National Vocational and Technical Training Commission (NAVTTC)

Curriculum

For

Certificate in Automotive Technician (Duration: 2 Years)

May 2015

Contents

1. Course Title:

Automotive Technician

2. Job Profile

An auto technician may work on all the repairing and troubleshooting aspects of the vehicle, such as engine, ignition and electrical systems, brakes, suspension, steering & wheels and transmission systems. Following is the brief outlook of the responsibilities of an auto technician.

Key responsibilities which auto technician can perform independently are:-

Preventive maintenance such as, engine tune-up, oil change, replacing filters, tire rotation and wheel balancing.

Maintains vehicle appearance by cleaning, washing and servicing.

Updates job knowledge by participating in educational opportunities; reading technical publications.

Key responsibilities which auto technician can perform under supervision are:-

- 1. Maintains vehicle functional condition by conducting inspections; repairing engine failures; repairing mechanical and electrical systems malfunctions; replacing parts and components
- 2. Complies with state vehicle requirements by testing engine, safety, and combustion control standards.
- 3. Maintains vehicle records by recording service and repairs history.
- 4. Keeps shop equipment operating by performing preventive maintenance and repairs

Accomplishes maintenance and organization mission by completing related results as needed.

Overall Objectives of the Course

3. Overall objectives of the course

Following are the objective of this training to enables trainees to plan, execute and evaluate work related tasks within the scope of their occupational activity

The trainee will be able to work as a semi-skilled worker.

Fulfill the job requirements for an employer.

Facilitate new entrants to learn and support the labor market.

Improve the workmanship and knowledge management of existing workers.

Plan, execute independently, check and correct the vehicle systems/ sub-system and where necessary evaluate in writing the theory and procedure of main system

whiting the theory and procedure of main system

Take a quick action with absolute technical understanding of automobile equipment.

Have a good working knowledge of automobile and its associated equipment

Understand basic engineering principles required to implement in automotive trade and its manufacturing industry

Essential compliance to safe working through occupational health and safety environment (OHSE)

Safe and smooth operation of vehicle and its control parameters.

Safe operation of starting and shutting off vehicle,

Ensure and develop the strategy of fault diagnosis to derive the conclusion for error rectification of automobile Awareness about manual response on automobile in the event of sensors/actuators failure

4. Synopsis and Details (Competencies gained after completion of course)

- Localize, identify causes, correct where possible and/or document defects & faults to be passed on to the appropriate experts for resolution, or (where appropriate) exchange or replace defective components.
- Recognize potential or impending defects & faults in automobile and contact expert assistance in order to keep the automobile functioning and to care customer satisfaction
- Perform routine, preventive maintenance
- Explain the principal operations of the automobile systems/ subsystems and explain how these systems work together

Read the technical documents, reports and be able to consult with experts Work effectively as a team-member and coordinate the activities with upstream and downstream operations Follow safety regulations required for as per job specification

• Efficiently Select, use, handle and implement auto motive, hand tools, workshop tools, and occupation, health and safety environment (HSE) knowledge.

5. Job opportunities

pass out of this program can be employed in some of the following sectors;

Automotive Workshops Car Dealerships Logistic Workshops Private Fleets and Automobile garages Government departments (Automobile maintenance & repair) Automotive Assembly plants Power Generation Workshops Automobile parts stores Air lines / road logistics department

6. Trainee entry level

Middle pass

7. Minimum qualification of trainer

Diploma in Automotive Engineering (DAE) have minimum of 2 years occupational and preferable teaching experience

8. Medium of instruction

English / Urdu

9. National Vocational Qualification Framework (NVQF) Levelling of Course

The Industrial & academic experts have Described **NVQF level** of Automotive Technician course in **Level 2**, which consists of seventeen (17) technical modules.

10. Sequence of Module

11.Course philosophy / Strategy

Students learn about individual components and system function within the vehicle on actual automobile system.

At the beginning of this course, students should first be familiarized with the system.

By assembling and disassembling component/ assemblies from actual automobile, students understand clearly why they are learning system and components in the vehicle.

12. Overview of the program

Location	Total Hours
At Institute (Including theory, Practical, and Secondary skills.)	1600

At OJT/Company (Practical training)	1600
Total Duration	3200
Total Credit	320 Credit

Module Title & Aim	Learning Units		Workplace Hours	Time Frame of The Modules
Module A: Perform Preventive	A-1 Follow vehicle specific original equipment manufacturers (OEM) recommendation	2.5	10	12.5
Maintenance Aim: This Module (A)	A-2 Conduct vehicle walk around inspection	2.8	11.2	14
of competency standard for Auto	A-3 Conduct under hood inspection	2.5	10	12.5
motive technician identifies the	A-4 Conduct under vehicle inspection	2.7	10.8	13.5
competencies required to perform preventive maintenance of vehicle according to Manufacturer	A-5 Change engine oil	2.8	11.2	14
	A-6 Replace oil filter	2.1	8.4	10.5
	A-7 Clean air filter	2.1	8.4	10.5
Instructions including vehicle Inspections,	A-8 Maintain spark plug	2.3	9.2	11.5
changing oil and filter, cleaning of air filter, maintaining of spark plugs, servicing of brake system, replacement of belts	A-9 Service brake system	2.5	10	12.5
	A-10 Replace drive belts	2.8	11.2	14
	A-11 Top up battery electrolyte	2.3	9.2	11.5
maintaining the level of battery electrolyte,	A-12 Adjust headlights	1.9	7.6	9.5
lights, adjustment of head clutch paddle ,	A-13 Adjust clutch pedal free play	2.1	8.4	10.5

Module Title & Aim	Learning Units	Workplace Hours	Time Frame of The Modules
Module B: Maintain Vehicle Engine	B-1 Inspect Engine cooling system	9.6	12
Aim: This Module (B) of competency standard for auto motive technician identifies the competencies required to perform vehicle engine maintenance including cooling system repairs & maintenance, lubrication system repairs & maintenance, fuel system repairs & maintenance, Ignition system repair & maintenance, starting system repairs & maintenance, charging system repairs & maintenance for normal	B-2 Repair engine cooling system	10	12.5
	B-3 Inspect lubrication system	8	10
	B-4 Repair lubrication system	9.2	11.5
	B-5 Inspect fuel system	10	12.5
	B-6 Repair fuel system	10	12.5
	B-7 Inspect ignition system	10	12.5
	B-8 Repair ignition system	10	12.5

	B-9 Inspect starting system	8	10
	B-10 Repair starting system	10	12.5
	B-11 Inspect Charging system	10.8	13.5
	B-12 Repair charging system	9.6	12
Module Title & Aim	Learning Units	Workplace Hours	Time Frame of The Modules
Module C: Repair Body Electrical System Aim: This Module (C) of competency	C-1 Diagnose affected electrical / electronic system malfunction(s)	9.6	12
standard for auto motive technician identifies	C-2 Repair Body Wiring	11.2	14
electrical system including diagnose affected	C-3 Replace wiper system parts	8	10
electrical / electronic system malfunctioning, repairing of body wiring, service and	C-4 Maintain lighting system	9.6	12
maintenance of wiper, Maintenance of	C-5 Maintain horn system	8	10
Ignting system, Maintenance of norn system, maintenance of ignition circuit, servicing of remote controls repairing of power window system, repairing power sunroof system and repair of Supplementary Restraint System (SRS) Restraint System for normal performance	C-6 Maintain central locking system	10.4	13
	C-7 Maintain ignition Switch System	9.6	12
	C-8 Service remote control	9.6	12
	C-9 Repair Power Window	9.6	12

	C-10 Service/Repair power sunroof	8.8	11
	C-11 Repair Supplementary Restraint System (SRS).	8.8	11
Module D: Maintain Heat ventilation and Air Condition System (HVAC)	D-1 Test HVAC system performance	10.4	13
Aim: This Module (D) of competency	D-2 Diagnose fault in electrical circuit of HVAC system	10.4	13
standard for auto motive technician identifies the competencies required to maintain Heating, Ventilation & Air conditioning	D-3 Repair HVAC electrical system	9.6	12
System(HVAC) including servicing, fault diagnosing and repairing of the system for	D-4 Diagnose fault in HVAC mechanical Components	10.4	13
normal performance	D-5 Repair HVAC Mechanical Components	10.4	13
	D-6 Perform refrigerant leak test	8.8	11
	D-7 Recharge AC refrigerant	8.8	11
	D-8 Perform HVAC system test (Road test)	9.6	12
	 D-5 Repair HVAC Mechanical Components D-6 Perform refrigerant leak test D-7 Recharge AC refrigerant D-8 Perform HVAC system test (Road test) 	10.4 8.8 8.8 9.6	1

Module E: Maintain Suspension System Aim: This Module (E) of competency standard for automotive technician identifies the competencies required to maintain suspension system including servicing, fault	E-1 Diagnose problems related to springs, struts, shocks, control arms, linkages	10.4	13
	E-2 Check for faults in the steering column and connections	9.6	12
suspension system and performing wheel	E-3 Replace suspension bushes	8	10
alignment for normal performance of vehicle.	E-4 Replace suspension links	9.6	12
	E-5 Replace shock absorbers	11.2	14
	E-6 Replace leaf springs	10.4	13
	E-7 Perform wheel balancing	7.2	9
	E-8 Perform wheel alignment road test	6.4	8

Module Title & Aim	Learning Units	Theory Hours	Workplace Hours	Time Frame of The Modules
Module F: Maintain Transmission System	F-1 Identify basic transmission operation	2.4	9.6	12
Aim: Overview: This Module (F) of competency standard for	F-2 Change A.T.F. (Automatic Transmission Fluid)	2.4	9.6	12
identifies the competencies required	F-3 Replace Automatic Transmission Filter	2.6	10.4	13
to maintain transmission system including identification of transmission system operation, changing of transmission fluid, replacement of transmission system mountings, perform automatic transmission over hauling, replacement of clutch system components,	F-4 Replace transmission mountings	2.2	8.8	11
	F-5 Replace automatic transmission shift lever button	2.2	8.8	11
	F-6 Perform automatic transmission overhauling	2.8	11.2	14
	F-7 Replace clutch system component (Manual Transmission)	2.2	8.8	11
repairing of gear box	F-8 Perform Manual	2.8	11.2	14

replacement of automatic transmission	Transmission overhauling			
shift lever bushes, replacement of constant velocity Joints (CV	F-9 Replace shift lever bushes	2.2	8.8	11
joints) Re-installation of propeller shaft, and adjustment of differential backlash	F-10 Replace constant velocity Joints (CV Joints)	2.6	10.4	13
	F-11 Reinstall Propeller Shaft	2	8	10
	F-12 Adjust differential backlash	2	8	10
Module G: Maintain Brake System	G-1 Verify brake specification	2.6	10.4	13
Aim: This Module (G) of competency standards for automotive	G-2 Perform brake inspection	2.6	10.4	13
technician identifies the competencies required to perform maintenance of brake system of vehicles according to Manufacturer Instructions including verification of brake specification , brake	G-3 Replace brake booster	2	8	10
	G-4 Replace brake master cylinder	2.6	10.4	13
	G-5 Replace wheel cylinders	2.4	9.6	12
	G-6 Replace brake calipers	2.6	10.4	13

inspection, replacement of brake system parts	G-7 Replace brake Discs/Drums	2.6	10.4	13
(e.g. brake boosters, wheel cylinder, calipers, discs, drums etc.) This	G-8 Service Brake Hoses, Pipes, Lines	2.4	9.6	12
module also includes servicing , bleeding & adjustment of the vital	G-9 Perform Brake system Air Bleeding	2.6	10.4	13
safety system of a vehicle	G-10 Adjust park brake cable			
		2	8	10
Module Title & Aim	Learning Units	Theory Hours	Workplace Hours	Time Frame of The Modules
Module H: Perform On- board Diagnostic	H-1 Perform vehicle scanning	2.4	9.6	12
Aim: This Module (H) of competency standard for automotive technician	H-2 Detect faults in vehicle Electronic systems	2.6	10.4	13
competencies required to perform vehicles on	H-3 Reset service intervals	2.4	9.6	12
board diagnosis according to Manufacturer	H-4 Replace Electronic Control Unit (ECU)	2.8	11.2	14
recommendations	H-5 Replace Sensors	2.4	9.6	12
including vehicle scanning, fault detection in vehicle electronic system, resetting of	H-6 Replace Actuators	2	8	10

service intervals, replacement of electronic control unit, sensors, actuators and performing on board manual diagnostic.				
Module I: Perform Engine Overhauling	I-1 Perform engine compression test	2.2	8.8	11
Aim: This Module (I) of competency standard for automotive technician	I-2 Perform engine oil pressure test	2.2	8.8	11
perform engine operation test to identify	I-3 Remove engine from vehicle	2.6	10.4	13
engine malfunction, verify faulty engine parts and components.	I-4 Dismantle engine components	2.6	10.4	13
Perform complete	I-5 Clean Engine parts	2.4	9.6	12
according to manufacturer's recommendations.	I-6 Perform Necessary Measurements	2.2	8.8	11
	I-7 Assemble Engine	2.4	9.6	12
	I-8 Reinstall Engine on vehicle	2.4	9.6	12
	I-9 Test performance after engine Overhauling	2.2	8.8	11

