3.1 Describe the properties of radiator coolant 3.2 Explain the importance of coolant in engine coolant system 3.3 Explain the methods of visual inspection to check the level of coolant 3.4 Understanding the use of periodic maintenance schedule to change the coolant by verifying from maintenance schedule given in owner's manual			
	4. Inspect the following components of the cooling system of vehicle according to repair manual: • Radiator • Hose pipes	4.1 Describe the functions of radiator hoses 4.2 Describe the methods of inspection of engine cooling system components according			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	• Water pump • Water jacket • Thermostat valve • Radiator fan • Radiator pressure cap • Radiator reservoir • Radiator coolant • Automatic fan switch • Temperature sensor • Drive belts • Hose pipes clamp	to repair manual • Radiator • Hose pipes • Water pump • Water jacket • Thermostat valve • Radiator fan • Radiator pressure cap • Radiator reservoir • Radiator coolant • Automatic switch • Temperature sensor • Drive belts • Hose pipes clamp			
	5. Service engine cooling system (e.g. water pump, radiator, coolant flush) of vehicle	5.1 Perform service of engine cooling system according to repair manual			
	6. Follow safety precautions at workplace	6.1 Adopt the safety precautions regarding personal health and workplace according to instructions			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU5: Service engine lubrication system (e.g., oil pump) of vehicle	Trainee will be able to: 1. Follow the instructions of repair manual to Service engine lubrication system 2. Arrange tools and equipment required to Service engine lubrication system 3. Inspect the level and quality of lubricants used in vehicle, according to repair manual	1.1 Read and interpret repair manual to service engine lubrication system 2.1 Explain the usage of tools and equipment for servicing engine lubrication system 2.2 Explain the usage of special service tools (SSTs) for engine lubrication system 2.3 Demonstrate arrangement of tools and equipment to service engine lubrication system 3.1 Describe the properties of engine oil 3.2 Describe the function of oil and oil filter according to owner's manual	**Total 25** **Theory** 04 **Practical** 21	SSTs, spanners, socket set, torque wrench, funnel, repair manual, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		3.3 Understanding visual inspection methods to check the level of various lubricants			
	4. Inspect the following components of the lubricating system of vehicle according to repair manual: • Oil pump • Oil galleries • Oil filter • Oil pressure switch • Oil pan • Oil pump strainer • Engine oil	4.1 Describe the working of following lubricating system components of vehicle: • 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			
	5. Service engine lubrication system (e.g., oil pump) of vehicle	5.1 Perform service of engine lubrication system according to repair manual			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	6. Follow safety precautions at workplace	6.1 Explain the safety precautions regarding personal health and workplace as per instructions			
LU6: Service valve train components of vehicle	Trainee will be able to: 1. Follow the instructions of repair manual to Service valve train components 2. Arrange tools and equipment required to Service valve train components	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	**Total 15** **Theory** 5 **Practical** 10	Spanner set, screw drivers, socket set, filler gauge, SSTs, repair manual, plier, bench vice, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		components			
	3. Inspect the following components of the valve train components according to repair manual: • Intake valves • Exhaust valves • Valve guides • Valve springs • Retainer washers • Rocker arms • Rocker arm shafts • Cam shaft • VVTI / V-Tec solenoid valves • Camshaft position sensors	3.1 Describe the following components of valve train components: • Intake valves • Exhaust valves • Valve guides • Valve springs • Retainer washers • Rocker arms • Rocker arm shafts • Cam shaft • VVTI / V-Tec solenoid valves • Camshaft position sensors 3.2 Demonstrate how to check & adjust valve clearance 3.3 Explain the function of cam sensor 3.4 Understanding various clearance measurements of			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		components according to repair manual 3.5 Demonstrate how to inspect valve train components according to repair manual			
	4. Service valve train components of vehicle	4.1 Perform service of valve train components according to repair manual			
	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	1.1 Read and interpret repair manual to service engine block components.	**Total 25** **Theory** 4	SSTs, ring compressor, torque wrench, screw drivers, repair manual, socket set, plastic hammer, PPEs	• Workplace
	2. Arrange tools and equipment required to	2.1 Explain the usage of tools, SSTs and	**Practical** 21		