Module J: Maintain Vehicle Infotainment system Aim: This competency	J-1 Check Infotainment System	2.4	9.6	12
	J-2 Replace audio Device	2.6	10.4	13
and repair vehicle infotainment system for	J-3 Replace video device	2.6	10.4	13
example audio video device, navigation system and park assist	J-4 Replace Parking Camera	2.6	10.4	13
system.	J-5 Install navigation equipment	2.2	8.8	11
Module K: Perform Communication	K-1 Practice active listening	2.6	10.4	13
Aim: This competency standard is about proper	K-2 Ask appropriate questions	2.6	10.4	13
external and internal customers through	K-3 Demonstrate telephone etiquette	2.4	9.6	12
various modes of communication	K-4 Instruct semi- skilled workers	2.4	9.6	12
	K-5 Communicate with supervisor	2.6	10.4	13
	K-6 Maintain relations with Parts dealers	2.2	8.8	11
	K-7 Perform	2.6	10.4	13

	E-Mail correspondence			
Module L: Pursue Professional	L-1 Obtain automotive technician certificate	2.4	9.6	12
Development Aim: This competency	L-2 Maintain Driving License	2.4	9.6	12
development of skills and competences to	L-3 Attend Training programs	2.2	8.8	11
meet the ever changing market demands and challenges are a key job	L-4 Consult experts colleagues	2.4	9.6	12
role in the occupation of Sales and Customer	L-5 Visit trade exhibitions	2.2	8.8	11
must evaluate his/her performance, attend	L-6 Join trade associations	2.4	9.6	12
capacity building programs and exhibit positive attitude towards	L-7 Interpret Automotive publications	2.4	9.6	12
attaining the organization's goals.	L-8 Document work performed	2.2	8.8	11
	L-9 Browse internet	2.4	9.6	12
	L-10 Mentor new staff	2.4	9.6	12
Module M: Demonstrate safety	M-1 Follow company procedures, policies	2.4	9.6	12
Aim: The competency standard (M) is about	M-2 Wear personal protective equipment as	2.2	8.8	11

demonstrating skill and	required			
knowledge of personal health, safety, Tools, equipment and consumables safety, fire-fighting, first -aid	M-3 Use tools and equipment according to manufacturer's specifications	2.4	9.6	12
procedures, quality and environment related regulations, reaction on accidents & safe	M-4 Handle hazardous materials according to guidelines	2.4	9.6	12
placement of automobile on work station in	M-5 Maintain clean shop environment	2.2	8.8	11
automotive repairing workshop.	M-6 Use fire extinguisher properly	2.4	9.6	12
	M-7 Report safety violations	2.4	9.6	12
	M-8 Lift vehicle using proper techniques i.e., manufacturer's specifications	2.2	8.8	11

Module N: Computer Skills I	See Annexure A	9.6	12
Aim: Learn to use Computer effectively			
Module Q: English Skills I			
Aim: To enhance students understanding about English language for reading, listening and speaking	See Annexure B	9.6	12
Module P:Life Skills I			
Aim: Add values to technical	See Annovure C	8.8	11
skills through intra- personal		0.0	
and inter-personal skills			
Secondary skills and activities I			
Aim: To add value in monthly assessment and extra curriculum activities	See Annexure D	10.4	13
Module Q: English- II			
Aim: To improve their writing capacity	See Annovure B	11 2	14
and enable them to speak English		11.2	14
language fluently			
Module N: Computer Skills II	See Annexure A	9.6	12

Aim: Get awareness of latest drawing and designing tools through computer applications used in the industry			
Module P: Life Skills- II	See Annexure C	11.2	14
Aim: Add value to technical skills		11.2	
Secondary skills and activities II	See Annexure D	8.8	11
Aim: To add value in monthly assessment and extra curriculum activities			
Module O1: On-job Training		1600 H	lrs. (1 Year)
Aim: Gain real workplace understanding, skills and experience Orientation of real	O1.1 Company orientation & Awareness of Safety SOP		
workplace environment	O1.2 Perform preventive Maintenance		
	O1.3 Maintain Vehicle Engine		
	O1.3 Repair Body Electrical System		
	O1.4 Maintain HVAC System		
	O1.5 Maintain Suspension System		

Module O2: On Job Training Aim: Deepen the understanding and skills for the concepts taught in the modules and building skills for Self - learning.	O2.1 Maintain Transmission System O2.2 Maintain Brake System O2.3 Perform On-Board Diagnostic O2.4 Perform Engine Overhauling O2.5 Maintain Vehicle Infotainment System		
Module R : Review and Preparation	Review ,recap and reflection	9.6	12
Aim: To review the content and assess through examination for output and quality of the trained person	2. Final examination preparation		

Theory Hours = 320, Practical Hours = 1280

Total Hours = 1600, OJT Hours = 1600

Duration Theory		Practice	Credit
225 Hours	45 Hours	180 Hours	22.5

13. Teaching Learning Guide - Automotive Technician

Module A: Perform Preventive Maintenance

Objective of the Module: This Module (A) of competency standard for Auto motive technician identifies the competencies required to perform preventive maintenance of vehicle according to Manufacturer Instructions including vehicle Inspections, Changing oil and filter, cleaning of air filter, maintaining of spark plugs, servicing of brake system, replacement of belts, maintaining the level of battery electrolyte, adjustment of Head lights, adjustment of clutch paddle, maintaining level of fluid, replacement of wheel bearings, maintaining wheels and re-torqueing of fasteners

Learning Unit	Learning Outcomes	Learning Elements	D u r a ti o n	Tools/Equipment material required	Learning Place
A-1 Follow vehicle specific original equipment manufacturers (OEM)	Trainee will be able to:Verify vehicle maintenance Schedule according to	Trainee will be able to:Describe precautionary measures adopted for Preventive maintenance	T o t a I:	Tool trolleyRepair ManualsMeasuring Instruments	Class room and Institute's workshop

recommendation	 Manufacturer's recommendation, Transport vehicle to service station safely, Interpret stripe and decal on the vehicle , Requisite necessary materials and equipment needed to perform maintenance, Ensure compliance of National/International laws, codes and regulations. 	 in vehicle, Interpret automobile shop work orders, Describe Tools & equipment required Preventive Maintenance, Differentiate types of Auto motive maintenance, Interpret maintenance schedules, Interpret service manuals according to specific model of vehicle, Describe maintenance of tools & equipment. 	12.5 hrs. Theory: 2.5 hrs. Practical 1	 Scanners Special Service Tools (SST) Vehicle protective kit Lift (two or Four post) Personal protective equipment (PPEs) 	
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A-2 Conduct vehicle walk around inspection	 Trainee will be able to: Locate exterior damages on vehicle Conduct vehicle tires/wheels inspection for normal working condition according to Manufacturers recommendations Conduct windshield/wiper/glasses inspection for their damage and condition Locate damage in side- view mirrors Locate physical damage in head and tail lights Locate damage in moldings 	 Trainee will be able to: Describe necessity of vehicle walk around inspection, Describe observations / faults and damages, Describe visual inspection techniques, Select tools, equipment and consumables required for vehicle preventive maintenance. 	Total: 14hrs. Theory: 2.8hrs.	 Vehicle Inspection Sheet 	Class room and Institute's workshop

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A-3 Conduct under hood inspection	 Trainee will be able to: Verify vehicle under hood components for normal working condition according to Preventive maintenance check list, Verify vehicle fluids and liquid for normal condition level according to preventive maintenance check list, 	 Trainee will be able to: Describe methods of under hood maintenance as per manufacturer's recommendation Identify vehicle under hood components/parts, Describe engine 	T o t a I : 1 2 5 h r	Tool trolleySSTRepair manual	Class room and Institute's workshop
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	 Verify vehicle wiring harness physical condition Verify condition of under hood fasteners for normal fastening, according to Manufacturer's recommendation 	 condition Differentiate engines,(diesel or petrol) Explain cooling system, Describe engine oil grading, Inspect drive Belts, Describe importance and properties of brake fluid 	s. T h e o r y: 2.5 h r s. P r a c t i c a l 1 0 h r s		
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A-4 Conduct under vehicle inspection	 Trainee will be able to: Station/place automobile for under vehicle inspection by applying auto workshop SOPs, Inspect following according to auto workshop SOPs: Suspension for damages and leakages. Fuel tank for physical damage or leakages, Linkages for worn/damage/loose fitting, Mounting worn/damage/loose fitting, Drive shaft worn/damage/loose fitting, Shields for worn/damage/loose fitting, 	 Trainee will be able to: Describe methods of under vehicle maintenance as per manufacturer's recommendation Interpret Pictorial diagrams given in Manufacturer's recommendation, Identify parts of vehicle lifting jacks, Describe operation of car lift 	Total: 13.5 hrs.Theory: 2.7 hrs.P	 service/workshop manuals according to the vehicle make & model Car lifts Grease Gun Grease Torque Wrench Tool Trolley Torque Wrench Personal safety equipment 	Class room and Institute's workshop

	 Exhaust muffler for clogging/ worn/damage/loose fitting. 		r a c t i c a l 1 0 8 h r s		
A-5 Change engine oil	 Trainee will be able to: Determine engine oil level by applying prescribed method, Locate oil drainage system , Remove oil from engine without spillage, Pour recommended quality and quantity of oil into engine without spilling, 	 Trainee will be able to: Describe precautionary measures adopted for oil change in vehicle, Interpret Pictorial diagrams engine oil drainage in Manufacturer's recommendation, Describe Tools, equipment and consumables used for 	T o t a l : 1 4 h r s T h	 Lift equipment Oil funnel Recommended oil Waste Oil drum Tool trolley Oil suction machine Personal safety equipment 	Class room and Institute's workshop

	 Dispose off waste oil by applying auto workshop SOPs. 	oil change, • Explain importance of following engine oil change schedule, • Describe necessity of different engine oil grading.	e o r y : 2 . 8 h r s . P r a c t i c a l 1 1 . 2 h r s .		
A.6	Trainee will be able to:	Trainee will be able to:	Т	Waste oil drum	Class

Replace oil filter	 Locate oil filter on the vehicle , 	 Describe working of oil filter, 	o t	 Tool trolley Special service tool 	room and Institute's
	 Remove oil filter from vehicle applying correct method, Fix oil filter in the vehicle according to Manufacturer's recommendation. 	 Describe schedule of oil filter change as per manufacturer's recommendation , Interpret Manufacturer's recommendation for oil filter location, Describe Special Service Tools for oil filter replacement. 	a I : 10.5 hrs. Theory : 2.1 hrs. Pra	 Special service tool (SST) Personal protective equipment's (PPEs) 	workshop

			c i c a i 8 4 h r s		
A-7 Clean air filter	 Trainee will be able to: Locate air filter on the vehicle as per Manufacturer's recommendation, clean air filter for clog/dust removal as per Manufacturer's recommendation Service air filter for clog/dust removal as per auto workshop SOPs, Reinstall air filter into the vehicle 	 Trainee will be able to: Describe precautionary measures adopted during service of air filter of vehicle, Describe Tools, equipment and consumables required to remove and replace air filter, Describe the purpose of air filter in an automobile, Interpret 	Tot a I : 10.5 hrs. The	 Tool Trolley Source of compressed air 	Class room and Institute's workshop

A-8	Trainee will be able to:	Manufacturer's recommendation for air filter location, • Enumerate troubles accrued in vehicle due to clogged air filter.	ory: 2.1 hrs. Practical 8.4 hrs. T	• Tool Trolley	Class
Maintain spark	Remove spark plug	Describe	o t	• Feeler gauge	room and Institute's
piug	trom the engine applying	precautionary			

recommended method, • Service spark plug as per method recommended in Manufacturer's recommendation, • Reinstall spark plug in the vehicle for normal operation applying as per manufacturer's recommended torque.	 measures adopted during removing installing, servicing of spark plug, Explain the necessity and types of spark plug Describe spark plug removal procedure, Interpret Manufacturer's recommendation for spark plug specifications, Describe adjustment of spark plug gap by using feeler gauge as per manual, Describe Tools , equipment and consumables needed to service spark plug 	a I : 11.5hrs.Theory:2.3hrs.Pract	• Spark Plug Cleaning Machine	workshop
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			i c a l 9 2 h r s		
A-9 Service brake system	 Trainee will be able to: Perform brake test for normal operation, Locate parts of brake system, Adjust brake paddle for normal operation according to Manufacturer's recommendation, Adjust parking brake for normal operation according to Manufacturer's recommendation, 	 Trainee will be able to: Describe importance of brake system in vehicle, Describe types of vehicle brake systems, Describe parts of conventional brake system, Interpret pictorial diagram of brake system in manufacturer's recommendation Describe Tools, equipment &consumables needed 	T o t a I : 1 2 . 5 h r s . T h e o r	 Emery paper Tool Trolley Personal safety equipment's Lifts (Two or Four Post) SST Measuring tools 	Class room and Institute's workshop

		to service brake system.	y : 2.5 h r s. P r a c t i c a l 1		
			l 1 0 h r s		
A-10 Replace drive belt	Trainee will be able to:Inspect drive belt for correct tension,Remove Drive belt by applying correct	Trainee will be able to: • Describe precautionary measures adopted while working with drive belts,	T o t a I :	 Tool Trolley Personal protective equipment's (PPEs) SST 	Class room and Institute's workshop
procedure, • Replace drive belt by applying correct procedure.	 Describe drive belt adjustment procedure, Describe drive belt replacement procedure, Interpret drive belt section of Manufacturer's recommendation, Describe tools, equipment and consumables needed to replace drive belts. 	1 4 h r r s . T h e o r y : 2 . 8 h r s . P r a c t i c a l l l			
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			2 h r s		
A-11 Top up battery electrolyte	 Trainee will be able to: Perform visual Inspection of battery for physical damage as per auto workshop SOPs, Perform test for determination of specific gravity of the battery as per auto workshop SOPs, Maintain electrolyte level in the battery up to mark without spilling, Determine battery off load /on load voltage. 	 Trainee will be able to: Describe typical voltage sources in automobile, Describe construction of battery, Describe automobile battery faults, Describe battery maintenance procedure, Describe usage of hydrometer for electrolyte check-up, Describe usage of battery tester for voltage testing. 	Total: 11.5 hrs.Theory: 2.3	 Tool Trolley Personal protective equipment's (PPEs) SST Hydrometer 	Class room and Institute's workshop

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A-12	Trainee will be able to:	• Describe	h r s P r a c t i c a I 9 2 h r s T	• Manufacturer's manuals	Class
			S .		
A-12 Adjust Head light	 Trainee will be able to: Inspect head light position by applying correct techniques, , Adjust head lights beams applying procedure prescribed in Manufacturer's 	 Describe Construction of electrical lamp, Enumerate types of lamps used in vehicles, Explain method for adjusting head lights, Interpret Pictorial diagram of 	T o t a I : 9 5 h	 Manufacturer's manuals headlight aligner Measuring Tape Tool Trolley Personal protective equipment's (PPEs) SST 	Class room and Institute's workshop

recommendation	Manufacturer's recommendation for headlights adjustment,	r s T h e o r y : 1 9 h r s P r a c	
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A-13 Adjust clutch pedal free play	 Trainee will be able to: Verify clutch pedal play for normal working, Adjust clutch system as per manufacturer's recommendation 	 Describe purpose of clutch, Describe Parts of clutch system, Describe adjustment procedure, Interpret Pictorial diagram of Manufacturer's recommendation for clutch adjustment, Describe tools, equipment and consumables needed to adjust clutch system. 	Total: 10.5 h rs. Theory: 2.1 h rs.	 Tool Trolley Personal protective equipment's (PPEs) SST Steel Rule Repair Manuals 	Class room and Institute's workshop

			Practical s.4 hrs.		
A-14 Top up all fluids	 A competent individual must be able to successfully: Determine fluids level of Brake system per OEM recommendations, Replace contaminated brake fluid. Top up Brake fluid per OEM recommendations, Transmission system, 	 A competent individual must be able to successfully: Enlist fluids used in vehicle Define purpose of typical automobile fluids, Explain the method of top up as per OEM standard, Interpret OEM manual to determine specifications of fluids used in specific vehicle. 	T o t a I : 1 0 . 5 h r s	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual 	Class room and Institute's workshop

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antifreeze, washer and	1	
power steering,	n	
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 Change level of fluids as 	0	
per auto workshop SOPs,	r	
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 Clean excess fluid as per 	:	
auto workshop SOPs.	2	
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A-15	Trainee will be able to:	Trainee will be able to:	Т	Tool Trolley	Class
Replace wheel bearing	 Remove bearing from wheel hub using method Prescribed in Manufacturer's recommendation, 	 Describe precautionary measures adopted while working with bearing, 	o t a I :	 Personal protective equipment's (PPEs) SST Lift (Two or Four posts) 	room and Institute's workshop
	 Apply Lubricates on bearing according to its specification, Fix bearing in the wheel for normal operation as per manufacturer's recommendation 	 Dearing, Describe advantages of bearing, Identify bearing according to its number code, Select tools for bearing removal and fixing, Describe bearing types, Describe bearing faults, Interpret Manufacturer's recommendation to determine specifications of wheel bearings used in apacific yobiolo 	1 3 h r s T h e o r y : 2 6 h r s P	 Ent (Two of Four posts) Repair manual Hydraulic Press 	
		 Describe the method of wheel 	r a c		

		bearing replacement.	t ica I 10.4 h r s.		
A-16 Maintain tire	 Trainee will be able to: Determine tire condition for normal operation as per manufacturer's recommendation , Remove tire from vehicle applying correct procedure, Service tire for normal operation as per manufacturer's recommendation Reinstall tire on vehicle applying correct procedure. 	 Trainee will be able to: Describe precautionary measures adopted while working with tire, Identify tires for the size and ply, Describe tire repairing tools and equipment and consumables, Describe the method of replacement as per manufacturer's recommendation 	T o t a I : 1 0 . 5 h r s . T h e	 Tread depth gauge Tool Trolley Personal protective equipment's (PPEs) SST Tire changing Machine Tire pressure gauge Source of compressed air 	Class room and Institute's workshop

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A-17	Trainee will be able to:	Trainee will be able to:	Т	Tool Trolley	Class
Re-torque	 Adjust of captive 	Explain Fasteners	0	Personal protective	room and
fasteners	threaded fasteners/nut &		t	• • • • • •	Institute's

bolts for recommended	threading.	a	equipment's (PPEs)	workshop
 torque, Replace clips /clamps 	 Explain fasteners and their types, Identify fasteners 	I : 1 2	 SST Torque wrench 	
Replace metallic fasteners	size,Describe tools to operate fasteners,	h r s		
	• Describe method of tightening the fasteners as per the recommended torque.	Theor y: 2 4 h r s P		
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A-18 Perform Lubrication	 Trainee will be able to: Select lubricants according to manufacturer's recommendation , Locate greasing/lubrication points according to Manufacturer's recommendation, Perform Chassis lubrication as per manufacturer's recommendation Perform under hood lubrication as per manufacturer's recommendation 	 Trainee will be able to: Describe precautionary measures adopted while applying grease/lubrication on vehicle engine, Describe the necessity of lubrication, Differentiate between lube types, Describe tools, equipment and consumables required for working on vehicle engine lubrication system, Explain types and 	Tot a I : 12hrs. Theory : 2.	 Tool Trolley Personal protective equipment's (PPEs) Oil can Grease gun 	Class room and Institute's workshop

	 Clean excess grease/lubricant from vehicle body as per manufacturer's recommendation 	use of grease, • Describe contamination of grease, • Interpret Manufacturer's recommendation to determine specifications of lubricants used in specific vehicle.	4 h r s . P r a c t i c a l 9 . 6 h r s .		
A-19 Conduct road test	 Trainee will be able to: Perform after service vehicle cleaning as per manufacturer's recommendation Bring out vehicle from service station safely, Perform road test as 	 Trainee will be able to: Describe precautionary measures adopted before, during and after road test, Describe functions of vehicle which have 	T o t a I : 1 0 h	 Driving authority letter Steering cover Valid Driving license Seat cover Floor mats 	Class room and Institute's workshop

per manufacturer's recommendation	to be determined during road test.	r s	
 Fill out road test check list. 		. T	
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Module B Title: Maintain Vehicle Engine

Objective of the Module: Auto motive technician identifies the competencies required to perform vehicle engine maintenance including cooling system s repair & maintenance, lubrication system repair & maintenance, fuel system repair & maintenance, lgnition system repair & maintenance, starting system repair & maintenance and the repair & maintenance of charging system for normal engine performance.

Duration	Theory:	Practice	0	Credit		
144 hours	28.8hours	115.2 hours		14.4		
Leanning onit	Learning Outcomes	Learning Elements	u r a t o n	m	ools/Equipment aterial required	Learning Place
B-1 Inspect engine cooling system	 Trainee will be able to: Locate components of vehicle cooling system , Determine functioning of cooling system applying prescribed procedures, Determine leakage in vehicle cooling system 	 Trainee will be able to: Describe precautionary measures adopted while working on cooling system of vehicle engine, Describe the necessity of engine cooling system, 	T o t a I : 1 2 h r	 Tool Persequi Spe (SS⁻) Rep 	Trolley sonal protective ipment's (PPEs) cial Service Tools T) air manual	Class room and Institute's workshop

	 applying prescribed procedures, Diagnose Physical damage in vehicle cooling system applying prescribed diagnostic techniques, Diagnose Faulty component / part in the cooling system of vehicle applying prescribed diagnostic techniques. 	 Describe vehicle cooling system component/parts, Describe coolant specifications, Describe tools, equipment and consumables required for working on vehicle engine cooling system. 	s T h e o r y : 2 4 h r s P r a c t i c a I 9 6 h r s	
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B-2 Repair engine cooling system.	 Trainee will be able to: Remove Parts from cooling system of vehicle applying method prescribed in service manual, Test engine cooling system component for normal working applying prescribed method, Perform servicing of cooling system as per auto workshop SOPs, Fix engine cooling system component in vehicle for normal function as per auto workshop SOPs, Perform after service test on cooling system of vehicle applying prescribed method. 	 Trainee will be able to: Explain operation of engine cooling system, Explain function of radiator, radiator cap, Thermostat valve, water pump & fan in vehicle cooling system, Enumerate steps to perform pressure test on cooling system. 	Total : 12.5hrs. Theory : 2.5hrs. P	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) 	Class room and Institute's workshop

			r a c t i c a l 1 0 h r s		
B-3 Inspect Lubrication system	 Trainee will be able to: Locate components of vehicle Lubrication system, Determine functioning of lubrication system applying prescribed procedures, Determine leakage in vehicle applying prescribed procedures, Determine oil pressure performance with oil pressure gauge as per 	 Trainee will be able to: Describe precautionary measures adopted while working on lubrication system of vehicle engine, Describe the necessity of lubrication in engine, Describe vehicle lubrication system component / parts, Describe tools 	T o t a I : 1 0 h r s T h e	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual 	Class room and Institute's workshop

	 auto workshop SOPs, Diagnose Physical damage in vehicle lubrication system applying prescribed diagnostic techniques, Diagnose Faulty component/part in the lubrication system of vehicle applying prescribed diagnostic techniques. 	required for working on engine lubrication system. • Describe typical lubricants for different vehicle. • Select tools, equipment and consumables required for working on vehicle Lubrication system.	ry: 2hrs.PractiCal 8hrs.		
B-4 Repair Lubrication system	 Trainee will be able to: Remove Lubricant from vehicle applying method prescribed in service manual, Remove Parts from 	 Trainee will be able to: Explain operation of vehicle lubrication system, Explain function of oil pump, oil galleries, 	T O t a I :	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) 	Class room and Institute's workshop

 lubrication system of applying method prescribed in repair manual, Test vehicle lubrication system component for normal working applying prescribed method, Perform servicing of lubrication system parts as per auto workshop SOPs, Reinstall vehicle lubrication system component in vehicle for normal function as per auto workshop SOPs, Perform after service test on Lubrication system of vehicle applying prescribed method. 	oil filter, oil sump, oil pressure release valve • Give purpose of O- ring, • Enumerate steps to perform servicing on lubrication system.	1 1 1 1 1 1 1 1 1 1 1 1 1 1	• Repair Manual	
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B-5 Inspect fuel system	 Trainee will be able to: Locate components of vehicle fuel system, Determine functioning of vehicle fuel system applying prescribed procedures, Determine the pressure of fuel pump applying prescribed procedures, Diagnose Physical damage in vehicle fuel system applying prescribed diagnostic techniques, Diagnose Faulty component/part in fuel system of vehicle applying prescribed diagnostic techniques, 	 Trainee will be able to: Describe precautionary measures adopted while working on fuel system, Describe fuels and its type used in Automobile Explain fuel system of petrol vehicle Explain fuel system of diesel automobile, Enumerate components of petrol vehicle fuel system, Enumerate components of diesel vehicle fuel system, Describe electronic 	Total: 12.5 hrsTheory: 2.5	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual 	Class room and Institute's workshop