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	Service engine block components	equipment to service engine block components 2.2 Demonstrate arrangement of tools required to service engine block components			
	3. Inspect the following components of the engine block components according to repair manual: • Piston • Connecting rods • Main shell bearings • Big ends bearings • Thrust washers • Crank shaft • Crank shaft sensor • Crank shaft pulser • Block sleeves • Rod bush	3.1 Describe the following components of the engine block components • Piston • Connecting rods • Main shell bearings • Big ends bearings • Thrust washers • Crank shaft • Crank shaft sensor • Crank shaft pulser • Block sleeves • Rod bush 3.2 Identify the noises of main bearings, connecting rods and piston pins			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		3.3 Demonstrate how to inspect engine block components according to repair manual			
	4. Service Engine Block Components of vehicle	4.1 Perform service of engine block components of vehicle according to repair manual			
	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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose fuel system problems of vehicle	The trainee will be able to 1. Follow the instructions of repair manual to service fuel metering System (e.g. injectors, regulators, switching valve) of vehicle 2. Arrange tools and equipment required to diagnose fuel system problems	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	**Total 20** **Theory** 3 **Practical** 17	Repair manual, spanner, gauges, sockets set, pliers, SST ,lock pliers, scanner , off car injector simulator, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		special service tools (SSTs) for fuel system fault diagnosis 2.3 Demonstrate arrangement of tools and equipment required to diagnose faults in fuel system			
	3. Diagnose fuel system problems	3.1 Describe the properties of gasoline 3.2 Describe how to diagnose problems in fuel system			
	4. Inspect the following components of fuel system according to repair manual: • Fuel pump • Fuel pump motor • Fuel pressure regulator • Fuel damper	4.1 Understanding the following components of fuel system: • Fuel pump • Fuel pump motor • Fuel pressure regulator • Fuel damper			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	• Fuel injectors • Supply lines • Fuel filter • Fuel gauge • Fuel injector gallery • O rings 5. Follow safety precautions at workplace	• Fuel injectors • Supply lines • Fuel filter • Fuel gauge • Fuel injector gallery • rings 4.2 Demonstrate how to inspect components of fuel system using repair manual 5.1 Explain the safety precautions regarding personal health and workplace as per instructions			
LU2: Service fuel metering System (e.g. injectors, regulators, switching valve) of vehicle	The trainee will be able to 1. Follow the instructions of repair manual to service fuel metering system 2. Arrange tools and	1.1 Read and interpret repair manual to service fuel metering system of vehicle 2.1 Explain the usage of	**Total 50** **Theory** 7 **Practical** 43	SSTs, Scanner, multi meter, off car injector simulator, screw drivers, spanners, pliers, socket set, repair manual, star Allen keys, PPEs	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	equipment required to service fuel metering system	tools and equipment to service fuel metering system 2.2 Understanding use of special service tools (SSTs) to service fuel metering system 2.3 Demonstrate arrangement of tools and equipment to service fuel metering system			
	3. Inspect the following components of fuel metering system according to repair manual: • Engine control module (ECM) • Air flow sensor • Heated oxygen sensor • Map sensor • In take air temperature	3.1 Demonstrate the use of diagnostics scanner 3.2 Describe following components of fuel metering system • Engine control module (ECM) • Air flow sensor • Heated oxygen sensor • Map sensor			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	sensor (IAT) • Throttle position sensor • Coolant temperature sensor • In take air control valve (IACV)	• In take air temperature sensor (IAT) • Throttle position sensor • Coolant temperature sensor • In take air control valve (IACV)			
		3.3 Demonstrate how to inspect components of fuel metering system using repair manual			
	4. Service fuel metering System (e.g. injectors, regulators, switching valve) of vehicle	4.1 Perform service of fuel metering system according to repair manual			
	5. Follow safety precautions at workplace	5.1 Understanding 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 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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose ignition system problems (e.g. scan tool, oscilloscope) of vehicle	The trainee will be able to 1. Follow the instructions of repair manual to diagnose ignition system problems 2. Arrange tools and equipment required to diagnose ignition system problems	1.1 Explain how to read and interpret repair manual to diagnose ignition system problems 2.1 Explain the usage of tools and equipment to diagnose ignition system problems 2.2 Understanding use of special service tools (SSTs) for diagnosing ignition	**Total 20** **Theory** 4 **Practical** 16	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