	 Diagnose fault in alternative Fuel (CNG / LPG) system as per auto workshop SOPs. 	 fuel injection system its parts and advantages, Explain working of Carburetor, Describe parts of carburetor, Explain necessity & working of fuel filter, Describe fuel injector, Explain return pressure injector rail (EFI) System, Select tools, equipment and consumables required for working on vehicle fuel system. 	h r s P r a c t i c a I 1 0 h r s		
B-6 Repair fuel system	 Trainee will be able to: Remove fuel from vehicle applying method prescribed in service manual, Remove Parts from fuel system of typical (conventional) petrol 	 Trainee will be able to: Describe symptoms of trouble in vehicle due to fuel system malfunctioning Enumerate carburetor parts, Describe carburetor 	T o t a I : 1 2	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual 	Class room and Institute's workshop

 vehicle applying method prescribed in service manual, Remove Parts from fuel system of typical (conventional) diesel vehicle applying method prescribed in service manual, Remove Parts from fuel system of EFI vehicle applying method prescribed in service manual, Test vehicle fuel system component for normal working applying prescribed method, Perform servicing of fuel system parts, Fix vehicle fuel system component in vehicle for normal function, Pour fuel in to the vehicle applying prescribed method, 	 servicing method, Describe fuel injector servicing method, Describe servicing method of EFI system. 	5 h r s T h e o r y : 2 5 h r s P r a c t i c a I 1	
 Perform after service test on fuel system of 		1 0 h	

	vehicle applying prescribed method,		r s		
B-7 Inspect Ignition system.	 Trainee will be able to: Identify components of vehicle ignition system, Determine functioning of ignition system applying prescribed procedures, Determine leakage in vehicle ignition system applying prescribed procedures, Determine ignition switch and ignition coil performance applying prescribed procedures, Determine ignition distributer condition applying prescribed procedures, Determine ignition distributer condition applying prescribed procedures, Diagnose Physical damage in vehicle ignition system applying prescribed diagnostic techniques, 	 Trainee will be able to: Describe precautionary measures adopted while working on ignition system of automobile, Describe necessity of ignition system in automobile, Describe vehicle ignition system component / parts, Explain Contact breaker (CB) point function, Explain Distributor less Ignition (DLI), Describe tools, equipment and consumables required for working on vehicle ignition system. 	Total: 12.5hrs. Theory: 2.5hrs	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter 	Class room and Institute's workshop

	Diagnose faulty component/part in ignition system of vehicle applying prescribed diagnostic techniques.		. P ractical I		
B-8 Repair ignition system	 Trainee will be able to: Remove Parts from ignition system of vehicle applying method prescribed in service manual, Test ignition system component of vehicle for normal functioning applying prescribed method, Perform servicing of 	 Trainee will be able to: Describe symptoms of trouble in vehicle due to ignition system malfunctioning, Describe Parts of ignition system, Describe the Purpose of distributor assembly, Describe characteristics of high 	T o t a I 2 5 h r s	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter 	Class room and Institute's workshop

ignition system parts, • Fix vehicle ignition system component in vehicle for normal function as per auto workshop SOPs, • Perform after service test on ignition system of vehicle applying prescribed method.	 tension lead, Describe working of ignition coil, Describe Purpose of battery in the ignition system of vehicle. 	T heory: 2.5hrs. P ractiCal10hrs.		
B-9 Inspect starting Trainee will be able to:	Trainee will be able to:	T	Tool Trolley	Class

system	 Locate components of vehicle starting system as per manufacturer's recommendation Determine functioning of starting system applying prescribed procedures, Diagnose Physical damage in vehicle starting system applying prescribed diagnostic techniques, Diagnose Faulty component/part in starting system of vehicle applying prescribed diagnostic techniques. 	 Describe precautionary measures adopted while working on starting system of automobile, Describe starting system of automobile, Describe vehicle starting system component / parts, Describe tools, equipment and consumables required for working on vehicle Starting system. 	otal: 10hrs.Theory:2hrs.Practic	 Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter 	room and Institute's workshop
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B-10 Repair starting system	 Trainee will be able to: Remove Parts from starting system of vehicle applying method prescribed in service manual, Test starting system component of vehicle for normal functioning applying prescribed method, Perform servicing of starting system parts, Reinstallation of ignition system component in vehicle as per manufacturer's recommendation Perform after service test on starting system of vehicle applying 	 Trainee will be able to: Describe symptoms of trouble in vehicle due to starting system malfunctioning, Describe Parts of starting system, Describe importance of battery characteristics in normal functioning of starting system, Describe the use of multi meter, Describe characteristics of High Tension lead/cable. Describe method of jump starting 	Total: 12.5 hrsTheory: 2.5	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter Soldering Iron 	Class room and Institute's workshop

	prescribed method.		h r s r a c t i c a I 1 0 h r s		
B-11 Inspect charging system	 Trainee will be able to: Locate components of vehicle charging system Determine functioning of starting system applying prescribed procedures, Diagnose Physical damage in vehicle Charging system 	 Trainee will be able to: Describe precautionary measures adopted while working on charging system of automobile Describe necessity of charging system in automobile, 	T o t a i 3 5 h	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter 	Class room and Institute's workshop

 applying prescribed diagnostic techniques, Diagnose Faulty component/part in charging system of vehicle applying prescribed diagnostic techniques. 	 Identify Venicle charging system component / parts, Explain function of vehicle alternator, Describe vehicle alternator parts, Draw free hand typical circuit/ electrical/ schematic/ block diagram of automobile charging circuit, Select tools, equipment and consumables required for working on vehicle ignition system. 	r S T h e o r y : 2 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h r s 7 h h r s	
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B-12 Repair Charging system	 Trainee will be able to: Remove Parts from Charging system of vehicle by applying method prescribed in service manual, Test charging system component of vehicle for normal functioning by applying prescribed method, Repair vehicle alternator by applying prescribed techniques, Perform servicing of charging system parts, Reinstall vehicle charging system component in vehicle for normal function as per auto workshop SOPs, Perform after service test on charging system of vehicle by applying 	 Trainee will be able to: Describe symptoms of trouble in vehicle due to charging system malfunctioning, Describe parts of charging system, Describe parts of alternator, Describe characteristics of automobile charger circuits. 	Total: 12hrs. Theory: 2.4hrs. P	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter Soldering Iron 	Class room and Institute's workshop

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Module C Title: Repair Body Electrical System

Objective of the Module: Auto motive technician identifies the competencies required to repair body electrical system including diagnose affected electrical / electronic system malfunctioning, repairing of body wiring, service and maintenance of wiper, Maintenance of lighting system, Maintenance of horn system, maintenance of ignition circuit, servicing of remote control, repairing of power Window circuitry, repairing Sunroof circuitry and servicing of Supplementary Restraint System (SRS) Restraint System for normal performance of vehicle.

Duration Theory:		Practice	Credit
129 hours	25.8 hours	103.2 hours	13

Learning Unit	Learning Outcomes	Learning Elements	D u r a t i o n	Tool / Equipment Material Required	Learning Place
C-1 Diagnose affected electrical/ electronic system malfunction(s)	 Trainee will be able to: Demonstrate use of test and measuring instruments as per their operation manual, Determine functioning of vehicle electrical/electronic circuit applying prescribed 	 Trainee will be able to: Describe precautionary measures adopted while working with test and measuring instruments, Describe precautionary 	T o t a i : 1 2 h r	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools(SST) Repair Manual Scanner 	Class room and Institute's workshop

pro • I	ocedures, Perform tests to	measures adopted while working on	s • Multi-meter
dia wir as pro	ngnose fault in ring/harness of vehicle per prescribed pocedure,	 vehicle electrical /electronic system, Describe voltage and its types(AC/DC) 	T h e o
 det det cor ele circ pro dar ele app dia for per rec . 	Perform tests to termine faulty mponents of vehicle ectrical/electronic cuit as per prescribed ocedure, Diagnose Physical mage in vehicle ectrical/electronic circuit plying prescribed agnostic techniques, Perform earthling test proper functioning as r manufacturer's commendation	 Interpret test and measuring instruments manually Interpret Vehicle schematics, Identify electrical protection devices used in automotive, Describe electrical protection devices used in automotive, Describe relays used in automotive, Describe relays used in automotive, Describe sensing devices used in automotive, Describe sensing devices used in automotive, 	r y : 2 . 4 h r ss . P r a c t i g . 6 h r s

		• Enumerate operation of electrical/ electronic test and measuring instruments used for automotive electrical service,	-		
		• Select tools, equipment and consumables required for working on vehicle electrical / electronic system.			
C-2 Repair body wiring	 Trainee will be able to: Maintain earth connection for normal functioning, Locate body wiring circuit components , Remove Faulty component/wire /cable/ terminal from body wiring of vehicle applying method prescribed in service manual, Test component/wire/cable/ terminal of vehicle body wiring for determination 	 Trainee will be able to: Calculate load on battery in power and ampere hour, Describe symptoms of trouble in vehicle due to body wiring malfunctioning, Describe characteristics of wires and cables used in automotive circuits, Identify ratings/values of component used in body wiring system of 	T o t a I : 1 4 h r s T h e o r	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Multi-meter 	Class room and Institute's workshop

	 of its condition applying prescribed testing methods, Repair vehicle wiring applying prescribed techniques. Fix component/wire/cable/ter minal related to body wiring circuit on proper place Connect component in vehicle body wiring circuit according to schematics Perform after service electrical test of vehicle for normal circuit operation Check connectivity wiring terminals for normal physical/electrical connections 	 vehicle, Describe harness and their insulation, Describe testing procedure of protecting devices of automobile circuits, Describe testing procedure of relays of automobile circuits, Describe testing procedure of sensing devices of automobile circuits. 	y : 2.8 hrs. Practical 11.2 hrs.		
C-3 Maintain wiper system	 Trainee will be able to: Diagnose physical/mechanical fault in wipers system of 	Trainee will be able to:Describe function of wipers in vehicles,	T o t a	 Tool Trolley Personal protective equipment's (PPEs) 	Class room and Institute's workshop
ver pro in s • wip app rec ma • •	nicle applying ocedure recommended service manual. Diagnose fault in pers circuit of vehicle plying procedure commended in service inual. Remove mechanical rts of wiper system	 Draw free hand wipers circuit / schematic diagram, Describe symptoms/causes of trouble in wiper system of the vehicle, Select tools, equipment and consumables required 	I 1 0 h r s T h e	 Special Service Tools (SST) Repair Manual Scanner Multi-meter 	
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from ma rec • • cor sys app tec	m as per inufacturer's commendation Remove electrical mponents of wiper stem from vehicle plying proper chniques.	for working on vehicle circuit/system of vehicle.	o r y : 2 h r s		
• app tec • cor sys ma rec	Service wiper motor olying prescribed chniques. Insert mechanical mponent in wiper stem of vehicle as per inufacturer's commendation		·Practical8		

	component in wiper system of vehicle by applying automotive manufacturer's recommendation • • Test after service wiper system performance for normal operations per manufacturer's recommendation •		h r s		
C-4 Maintain lighting system	 Trainee will be able to: Diagnose Fault in Lighting System of the Vehicle by applying prescribed diagnostic techniques, Locate components of lighting circuit of the vehicle Remove component from lighting circuit of vehicle by applying manufacturer's recommendation 	 Trainee will be able to: Describe precautionary measures adopted while working on vehicle lighting system, Describe function of Components in vehicle lighting system, Describe techniques and procedures of diagnosing faults in lighting system, 	T o t a I : 1 2 h r s . T h e	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner Multi-meter 	Class room and Institute's workshop

	 Test component for determination of its condition by applying manufacturer's recommendation Perform mechanical/physical repair / maintenance of lighting system of vehicle applying prescribed techniques, Repair vehicle lighting circuit applying prescribed techniques, Reinstall component/wire/cable/ter minal related to lighting circuit on proper place, Connect component in vehicle lighting circuit according to schematics, Perform after service electrical test of vehicle for normal lighting circuit operation, Test lighting circuit connectors for proper connections using 	for inspecting and verifying the repair of lighting system, Interpret schematic diagram of lighting circuit of vehicle, Explain different lighting system of vehicle, Describe symptoms/causes of trouble in lighting system of the vehicle, Select tools, equipment and consumables required for working on lighting circuit / system of vehicle.	ory: 2.4 hrs. Practical 9.6 hrs. ∙		
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	prescribed techniques.				
C-5	Trainee will be able to:	Trainee will be able to:	т	Tool Trolley	Class
Maintain horn system	 Locate components of horn circuit of the vehicle Diagnose Fault in horn circuit of the Vehicle by applying manufacturer's recommendation Remove component from horn circuit of vehicle by applying manufacturer's recommendation Test component for determination of its condition by applying automotive workshop SOPs, Perform mechanical/physical repair/maintenance of horn system of vehicle applying prescribed techniques, Repair vehicle horn circuit applying 	 Describe precautionary measures adopted while working on vehicle horn circuit, Describe function of Components in vehicle horn circuit, Describe techniques and procedures of diagnosing faults in horn circuit, Explain techniques for inspecting and verifying the repair of horn system, Read and interpret schematic diagram of horn circuit of vehicle, Describe symptoms/causes of trouble in horn circuit of the vehicle, Select tools, equipment and 	otal: 10hrs.Theory:2hrs.Pract	 Personal protective equipment's (PPEs) SST Repair Manual Scanner Multi-meter 	room and Institute's workshop

	 prescribed techniques, Fix component/ wire/ cable/terminal related to horn circuit on proper place, Connect component in vehicle horn circuit according to schematics, Perform after service test of vehicle for normal horn operation. 	consumables required for working on vehicle horn circuit.	i c a l 8 h r s		
C-6 Maintain central locking system	 Trainee will be able to: Locate components of central locking circuit of the vehicle Diagnose Fault in central locking circuit of the Vehicle by applying automotive workshop SOPs, Remove component from central locking circuit of vehicle by applying automotive workshop SOPs, Remove component from central locking circuit of vehicle by applying automotive workshop SOPs, Test component for 	 Trainee will be able to: Describe precautionary measures adopted while working on vehicle central locking system, Explain central locking system, Describe components of central locking system, Identify components of central locking system, 	T o t a i : 1 3 h r s . T h e o	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual Scanner Multi-meter 	Class room and Institute's workshop

 determination of its condition by applying manufacturer's recommendation Perform mechanical/physical repair / maintenance of horn system of vehicle applying prescribed techniques, Repair vehicle central locking circuit by applying prescribed techniques, Reinstall component/wire/cable/ter minal related to central locking circuit on proper place, Connect component in vehicle central locking circuit according to related schematics, Perform after service test of vehicle for normal central locking operation by applying prescribed techniques. 	 Describe function of Components in vehicle central locking system, Describe techniques and procedures of diagnosing faults in central locking system, Read and interpret schematic diagram of central locking circuit of vehicle, Describe symptoms/causes of trouble in central locking system of the vehicle, Select tools, equipment & consumables required for working on vehicle central locking system of the vehicle. 	r y : 2 . 6 h r s . P r a c t i c a l 1 0 . 4 h r s .	
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C-7 Maintain Ignition switch system	 Trainee will be able to: Test Ignition switch for proper function, Remove ignition switch from the steering by applying Manufacturer's recommendation Perform electrical/mechanical Servicing on ignition switch by applying Manufacturer's recommendation Reinstall ignition switch assembly on proper place by applying Manufacturer's recommendation Perform after service test of ignition for normal operation by applying Manufacturer's recommendation 	 Trainee will be able to: Describe precautionary measures adopted while working on ignition switch, Describe function of ignition switch, Describe systems controlled with ignition switch in vehicle, Describe method of removing and installation of ignition switch to the vehicle, Read and interpret schematic diagram of ignition switch of vehicle, Describe symptoms / causes of trouble in ignition switch Select tools, equipment & consumables required for working on ignition system. 	Total: 12hrs.TheorY: 2.4hrs.Prac	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual Scanner Multi-meter 	Class room and Institute's workshop
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C-8 Service Remote control	 Trainee will be able to: Test remote control for proper performance by applying manufacturer's recommendation Service remote control system by applying Manufacturer's recommendation Replace remote control cells by Manufacturer's recommendation Perform after service test of remote for normal operation by Manufacturer's 	 Trainee will be able to: Describe precautionary measures adopted while working on remote control, Describe function of remote control, Describe working principle of remote control system, Describe method of removing cells from remote control unit, Describe remote control cells 	T o t a l : 1 2 h r s . T h e o r y	 Tool Trolley Personal protective equipment's (PPEs) SST Multi-meter 	Class room and Institute's workshop

	recommendation	 characteristics, Describe symptoms/causes of trouble in remote control system, Select tools, equipment and consumables required for working on remote control. 	: 2 . 4 h r s . P r a c t i c a I 9 . 6 h r s		
C-9 Maintain Power windows system	 Trainee will be able to: Locate components/parts of power windows system on the vehicle 	Trainee will be able to: • Describe precautionary measures adopted while working on vehicle Power	T o t a I :	 Tool Trolley Personal protective equipment's (PPEs) SST 	Class room and Institute's workshop

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 Diagnose fault in power windows circuit of the vehicle by applying Manufacturer's recommendation Remove component from Power windows system of vehicle by 	 windows system, Explain power windows system, Describe function of power windows Components in the vehicle, 	1 2 h r s T	 Repair Manual Scanner Multi-meter 	
 applying Manufacturer's recommendation Test power windows system component for determination of its condition by Manufacturer's recommendation 	 Describe techniques and procedures of diagnosing faults in power windows system, Interpret schematic diagram of power windows system of 	e r y : 2		
• Perform mechanical/physical repair/maintenance of power windows system of vehicle applying prescribed techniques,	 vehicle, Describe symptoms/causes of trouble in power windows system of the vehicle, 	h r P a		
 Repair vehicle power windows circuit applying prescribed techniques, Service power windows motor applying prescribed techniques, 	• Select tools, equipment and consumables required for working on vehicle power windows circuit/system of vehicle.	t i c a I 9		

	 Reinstall mechanical/electrical component related to Power windows system on proper place, Connect component in vehicle power windows circuit according to related schematics, Perform after service test of vehicle for normal Power windows system operation by manufacturer's recommendation 		6 h s		
C-10 Maintain sunroof system	 Trainee will be able to: Locate components/parts of sunroof system of the vehicle , Diagnose fault in sunroof system of the by manufacturer's recommendation, 	 Trainee will be able to: Describe precautionary measures adopted while working on vehicle sunroof system, Explain sunroof system, 	T o t a l : 1 h r	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual Scanner Multi-meter 	Class room and Institute's workshop

	sunroof system Connect component in vehicle sunroof system according to related schematics, • Perform after service test of vehicle for normal sunroof system operation by applying manufacturer's recommendation				
C-11	Trainee will be able to:	Trainee will be able to:	Т	Tool Trolley	Class
Repair Supplementary	 Diagnose Fault in SRS of the vehicle, 	 State importance of SRS in automobile, 	o t a	 Personal protective equipment's (PPEs) 	room and Institute's workshop
(SRS)	Locate components	Describe		• SST	
()	(e.g. airbag, sensors,	precautionary	:	Repair Manual	
	circuit of the vehicle	while working on	1	Scanner	
	Remove component	vehicle SRS,	h	Multi-meter	

vehicle applying manufacturer's recommendation	Supplementary Restraint System (SRS),	s T
 wanufacturer's recommendation Test component for determination of its condition applying manufacturer's recommendation Perform mechanical / physical repair/maintenance of SRS of vehicle applying manufacturer's recommendation Reinstall component/wire/cable/ter minal related to SRS circuit on proper place, Connect component in vehicle SRS circuit according to schematics, Perform after service electrical test of vehicle for normal SRS circuit 	 Restraint System (SRS), Describe components of SRS, Identify components of SRS, Describe function of SRS components in vehicle, Describe techniques and procedures of diagnosing faults in SRS, Interpret schematic diagram of SRS of vehicle, Describe symptoms/causes of trouble in SRS system of the vehicle, Select tools, equipment and 	. T h e o r y : 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 1 . 3 . P r a . I . 8 .
•	for working on vehicle SRS circuit of vehicle,	8 h r s

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Module D Title: Maintain Heat Ventilation and Air Condition System (HVAC)

Objective of the Module: Automotive technician identifies the competencies required to maintain Heating, Ventilation & Air Condition System (HVAC) including Servicing, fault diagnosing and repairing of the system for normal performance on vehicle.

Duration Theory:		Practice	Credit
98 hours	19.6 hours	78.4 hours	10

Learning Unit	Learning Outcomes	Learning Elements	D u r a t i o n	Materials/ Learning Aids/ Reference Material Required	Learning Place
D-1 Test HVAC System performance	 Trainee will be able to: Perform cooling test on HVAC system performance adopting manufacturer's recommendation Perform pressure test on HVAC System to determine refrigerant pressure adopting manufacturer's recommendation, Perform Cleaning of vehicle HVAC system as per Manufacturer's recommendation Perform trim repairing in vehicle HVAC system 	 Trainee will be able to: Explain HVAC system, Describe precautionary measures adopted while performing tests on HVAC system of vehicle, Describe importance of necessity of HVAC system in automobile, Describe components of HVAC system, Describe working of HVAC system, 	Total : 13hrs. Theory : 0	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual Scanner Multi-meter Refrigerant Recycling Machine Vacuum pump 	Class room and Institute's workshop

	recommendation, • Recycle Refrigerant in vehicle HVAC system as per Manufacturer's recommendation Perform after service electrical test of vehicle for normal HVAC operation.	compressor, condenser, heater core. evaporator, receiver drier, • Describe techniques and procedures for servicing and repairing Vehicle HVAC system, • Select tools, equipment and consumables required for working on vehicle HVAC system Explain function and operation of the climate control system and refrigerants	. 6 h r s . P r a c t i c a l 1 0 . 4 h r s		
D-2 Diagnose Fault in Electrical circuit of HVAC system	Trainee will be able to: • Diagnose electrical fault in HVAC system of the Vehicle adopting by Manufacturer's recommendation and procedures.	 Trainee will be able to: Describe function of components of HVAC system in vehicle, Describe techniques and procedures of 	T o t a I : 1	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual 	Class room and Institute's workshop

 Locate components of HVAC circuit of the vehicle , Test electrical components for determination of their condition applying Manufacturer's recommendation and procedures, 	 diagnosing faults due to electrical malfunctioning in HVAC circuit of automobile, Interpret Electrical schematics of HVAC system of automobile, Describe symptoms/causes of trouble in HVAC system of the vehicle, Describe usage of gauges and probes, Select tools, equipment & consumables required for working on HVAC system / circuit of vehicle. 	 Scanner Multi-meter Refrigerant Recycling Machine Vacuum pump Vacuum pump Vacuum pump Vacuum pump P P r a c a i c a i i
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			4 h r s		
D-3 Repair HVAC Electrical circuit	 Trainee will be able to: Perform HVAC Circuit test to determine electrical fault adopting Manufacturer's recommendation and procedures, Verify electrical values of HVAC circuit with the Manufacturer's recommendation and Schematics, Replace HVAC electrical components and parts as per Manufacturer's recommendation Repair HVAC electrical components per Manufacturer's recommendation Repair HVAC electrical components per Manufacturer's recommendation Repair vehicle HVAC applying Manufacturer's 	 Trainee will be able to: Explain techniques and procedures of repairing vehicle HVAC electrical faults, Select tools, equipment and consumables required for working on HVAC system / circuit of vehicle. 	Total: 12hrs. Theory: 2.4hrs	Toll trolley Personal protective equipment (PPEs) SST Repair Manual Scanner Multi-meter	Class room and Institute's workshop

	recommendation Reinstall component/ wire/cable/terminal related to HVAC circuit • Perform after service electrical test of vehicle for normal HVAC circuit operation.		. P r a c t i c a l 9 . 6 h r s .		
D-4 Diagnose Fault(s) in HVAC Mechanical Components	 Trainee will be able to: Diagnose choking in vehicle HVAC system component e.g. AC condenser, Heater core, Evaporator, Receiver drier, Diagnose damage(s) in vehicle HVAC system components e.g.AC condenser, Heater core evaporator, receiver drier, compressor, 	 Trainee will be able to: Describe the specific safety procedures as mentioned in the guidelines, Describe function of the components of HVAC system, Interpret the repair manual for carrying out diagnoses. 	T o t a I : 1 3 h r s T	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual 	Class room and Institute's workshop

 Diagnose mechanical/clogging fault in HVAC system by Manufacturer's recommendation 	h e o r v	
Remove Parts from HVAC system of vehicle applying per Manufacturer's recommendation	y 2 6 h r s	
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D-5	Trainee will be able to:	Trainee will be able to:	T • Tool trolley Class
Repair HVAC Mechanical Components	 Remove mechanical fault / cogging from HVAC system of vehicle applying SOPs, Perform mechanical / physical repair / maintenance of HVAC of vehicle applying prescribed techniques, Perform refrigerant pressure test, Perform after service mechanical test of vehicle for normal HVAC operation. 	 Describe techniques and procedures of removing faults due to electrical malfunctioning in HVAC circuit of automobile, Interpret repair manual to carry out repair, Select tools, equipment and consumables required for working on HVAC system / circuit of vehicle. 	0 • Personal protective equipment's (PPEs) room and institute's workshop 1 • SST • Repair Manual 1 • Repair Manual • • • • • • • • • • • • • • • • • • •

			t i c a I 1 0 4 h r s		
D-6 Perform Refrigerant Leak Test	Trainee will be able to: • Connect HVAC Refrigerant recycle machine with vehicle as mentioned in Manufacturer's recommendation Perform leakage test to determine refrigerant/cooling leakage from HVAC system adopting by Manufacturer's recommendation and procedures.	 Trainee will be able to: Describe precautionary measures adopted while performing leakage test on vehicle HVAC system, Describe usage of gauges and probes, Interpret repair manual to carry out Refrigerant Leak Test, Describe different types of Refrigerant Leak Detectors (RLD) Describe usage of tools and operation of 	T o t a l : 1 1 h r s . T h e o r	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Multi-meter Refrigerant Recycling Machine Vacuum pump 	Class room and Institute's workshop

		equipment Describe specific safety procedures as mentioned in Manufacturer's recommendation guideline.	y : 2.2 hrs. Practical 8.8 hrs.		
D-7	Trainee will be able to:	Trainee will be able to:	Т	Tool trolley	Class
Recharge AC Refrigerant	 Recycle refrigerant of vehicle as per Manufacturer's 	 Describe precautionary measures adopted while flushing / 	o t a I	 Personal protective equipment's (PPEs) SST 	room and Institute's workshop