		system problems 2.3 Demonstrate arrangement of tools and equipment to diagnose faults in ignition system			
	3. Inspect the following components of ignition system according to repair manual: • 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)	3.1 Describe the following components of ignition system: • 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) 3.2 Demonstrate how to inspect components			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		of ignition system using repair manual			
	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	The trainee will be able to 1 Follow the instructions of repair manual to service distributor and C.B point 2 Arrange tools and equipment required to service distributor and C.B point	1.1 Explain how to read and interpret repair manual to service distributor and C.B point 2.1 Explain the usage of tools and equipment to service distributor and C.B point 2.2 Understanding use of special service tools (SSTs) to service distributor and C.B point 2.3 Demonstrate	**Total 10** **Theory** 2 **Practical** 8	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
		arrangement of tools and equipment to service distributor and C.B point
	3 Inspect the following components of distributor according to repair manual: • Contact breaker (C.B) point • Condenser • Router • Distributor cap • Router shaft • Advance plate • Governor weights • Advance vacuum mechanism	3.1 Describe the following components of distributor • Contact breaker (C.B) point • Condenser • Router • Distributor cap • Router shaft • Advance plate • Governor weights • Advance vacuum mechanism			
	4 Service Distributor and C.B point of ignition system	4.1 Demonstrate how to service distributor and C.B point of ignition system as per repair manual			
	5 Follow safety precautions at workplace	5.1 Adopt safety precautions regarding personal			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		health and workplace as per instructions			
LU3: Service spark plugs & wires of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to service spark plugs and wires 2 Arrange tools and equipment required to service spark plugs and wires	1.1 Explain how to read and interpret repair manual to service spark plugs and wires 2.1 Explain the usage of tools and equipment to service spark plugs and wires 2.2 Understanding use of multi meter 2.3 Demonstrate arrangement of tools and equipment to service spark plugs & wires	**Total 10** **Theory** 2 **Practical** 8	Multi meter, filler gauge, socket set, plug cleaner, T handles, repair manual, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	3 Service spark plugs & wires of vehicle	3.1 Identify the types and range of spark plugs 3.2 Describe the 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 Follow safety precautions at workplace	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	1.1 Explain how to read and interpret repair manual to service emission control	**Total 20** **Theory** 4	SSTs, Scanner, repair manual, exhaust gas analyser, back pressure tester, spanners, socket set,	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		system	**Practical** 16	screw drivers, vacuum tester, PPE	
	2 Arrange tools and equipment required to service emission control system	2.1 Explain the usage of tools and equipment to service emission control system 2.2 Understanding use of special service tools (SSTs) for servicing emission control system 2.3 Demonstrate arrangement of tools and equipment to service emission control system			
	3 Inspect the following components of distributor: • Catalytic convertor • Charcoal canister • Purge valve • Positive crankcase ventilation valve (PCV)	3.1 Describe the following components of distributor: • Catalytic convertor • Charcoal canister • Purge valve • Positive			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	• Fuel tank • Fuel tank lid • Exhaust gases recirculation valve (EGR) • Heated oxygen sensors (H2OS)	crankcase ventilation valve (PCV) • Fuel tank • Fuel tank lid • Exhaust gases recirculation valve (EGR) • Heated oxygen sensors (H2OS)			
	4 Service emission control System of vehicle	4.1 Demonstrate how to service emission control system of vehicle as per repair manual			
	5 Follow safety precautions at workplace	5.1 Explain the safety precautions regarding personal health and workplace as per instructions			
LU5: Perform ignition road test of vehicle	The trainee will be able to		**Total 20**	Scanner, seat covers protector, steering wheel cover, hand	• Workplace / Road

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	1 Follow the organizational policy regarding road test	1.1 Explain organizational rules, regulations and policies regarding road test	**Theory** 3 **Practical** 17	brake cover, gear lever cover, floor matts, driving license	
	2 Verify following on road test according to organizational guidelines: • Pick up • Juttring • Drivability	2.1 Describe local driving laws 2.2 Demonstrate methods of checking performance of vehicle during road test 2.3 Perform road test according to company policy			
	3 Follow safety precautions while driving	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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Diagnose steering and/or suspension problems of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to diagnose steering/suspension problems 2 Arrange tools and equipment required to diagnose steering/suspension problems	1.1 Explain how to read and interpret repair manual to diagnose steering/suspension problems 2.1 Explain the usage of tools and equipment for diagnosing steering/suspension problems 2.2 Explain the usage of special service tools (SSTs) for	**Total 20** **Theory** 3 **Practical** 17	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	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		diagnosing steering/suspension problems 2.3 Demonstrate arrangement of tools and equipment for fault diagnostics in suspension steering system			
	3 Inspect the following components of steering/suspension system according to repair manual: • 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	3.1 Describe the following components of steering/suspension system according to repair manual: • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control unit (ECU) of power steering • Electric power motor (EPS) • Power steering pump			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	• 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 4 Follow safety precautions at workplace	• 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 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	The trainee will be able to		**Total**	Jack, safety stand,	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
suspension components of vehicle	1 Follow the instructions of repair manual to service suspension components	1.1 Explain how to read and interpret repair manual to service suspension components	**40** **Theory** 7 **Practical** 33	hammers, ball joint opener, tire lever, wheel spanner, spanner set, scanner, SSTs, sockets, screw drivers, lift, bench vice, PPE	
	2 Arrange tools and equipment required to service suspension components	2.1 Explain the usage of tools and equipment to service suspension components 2.2 Describe use of special service tools (SSTs) for service suspension components 2.3 Demonstrate the arrangement of tools and equipment to service suspension components			
	3 Service the following components of suspension system according to repair	3.1 Explain the methods to service following components of suspension system :			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	manual: • Hub knuckle • Wheel hub • hub stud • Springs • Shock absorber • Sway bar • Stabilizer bar • Z link • Control arm • Ball joints 4 Follow safety precautions at workplace	• Hub knuckle • Wheel hub • hub stud • Springs • Shock absorber • Sway bar • Stabilizer bar • Z link • Control arm • Ball joints 3.2 Service components of suspension system according to repair manual 4.1 Explain the safety precautions regarding personal health and workplace as per instructions			
LU3: Service steering system of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to service steering system	1.1 Explain how to read and interpret repair manual to service	**Total 20** **Theory** 5	Jack, safety stand, Wheel aligner, wheel balancer, hammers, wheel spanner, spanner set, SSTs,	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	of vehicle	steering system of vehicle	**Practical** 15	air pressure gauge, sockets, screw drivers, lift, PPE	
	2 Arrange tools and equipment required to service steering system of vehicle	2.1 Explain the usage of tools and equipment for servicing steering system of vehicle 2.2 Describe use of special service tools (SSTs) for servicing steering system of vehicle 2.3 Demonstrate arrangement of tools and equipment to service steering system of vehicle			
	3 Service the following components of steering system according to repair manual: • Steering rack • Steering box • Steering column • Intermediate shaft (cross)	3.1 Explain the methods to service following steering system: • Steering rack • Steering box • Steering column • Intermediate shaft (cross) • Electronic control			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	• Electronic control unit (ECU) of power steering • Electric power steering (EPS) • Power steering pump	unit (ECU) of power steering • Electric power steering (EPS) • Power steering pump 3.2 Describe the importance of power steering fluid 3.3 Service components of steering system according to repair manual			
	4 Follow safety precautions at workplace	4.1 Adopt safety 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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Service manual clutch system of vehicle	The trainee will be able to 1 Follow the instructions of repair manual to service manual clutch system of vehicle 2 Arrange tools and equipment required to service manual clutch system of vehicle	1.1 Explain how to read and interpret repair manual to service manual clutch system of vehicle 2.1 Understanding use of tools and equipment to service manual clutch system of vehicle 2.2 Explain the usage of special service tools (SSTs) to service manual clutch system of vehicle	**Total 30** **Theory** 5 **Practical** 25	Jack, safety stand, lift, spanner set, socket set, oil gun, SSTs, repair manual, screw drivers, hammers, lock pliers, PPE	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		2.3 Demonstrate arrangement of tools and equipment to service manual clutch system of vehicle			
	3 Service the following components of manual clutch system according to repair manual: • 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	3.1 Explain the methods to service following components of manual clutch system: • 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			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		• Gear box seals 3.2 Describe grading of fluid used in clutch system 3.3 Explain how to check the efficiency of clutch plate 3.4 Perform service of manual clutch components according to repair manual			
	4 Follow safety precautions at workplace	4.1 Understanding safety precautions regarding personal health & workplace as per instructions			
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	**Total 40** **Theory** 15 **Practical**	Jack, safety stand, lift, scanner, spanner set, socket set, fluid filler gun, SSTs, repair manual, screw drivers, stall speed test gauge,	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
		vehicle	25	hammers, lock pliers, PPE	
	2 Arrange tools and equipment required to service automatic transmission of vehicle	2.1 Explain the usage of tools and equipment for servicing automatic transmission of vehicle 2.2 Describe use of special service tools (SSTs) to service automatic transmission of vehicle 2.3 Demonstrate arrangement of tools and equipment to service automatic transmission			
	3 Service the following components of automatic transmission according to repair manual: • Torque convertor	3.1 Explain the methods to service following components of automatic transmission: • Torque convertor			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	• Gear shifting lever and linkage • Vehicle speed sensor • Gear shifting Solenoid valve • Differential • Valve body • Drive shafts • Automatic transmission fluid (ATF) • Gear box seals • Continuous variable transmission (CVT) • Electronic transmission (ECT)	• Gear shifting lever and linkage • Vehicle speed sensor • 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 Follow safety	4.1 Explain the safety			