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	recommendation	charging retrigerant,	: e Repair Manual
•	Select Refrigerant according to HVAC	 Describe HVAC Refrigerants, 	 Refrigerant Recycling Machine
	system installed in vehicle,	 Describe types of automobile refrigerants. 	h r s
•	Perform Flushing of AC System according to Manufacturer's	 Describe mixing of refrigerants, 	T
	Recharge refrigerant in Vehicle HVAC system	 Describe Recharging auto AC Systems, 	e 0
•	Reinstall vehicle HVAC System as per	 Adding Oil to the AC System, 	r y
	Manufacturer's recommendation.	 Enumerate operating steps of 	2
•	Verify function of HVAC system after refrigerant re-charging by Manufacturer's recommendation	 Describe usage of tools and operation of equipment Describe specific safety procedures as mentioned in Manufacturer's recommendation guideline. 	2 h r s P r a c t t i
			a I 8

			8 h r s		
D-8 Perform HVAC System Road Test	 Trainee will be able to: Adjust HVAC controls as per costumer desire Perform Defogging Drive vehicle for a distance to check compartment temperature for normal cooling Check vehicle engine temperature 	 Trainee will be able to: Describe precautionary measures adopted while performing road test for HVAC system, Interpret the repair manual to carry out the test and to verify the values, Prepare Check list for HVAC system performance test on road. 	Total: 12hrs. Theory: 2.4hr	 Valid Driving license Seat cover Floor mats Digital AC cooling Tester 	Class room and Institute's workshop

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Module E Title: Maintain Suspension System

Objective of the Module: Automotive technician identifies the competencies required to maintain Suspension system including Servicing, fault diagnosing, Parts replacement, repairing of suspension system and performing wheel alignment for normal performance of vehicle

Duration Theory:		Practice	Credit
91 hours	18.2 hours	72.8 hours	9

Learning Unit	Learning Outcomes	Learning Elements	D u r a ti o n	Tool/Equipment Material Required	Learning Place
E-1 Diagnose problems related to Springs, Struts, shocks absorber, control arms, linkages	 Trainee will be able to: Perform road test to determine cause of noise and vibration due to steering & suspension system of the vehicle according Manufacturer's recommendation and procedures. Identify type of steering system of specific vehicle applying Manufacturer's recommendation. Identify type of suspension system of specific vehicle applying Manufacturer's recommendation. Identify type of suspension system of specific vehicle applying Manufacturer's recommendation. Identify type of suspension system of specific vehicle applying Manufacturer's recommendation , Locate components of steering & suspension system according to Manufacturer's 	 Trainee will be able to: Describe precautionary measures adopted while working on steering and suspension system of vehicle, Describe importance of steering and suspension system, Describe the function of steering system Describe the function of steering system Describe working of standard mechanical (reciprocating ball) steering, Describe working of rack and pinion steering, 	T ot a l: 1 3 h r s T h e o r y : 2 . 6 h r s	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Scanner Multi-meter Lifting source 	Class room and Institute's workshop

 recommendation Diagnose Physical damage /warn / fault/grinded /silted / damaged / broken part in steering & suspension system components (e.g. size loss, rusting, Tension loss, thread slip, etc.) applying 	 Describe parts of steering box Interpret steering & r a suspension system., Interpret manual steering pictorial schematics, Interpret Power steering pictorial 0 	
 prescribed diagnostic techniques, Measure spring specifications with respect to Manufacturer's recommendation, Measure shocks and 	 schematics, Interpret manual steering electrical schematics, Interpret suspension pictorial schematics Enumerate 	
 Measure snocks and struts specifications with respect to Manufacturer's recommendation, Remove Springs from steering & suspension system as per Manufacturer's recommendation and procedures. Remove linkages from 	 components of manual steering system, Enumerate components of power steering system, Describe steering and suspension system fasteners e.g. Springs, Struts, shocks, control arms / 	

 suspension system as per Manufacturer's recommendation and procedures. Remove shocks and struts from suspension system as per Manufacturer's recommendation and procedures. Test conventional steering parts for wear and damage. Test rack and pinion steering for wear and damage 	 linkages, Select tools, equipment and consumables required for working on vehicle wiper system, Interpret suspension section of repair manuals. Describe the operation of the suspension system. 	
 Test (inner and outer Tie rods) for normal working as per Manufacturer's recommendation and procedures. 		
• Determine steering fluid characteristics for normal performance applying Manufacturer's recommendation and procedures.		
Determine power steering pump belt for normal performance		

	applying SOPs				
E-2 Check for faults in the steering column and connections	 Trainee will be able to: Perform servicing on steering system by applying Manufacturer's recommendation and procedures. Remove worn parts including: tie rods, idler arms, center links, pitman arms, pitman shaft, seals, entire racks from steering system Manufacturer's recommendation and procedures. Replace Steering system parts Manufacturer's recommendation, Diagnose faulty/wear and tear part related with steering system applying SOPs, Perform after service test to determine normal working steering system applying prescribed methods of testing. 	 Trainee will be able to: Describe Specific safety precautions and guidelines necessary to perform steering system, Interpret repair manuals to steering service and repair section, Identify tools and equipment's required to repair and replace parts of steering system. 	Total: 12hrs. Theory: 2.4hrs. Prac	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Lifting source Multi-meter scanner 	Class room and Institute's workshop

			ti c a I 9 6 h r s		
E-3 Replace Suspension Bushes	 Trainee will be able to: Identify bushes in suspension system of vehicle applying prescribed SOPs, Inspect suspension bushes for normal function applying SOPs, Remove suspension bushes using prescribed SOPs. Perform servicing on suspension system applying SOPs, Replace bushes from suspension systems Manufacturer's 	 Trainee will be able to: Describe Specific safety precautions and guidelines necessary to replace suspension bushes, Interpret suspension section of repair manual, Identify suspension system, Describe uses and necessity of suspension bushes, Select tools and equipment's required to diagnoses faults in 	T o t a l : 1 0 h r s . T h e o r y : 2	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Lifting source Hydraulic Press 	Class room and Institute's workshop

	 Perform after service test to determine normal working of bushes applying prescribed methods of testing. 	suspension system.	h r r a c ti c a l 8 h r s		
E-4 Replace Suspension Links	 Trainee will be able to: Locate linkage in suspension system of vehicle applying Manufacturer's recommendation Inspect suspension bushes for normal function as per Manufacturer's recommendation Remove linkage from suspension using prescribed 	 Trainee will be able to: Describe Specific safety precautions and guidelines necessary to replace suspension bushes, Interpret repair manuals to suspension bush replacement section, Identify tools and equipment's required 	T o t a ! 1 2 h r s T h	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Lifting source Hydraulic Press 	Class room and Institute's workshop

	 Manufacturer's recommendation and procedures. Replace linkage of suspension systems as per manufacturer's recommendation, Perform after service test to determine normal working of linkage applying prescribed methods of testing. 	 to replace suspension linkage, Describe uses and necessity of suspension linkage, Identify tools and equipment required to remove from and fix in suspension system, 	e o r y : 2 . 4 h r s . P r a c ti c a I 9 . 6 h r s .		
E-5 Replace Shock Absorber	 Trainee will be able to: Identify shock absorber in suspension system of 	 Trainee will be able to: Describe Specific safety precautions 	T O t	 Tool trolley Personal protective	Class room and Institute's

			1 2 h r s		
E-6 Replace Leaf Spring	 Trainee will be able to: Identify leaf spring in suspension system Inspect leaf spring normal function as per manufacturer's recommendation, Remove leaf spring as per manufacturer's recommendation, Perform servicing on leaf spring as per manufacturer's recommendation, Perform servicing on leaf spring as per manufacturer's recommendation, Reinstall leaf spring in vehicle Perform after service test to determine normal working of leaf spring as per manufacturer's 	 Trainee will be able to: Describe Specific safety precautions and guidelines necessary to replace leaf spring, Interpret schematics of repair manual, Identify tools and equipment required to work on leaf spring, Describe uses and necessity of leaf spring Identify tools, equipment and consumables required to work on leaf spring. 	T ot al: 1 3 h r s . T h e o r y : 2 . 6 h r	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Lifting source 	Class room and Institute's workshop
	recommendation, • Of testing.		s P r a c ti c a I 1 0 · 4 h r s		
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E-7 Perform Wheel Balancing	 Trainee will be able to: Drive vehicle to the identify wheel balancing applying prescribed methods of testing, Remove the wheel from vehicle as per manufacturer's recommendation, Perform wheel balancing following 	 Trainee will be able to: Describe precautionary measures adopted while automobile wheel alignment, Describe necessity of wheel alignment, Enumerate procedure of wheel alignment, 	T o t a l : 9 h r s T h	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Lift four post Wheel Alignment Machine 	Class room and Institute's workshop

	 Reinstall balanced wheel on vehicle as per manufacturer's recommendation, Perform after wheel balancing test drive to determine wheel alignment correctness. 	 Identify parts of wheel alignment machine, State operation and controls of wheel alignment machine, Interpret wheel alignment machine operation manual, Interpret repair manuals to perform vehicle wheel alignment, Identify tools equipment & consumable required to perform wheel balancing. 	e o r y : 1 . 8 h r s . P r a c ti c a l 7 . 2 h r s . P		
L-o Perform Wheel Alignment Road	 Drive vehicle to the identify wheel alignment 	Describe precautionary	o t	Personal protective	room and Institute's

Test	 applying prescribed methods of testing, Drive vehicle on to the plate form of wheel alignment machine (Turn Table) precisely, Input vehicle data to the wheel alignment machine to the Perform wheel alignment following manufacturer's recommendation, Remove vehicle from wheel alignment machine safely, Perform after alignment test drive to determine correct wheel alignment. 	 measures adopted while automobile wheel alignment, Describe necessity of wheel alignment, Enumerate procedure of wheel alignment, Identify parts of wheel alignment machine, State operation and controls of wheel alignment machine, Interpret wheel alignment machine operation manual. Interpret repair manuals to perform vehicle wheel alignment, Select tools equipment and consumable required to perform wheel alignment. 	a i: 8 h r s • 1 • 1 • • • • • • • • • • • • •	equipment's (PPEs) SST Lifting Source – (Lift Two post) Wheel Balancing Machine	workshop
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Module F Title: Maintain Transmission System

Objective of the Module: Automotive technician identifies the competencies required to maintain transmission system including identification of transmission system operation, changing of transmission fluid, Replacement of transmission fluid filter, Replacement of transmission system mountings, Perform automatic transmission over hauling, replacement of clutch system components, repairing of gear box, replacement of automatic transmission shift lever bushes, replacement of CV joints, Re-installation of propeller shaft, and adjustment of differential backlash

Duration	Theory:			Practice			Credit
142 hours	28.4 hours		113.6 hours			14	
Learning Unit	Learning Outcomes	Learning Elements		Duration	Tool/Equipmen t Material Required	Le	arning Place
F-1 Verify transmission operation	Trainee will be able to: • Check vehicle for identification of	Trainee will be able to: • Describe precautionary measures adopted while	To 12 hrs hrs	tal: hrs. Theory: 2.4 s. Practical 9.6 s.	 Valid driving license Driving Authority letter Lifting Source – 	Clas Insti worł	s room and tute's (shop

transmission type, • Perform basic physical inspection of transmission system, • Determine performance of vehicle transmission performance, • Diagnose faults in Transmission system of the vehicle.	 working on transmission system of vehicle, Differentiate between manual and automatic transmission of automobile, Describe working principle of manual and automatic transmission of automobile, Describe main components of manual transmission system, 	• Scanner
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	 Interpret schematics of manual and automatic transmission systems of automobile, 		
	• Describe symptoms/cau ses of trouble in manual transmission system of the vehicle,		
	• Describe symptoms/cau ses of trouble in Automatic transmission system of the vehicle,		
	 Describe techniques and procedures of diagnosing faults due to electrical malfunctioning 		

		in transmission system of automobile, • Select tools, equipment and consumables required for working on transmission system of vehicle.			
F-2 Change automatic transmission fluid(ATF)	Trainee will be able to: • Identify Transmission fluid drain mechanism / sump, • Determine transmission fluid characteristics prescribed method, • Remove transmission	Trainee will be able to: • Describe precautionary measures adopted for ATF change in vehicle, • Describe Tools, equipment and consumables used for ATF change,	Total: 12 hrs. Theory: 2.4 hrs. Practical 9.6 hrs.	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Waste oil Container Lifting source (Two Post) 	Class room and Institute's workshop

	 fluid from system without spoilage, Clean automatic transmission fluid strainer according to repair manual, Pour recommended quantity of fluid into transmission system without spoilage, Dispose of used transmission fluid as per manufacturer' s recommendati ons 	 Explain importance of following ATF change schedule, Explain techniques for dismantling automatic transmission oil sump. 			
F-3	Trainee will be able	Trainee will be able	Total:	 Tool trolley 	Class room and

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Replace automatic transmission fluid filter	to: • Locate ATF filter on vehicle , • Remove ATF filter from vehicle , • Install ATF filter in the vehicle according to Manufacturer' s recommendati on.	 to: Describe precautionary measures adopted for ATF change in vehicle, Differentiate between automatic transmission fluid filter & Steiner, Explain importance of following ATF change schedule, Describe schedule, Describe schedule of oil filter change as per manufacturer' s recommendati ons. Select SST for oil filter 	13 hrs. Theory: 2.6 hrs. Practical 10.4 hrs.	 Personal protective equipment's (PPEs) SST Repair Manual Waste oil Container Lifting source (Two Post) 	Institute's workshop

		 change Explain techniques for dismantling automatic transmission oil sump, Explain techniques for replacement of automatic transmission fluid filter. 			
F-4 Replace transmission mountings	 Trainee will be able to: Locate transmission mounting on vehicle , Remove mountings from transmission system as per Diagnose faulty wear and tear mounting applying 	Trainee will be able to: • Describe precautionary measures adopted for replacement of transmission mountings in automobile, • Describe Tools, equipment and	Total: 11hrs Theory: 2.2 hrs. Practical 8.8 hrs.	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Hydraulic Jack 	Class room and Institute's workshop

	 manufacturer's Recommendati on. Re-Install mountings in the transmission system vehicle according to Manufacturer's recommendati on, Perform test drive to determine functioning of transmission mounting , 	consumables used for replacement of transmission mountings in automobile, • Describe problems accrued due to damage transmission mountings • Describe techniques for dismantling of transmission mountings • Describe techniques for removing transmission mounting.			
F-5 Replace Automatic Transmissions Shift lever button	Trainee will be able to: • Locate Shift lever button on vehicle ,	Trainee will be able to: • Describe precautionary measures	Total: 11hrs Theory: 2.2 hrs. Practical 8.8 hrs.	 Tool trolley Personal protective equipment's (PPEs) 	Class room and Institute's workshop

 Remove Shift lever button from transmission system of vehicle applying proper method, Install shift lever button in transmission system of vehicle according to Manufacturer' s recommendati on, Test shift lever button for normal operation. 	adopted for replacement of Shift lever button in automobile, • Describe Tools, equipment and consumables used for replacement of Shift lever button in automobile, • Discuss about possible problems occurrence due to damaged Shift lever button in automobile, • Explain techniques for dismantling of	• SST • Repair Manual	
	dismantling of Shift lever		

		button. • Enumerate method of removing shift lever button.			
F-6 Perform automatic transmission overhauling	 Trainee will be able to: Apart manual transmission system installation from vehicle, Dis-engage transmission system from vehicle, Dismantle transmission system part, Take measurement s of automatic transmission components, Diagnose faulty wear 	Trainee will be able to: • Describe precautionary measures adopted to perform automatic transmission system over hauling in automobile, • Explain mechanical measuring units, • Demonstrat e use of automobile shop measuring instrument, • Explain	Total: 14hrs Theory: 2.8 hrs. Practical 11.2 hrs.	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Waste oil Container Lifting source (Two Post) Multi-meter Hydraulic jack Transmission overhauling Stand 	Class room and Institute's workshop

 and tear related with gear box Manufacturer' s recommendati on Perform servicing on manual transmission system, Connect automatic transmission mechanical components, Connect automatic transmission electrical components, 	measurement techniques for automatic transmission system of automobile, • Describe function of automatic transmission system mechanical parts, • Describe function of automatic transmission system electrical parts, • Enumerate automatic
automatic transmission mechanical components, • Connect automatic	Describe function of automatic transmission system electrical parts
transmission electrical components, • Re-Install automatic transmission system on	Enumerate automatic transmission installations removal steps,
vehicle,Perform test	Explain techniques for overhauling

	drive to determine functioning of transmission system.	 automatic transmission, Select tools, equipment & consumable according to the repair manual, Adopt proper method for dismantling and assembling of automatic transmission according to repair manual. 			
F-7 Replace clutch system components (Manual Transmission)	Trainee will be able to: • Locate clutch system components (e.g. Clutch, master cylinder, fly wheel, clutch plate, finger	Trainee will be able to: • Describe precautionary measures adopted for replacement of Shift lever button in	Total: 11hrs Theory: 2.2 hrs. Practical 8.8 hrs.	 Tool trolley Personal protective equipment's (PPEs) SST Repair Manual Lifting Source 	Class room and Institute's workshop

plate etc.) On vehicle. • Remove components from clutch	automobile, Interpret schematics of clutch 	Hydraulic jack
system of vehicle applying proper method,	 automobile, Describe possible problems occurrence 	
 Diagnose faulty/wear and tear related with clutch system applying manufacturer' s recommendati on 	due to faulty clutch system in automobile, • Describe techniques for dismantling of clutch system components in automobile,	
 Take measurement s of clutch components, 	 Select tools, equipment and consumables used for 	
 Perform servicing on clutch system, Re-Install 	replacement of clutch system components in automobile.	

	clutch system in vehicle according to Manufacturer' s recommendati on, • Test clutch system for normal operation.				
F-8 Perform Manual Transmission overhauling	Trainee will be able to: • Locate gear components (e.g. input shaft, output shaft, output shaft Shift levers, gears etc.) on vehicle , • Remove components from gear box of vehicle applying proper	Trainee will be able to: Interpret gearbox schematics of specific automobile, Describe possible problems occurrence due to malfunctioning gearbox in automobile, Describe	Total: 14hrs Theory: 2.8 hrs. Practical 11.2 hrs.	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual Hydraulic jack Transmission Overhaul stand 	Class room and Institute's workshop

 method, Take measurement s of gearbox components Diagnose faulty/wear and tear related with gear box by applying SOPs, Repair gear box using prescribed techniques 	techniques for dismantling of gearbox and its components in automobile, • Select tools, equipment and consumables used to perform repairing of automobile gearbox.		
 Re-Install gear box in vehicle according to Manufacturer' s recommendati on, Test gear system for normal operation by 			

	applying prescribed testing method.				
F-9 Replace shift lever bushes	Trainee will be able to: • Locate Shift lever bushes on vehicle, • Remove Shift lever bushes from transmission system of vehicle applying proper method, • Install shift lever bushes in transmission system of vehicle according to Manufacturer' s recommendati on,	Trainee will be able to: • Describe precautionary measures adopted for replacement of Shift lever bushes in automobile, • Interpret schematics of shift lever bushes in automobile, • Describe Tools, equipment and consumables used for replacement of Shift lever bushes in	Total: 11hrs Theory: 2.2 hrs. Practical 8.8 hrs.	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Lifting source 	Class room and Institute's workshop

	• Test shift lever bushes for normal operation,	 automobile, Describe possible problems occurrence due to malfunctioning Shift lever bushes in automobile, Explain techniques for dismantling of Shift lever bushes in automobile, Enumerate method of removing Shift lever bushes. 			
F-10 Replace constant velocity (CV) joints	Trainee will be able to: • Locate CV Joints on vehicle , • Remove CV Joints transmission	Trainee will be able to: • Describe precautionary measures adopted for replacement of Shift lever	Total: 13hrs Theory: 2.6 hrs. Practical 10.4 hrs.	 Tool trolley Personal protective equipment's (PPEs) Special Service 	Class room and Institute's workshop

system of vehicle applying proper method,bushes in automobile, • Interpret schematics of CV Joints inTools (SST) • Repair Manual • Lifting	system of vehicle applying proper method, • Install CV Joints in transmission system of vehicle according to Manufacturer' s recommendati on, • Test CV Joints for normal operation.	bushes in automobile, • Interpret schematics of CV Joints in automobile, • Select tools, equipment and consumables used for replacement of CV Joints in automobile, • Describe possible problems occurrence due to malfunctioning of CV Joints in automobile, • Explain techniques for dismantling of CV Joints in automobile, • Enumerate	Tools (SST) • Repair Manual • Lifting Source
	Install CV Joints in transmission system of vehicle according to Manufacturer' s	CV Joints in automobile, • Select tools, equipment and consumables used for replacement	Source
 Install CV Joints in Select tools, equipment and vehicle according to Manufacturer' s of CV Joints 	recommendati on, • Test CV Joints for normal operation.	 in automobile, Describe possible problems occurrence due to malfunctioning of CV Joints in automobile, 	
 Install CV Joints in Select tools, equipment and consumables according to used for recommendati on, Test CV Joints for normal operation. • Describe possible problems occurrence due to malfunctioning of CV Joints in automobile, 		 Explain techniques for dismantling of CV Joints in automobile, Enumerate 	

		method of removing CV Joints.			
F-11 Reinstall propeller shaft	Trainee will be able to: • Locate propeller shaft on vehicle , • Remove propeller shaft transmission system of vehicle applying proper method, • Install propeller shaft in transmission system of vehicle according to Manufacturer' s recommendati on,	Trainee will be able to: • Describe precautionary measures adopted for propeller shaft installation in automobile, • Interpret schematics of propeller shaft in automobile, • Select tools, equipment and consumables used for installation of propeller shaft in automobile, • Discuss possible problems	Total: 10hrs Theory: 2 hrs. Practical 8 hrs.	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Lifting Source(Two post) 	Class room and Institute's workshop

	 Test propeller shaft for normal operation, 	occurrence due to malfunctioning of propeller shaft in automobile,			
		 Explain techniques for dismantling of propeller shaft in automobile, 			
		 Enumerate method of removing propeller shaft, 			
		 Enumerate method of propeller shaft re-installation. 			
F-12	Trainee will be able	Trainee will be able	Total:	Tool trolley	Class room and
Adjust differential	to:	to:	10 hrs. Theory:	Personal	Institute's
backlash	 Locate differential backlash on vehicle , Determine adjustment of 	 Describe precautionary measures adopted for differential backlash of 	2 hrs. Practical 8 hrs.	protective equipment's (PPEs) • Special Service	workanop

differential backlash of vehicle for normal function applying proper method, • Perform servicing of for normal function, Adjust differential backlash for normal function of differential according to Manufacturer' s recommendati on • Test normal operation of differential after backlash adjustment	 automobile, Identify differential backlash and related parts, Interpret schematics of differential backlash, Describe common Tools, SSTs, equipment and consumables used for installation of differential backlash. Describe possible problems occurrence due to malfunctioning of differential backlash in automobile, 	Tools (SST) • Repair Manual • Lifting Source (Two post) • Differential stand • Dial gauge
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• Describe techniques for dismantling of differential backlash in automobile,		
 Enumerate method of removing differential backlash. 		
 Enumerate method of differential backlash adjustment 		

Module G Title: Maintain Brake System

Objective of the Module: This Module (G) of competency standards for Auto motive technician identifies the competencies required to perform maintenance of brake system of vehicles according to Manufacturer Instructions including verification of brake specification, brake inspection, replacement of brake system parts (e.g. brake boosters, wheel cylinder, calipers, discs, drums etc.) This module also includes servicing, bleeding & adjustment of the vital safety system of a vehicle

Duration	Theory:	Practice	Credit
122 hours	24.4 hours	97.6 hours	12

Learning Unit	Learning Outcomes	Learning Elements	D u r a t i o n	Tool/Equipment Material Required	Learning Place
G-1 Verify brake	Total: 11hrs Theory: 2.2 hrs.	Trainee will be able to: • Describe precautionary	Т 0 +	Tool trolleyPersonal protective	Class room and
specification	Practical 8.8 hrs.	measures adopted for while working on brake system of automobile	ו a l :	equipment's (PPEs) Special Service Tools (SST) 	workshop
		 Describe types brake systems in automobile Differentiate braking systems according to technology applications 	1 3 h r s	 Repair Manual Lifting Source (Two post) Differential stand 	
		 Describe working of braking system Describe component of drum brakes 	Theory: 2.6	• Dial gauge	

			h r s r a c t i c a l 1 0 4 h r s		
			S		
G-2 Perform brake inspection	 Trainee will be able to: Inspect brake pads/ brake shoes wear tear as per manual. Inspect disc pads applying SOPs Inspect master 	 Trainee will be able to: Describe component of disc braking system Describe component of hydraulic Braking system Describe component of ABS 	T o t a i 3 h	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Lifting Source (Two 	Class room and Institute's workshop