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 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

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
LU1: Identify hazards in workplace environment	The trainee will be able to 1 Read and interpret work processes and procedures correctly to identify risk of hazards at workplace 2 Recognize processes, tools, equipment and consumable materials that have the potential to cause harm	1.1 Explain how to read and interpret work processes and procedures correctly to identify risk & hazards at workplace 2.1 Describe processes, tools, equipment and consumable materials that have the potential to cause harm	**Total 15** **Theory** 4 **Practical** 11	Health and safety manual.	• Class room • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	3 Identify any potential hazards and take appropriate action to minimize the risk	3.1 Understanding 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	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	**Total 15** **Theory** 4 **Practical** 11	Safety shoes, Safety gloves, Safety goggles, Safety helmet, Fire extinguisher, Smoke alarm, First aid box, Wheel chair, stretcher	• Class room • Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	taken 3 Deal with problems which are within your control, and report those that cannot be resolved to safety officer	corrective action accordingly 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	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	**Total 15** **Theory** 5 **Practical** 10	Safety shoes, Safety gloves, Safety goggles, Safety helmet, face mask	• Workplace

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	optimum protection in compliance with company procedures.	to ensure proper fit & optimum protection in compliance with company procedures.			
	3 Ensure personal protective equipment is cleaned and stored in proper place.	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.	1.1 Explain Importance of safety at workplace and its implications. 1.2 Describe work safety procedures and guidelines.	**Total 15** **Theory** 5 **Practical** 10	Fire extinguisher, tool box/bins, Safety covers, first aid box, safety equipment	• Workplace
	2 Apply work procedures and approaches that ensure personal safety as well as others safety.	2.1 Explain how to apply work procedures and approaches for personal & others safety			

Learning Unit	Learning Outcomes	Learning Elements	Duration(Hours)	Materials Required	Learning Place
	3 Demonstrate good housekeeping in the workplace by cleaning up spills or leaks.	3.1 Understanding approaches to maintain good housekeeping at workplace adopting various organizational procedures			
	4 Keep work area clean and clear of obstructions, and storing tools or equipment, so that the potential for accident or injury is prevented.	4.1 Describe how to keep work area clean and clear to minimize potential for accident or injury			
	5 Ensure tools or equipment are in place and available in proper place as per company procedures.	5.1 Demonstrate proper storage of tools and equipment as per standard procedures			

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	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	Integrated assessment: • Project • Demonstration • Role play • Oral and written questions
Perform Preventive Maintenance	4	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	
Maintain Brake System	4	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	
Maintain Engine	5	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	
Maintain Fuel System	4	• Observation • Activity sheets • Simulation	

		• Oral and written questions • Demonstration	
Perform Ignition System Service **Maintain Suspension/Steering Systems**	4	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	
Maintain Drive Line systems	3	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	
Apply Safety Precautions and Guidelines at Workplace	3	• 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-handles8, 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
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

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