 Inspect wheel cylinder applying SOPs 	 parking brake system Describe the function of parking brakes Tabulate reaction and distance braking ratio Describe replacement 	 S Vernier Caliper, Micrometer, T h Dial gauge e o r
	brake pads / brake shoes as per Manufacturer's recommendation	y : 2 . 6 h r s . P r
		a c t i i c a l l 1 0

			r s		
G-3 Replace brake booster	 Irainee will be able to: Locate brake booster on vehicle Remove brake booster of vehicle applying proper method re-install brake booster in vehicle according to manufacturer's recommendation Test brake booster for normal operation. 	 Describe Tools, equipment and consumables used for replacement of brake booster in automobile Describe possible problems occurrence due to damaged brake booster in automobile Describe techniques for dismantling of brake booster in automobile Enumerate method of removing brake booster 	Total : 10hrs Theory : 2hrs. Pra	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Brake bleeding unit 	Class room and Institute's workshop

			cti ca l 8 h r s.		
G-4 Replace brake master cylinder	 Trainee will be able to: Locate master cylinder on vehicle Remove master cylinder of vehicle applying proper method Re-assemble master cylinder in vehicle according to Manufacturer's recommendation. Test master cylinder for normal operation by applying manufacturer's recommendation 	 Trainee will be able to: Describe Tools, equipment and consumables used for replacement master cylinder in automobile Describe possible problems occurrence due to damaged master cylinder in automobile Describe techniques for dismantling of master cylinder in automobile Enumerate method of removing master cylinder 	T ot a I i 1 3 h r s . T h e o r y :	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Brake bleeding unit Special Service Tools (SST) 	Class room and Institute's workshop

			2.6 hrs. Practical 10.4 hrs		
			S		
G-5 Replace wheel cylinders	Trainee will be able to: • Remove wheel cylinder of vehicle applying manufacturer's recommendation	 Trainee will be able to: Describe Tools, equipment and consumables used for replacement of wheel 	T o t a I :	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) 	Class room and Institute's workshop

 Re-install wheel cylinder of vehicle according to Manufacturer's recommendation Test wheel cylinder for normal operation 	 cylinder in automobile Describe possible problems occurrence due to damaged wheel cylinder in automobile Describe techniques for dismantling of wheel cylinder in automobile Enumerate method of removing wheel cylinder 	 Repair Manual Brake bleeding unit Lifting Source (Two Post) Washing tray Washing tray Washing tray Y 2 4 h r s . P r a c a I 9 .
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			6 h r s		
G-6 Replace brake calipers	 Trainee will be able to: Locate brake calipers on vehicle Remove brake calipers of vehicle applying proper method Install brake calipers of vehicle according to Manufacturer's recommendation Test brake calipers for normal operation 	 Trainee will be able to: Describe Tools, equipment and consumables used for replacement of brake caliper Describe possible problems occurrence due to damaged brake calipers Describe techniques for dismantling of brake calipers Enumerate method of removing brake calipers 	Total : 13hrs. Theory : 2.6hrs	 Tool Trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Brake bleeding unit Lifting Source (Two Post) Washing tray 	Class room and Institute's workshop

			. P ractical 10.4hrs.		
G-7 Replace brake Discs/Drums	Trainee will be able to: • Locate brake Discs/drum on vehicle • Remove brake Discs/drum of vehicle applying proper method • Install brake Discs/drum of vehicle according to	 Trainee will be able to: Describe Tools, equipment and consumables used for replacement of brake Discs/drum Describe possible problems occurrence due to damaged brake Discs/drum Describe techniques for 	T o t a l : 1 3 h r s	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Lifting Source (Two Post) 	Class room and Institute's workshop

Manufacturer's recommendation • Test brake Discs/drum for normal operation	dismantling of brake Discs/drum Enumerate method of removing brake Discs/drum	T h e o r y : 2 . 6 h r s . P r a c t i 1 0 . 4 h

G-8 Service Brake Hoses, Pipes, Lines	 Trainee will be able to: Locate Brake line parts in vehicle Re-install brake fluid reservoir. Detect brake fluid leakage by applying prescribed leakage detection procedures Inspect connection of brake lines to the wheel assembly Remove brake lines to the wheel assembly Remove brake lines Manufacturer's recommendation Re-Install brake lines Manufacturer's recommendation Remove slack out of the brake lines safely Test brake lines for normal function as per Manufacturer's recommendation 	 Trainee will be able to: Describe possible problems occurrence due to damaged brake lines in automobile Enumerate method of removing brake lines Explain techniques for dismantling of brake lines in automobile Interpret brake system connections as per Manufacturer's recommendation Select Tools, equipment and consumables used for replacement of brake lines in automobile 	Total : 12hrs. Theory : 2.4hrs. Pra	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Lifting Source (Two Post) Washing tray 	Class room and Institute's workshop
			c t c a l 9 6 h r s		
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G-9 Perform Brake system air bleeding	 Trainee will be able to: Confirm need to bleed the brake system as per manufacturer's recommendation Position vehicle on a flat surface safely Perform air bleeding Manufacturer's recommendation 	 Trainee will be able to: Describe precautionary measures adopted for while performing air bleeding on brake system Describe necessity of air bleeding in vehicle State steps of air bleeding Describe Tools, equipment and consumables used to perform air bleeding on automobile 	T o t a l : 1 3 h r s . T h e o r	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Lifting Source (Two Post) Washing tray Brake system Air Bleeding unit 	Class room and Institute's workshop

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G-10 Adjust parking brake	Trainee will be able to: • Check Parking brake performance for normal operation	Trainee will be able to: • Describe Tools, equipment and consumables used for	T o t a	 Tool trolley Personal protective equipment's (PPEs) 	Class room and Institute's workshop

 Perform servicing on parking brake cable as per Manufacturer's recommendation Perform adjustment of Parking brake cable on optimum position as per Manufacturer's recommendation Test brake for normal operation 	 adjustment of parking brake Describe possible problems occurrence due to defective parking brake Explain techniques for dismantling of parking brake cable of automobile Enumerate re- assembling of parking brake cable 	 I Special Service Tools (SST) 1 Repair Manual 0 Lifting Source (Two Post) s T h e o r y i
		2 h r s P r a c t t i c a l

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Module H Title: Perform On-board Diagnostic

Objective of the Module: This Module (H) of competency standard for Auto motive technician identifies the competencies required to perform vehicles on board diagnosis according to Manufacturer recommendations including vehicle scanning, fault detection in vehicle electronic system, resetting of service intervals, replacement of electronic control unit, sensors, and actuators and performing on board manual diagnostic

Duration	Theory:	Practice	Credit
73 hours	14.6 hours	58.4 hours	7

Learning Unit	Learning Outcomes	Learning Elements	D u r a t i o n	Tool/Equipment Material Required	Learning Place
H-1	Trainee will be able to:	Trainee will be able to:	т	Seat Cover, Floor Mat	Class

Perform vehicle scanning	•	Prepare vehicle for scanning using specific method mentioned in Manufacturer's recommendation Connect Data Link Cable with vehicle diagnostic connector. Using specified method mentioned in service manual. Set the scanning system according to the specific vehicle Perform scanning of vehicle	•	Describe precautionary measures adopted for while performing on board scanning Describe parts of on board scanning system Describe method of on board scanning Describe the function of the scanner. Describe the method of connecting data link cable Select tools, equipment and consumables required for vehicle scanning	otal: 12hrs.Theory:2.4hrs.Pract	• Scanner • Repair Manual	room and Institute's workshop

			i c a I 9 6 h r s		
H-2 Detect faults in vehicle Electronic Systems	 Trainee will be able to: Interpret vehicle data for diagnosing Collect Engine electrical data of vehicle through OBD scanning applying techniques Manufacturer's recommendation Collect electrical data of vehicle through OBD scanning applying Manufacturer's recommendation Collect vehicle through OBD scanning applying Manufacturer's recommendation 	 Trainee will be able to: Describe the method of connecting data link cable Describe the method of connecting data link cable with diagnosis connector Describe types of warning lights in instrument cluster Explain method of data retrieving for vehicle fault diagnosis Explain data retrieving procedure for diagnosing of vehicle. Interpret OBD program 	T o t a l : 1 3 h r s . T h e o r y :	 Seat Cover, Floor Mat Scanner Repair Manual 	Class room and Institute's workshop

	 chassis electrical data through OBD scanning applying Manufacturer's recommendation Collect vehicle body electrical data through OBD scanning applying Manufacturer's recommendation Retrieve collected electrical data applying techniques given in scanner manual. 		2. 6 h r s. P r a c t i c a I 10 4 h r		
			r s		
H-3 Reset Service Intervals	 Trainee will be able to: Select the vehicle data for resetting service interval Perform equipment 	 Trainee will be able to: Identify service interval as per maintenance manual Describe method of Backing up vehicle data 	T o t a I :	 Seat Cover, Floor Mat Scanner Repair Manual 	Class room and Institute's workshop

•	setting for vehicle data resetting Back up vehicle service data on prescribed location Delete previous data from vehicle on costumer's demand,	•	Describe method of deleting vehicle service intervals. Describe steps for performing service intervals resetting	1 2 h r s T h	
•	costumer's demand, applying methods recommended in Manufacturer's recommendation Perform service intervals resetting applying methods as per Manufacturer's recommendation			e r y : 2 4 h r s P r a	
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			6 h r s
H-4 Replace Electronic Control Unit (ECU)	 Trainee will be able to: Locate ECU in the vehicle Turn the ignition switch on Unplug electrical connector of electronic control unit Remove electronic control unit Re-install ECU in vehicle Re-install ECU in vehicle as per Manufacturer's recommendation Perform synchronization with the help of scanner according to repair manual manufacturer's recommendation 	 Trainee will be able to: Describe the method of connecting data link cable Interpret possible errors. Explain the function description electronic control unit. Explain handling of electrical connectors of electronic control unit. 	T• Tool trolleyClass room and Institute's workshopi• Personal protective equipment's (PPEs)Institute's workshopi• Special Service Tools (SST)•1• Repair Manual4• Scannerrsr•r•y•2•8•h•r•s•s•s•

			P r a c t i c a l 1 1 2 h r s		
H-5 Replace Sensors	 Trainee will be able to: Locate sensors (e.g. Crankshaft position sensor, Camshaft position sensor, Airflow sensor, Throttle position sensor etc.) Remove sensors from the vehicle Connect sensors in the vehicle applying 	 Trainee will be able to: Describe the method of connecting data link cable Describe types of sensors and their locations Describe functioning of sensors Describe handling of electrical connectors of electronic control according to 	T o t a I : 1 2 h r s T	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Scanner 	Class room and Institute's workshop

	 manufacturer's recommendation Perform synchronization with the help of scanner according to Manufacturer's recommendation 	Manufacturer's recommendation • Interpret repair manual	h e o r y : 2 . 4 h r s . P r a c t i c a I 9 . 6 h r s .		
H-6	Trainee will be able to:	Trainee will be able to:	T	Tool trolley	Class

Replace	•	Locate actuators	•	Describe functioning of	0	Personal protective room and
vehicle Actuators		(e.g. idle speed		actuators	t a	equipment's (PPEs) Institute's
		variable valve timing	Describe typical actuators in vehicle	I :	Special Service Tools (SST)	
		motor, gear shifting solenoid etc.) in	•	Describe manual testing procedure of actuators	1 0	Repair ManualScanner
	•	vehicle Remove actuators	•	Describe procedure of actuators testing with the	h r	Multi-meter
	•	Detect faulty actuator		help of scanner	S	
		in vehicle applying manufacturer's			T h	
		recommendation			e	
	•	Connect actuator in			0 r	
		manufacturer's			y	
		recommendation			:	
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H-7 Perform on- board manual diagnostic	 Trainee will be able to: Locate manual diagnostic connector Diagnose trouble part of the vehicle with the help of on board manual diagnoses 	 Trainee will be able to: Interpret diagnostic manual Interpret diagnostic codes Describe repairs as per service manual 	Total: 10hrs. Theory: 2hr	 Special Service Tools (SST) Repair Manual 	Class room and Institute's workshop

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Module I Title: Perform Engine Overhauling

Objective of the Module: This Module (I) of competency standard for Auto motive technician identifies the competencies required to perform engine operation test to identify engine malfunction, verify faulty engine parts and components. Perform complete engine overhauling according to Manufacturer's recommendation

Duration Theory:		Practice	Credit	
106 hours	106 hours 21.2 hours		11	

ſ	Learning Unit	Learning Outcomes	Learning Elements	D	Tool/Equipment	Learning
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			r a ti o n	Material Required	Place
I-1 Perform Engine Compression Test	 Trainee will be able to: Perform under bonnet cleaning by applying prescribed cleaning methods Perform a visual inspection of engine to determine physical condition /wear and tear Station vehicle for engine removal. Determine engine performance by listen to the sounds/Noises coming out from engine Perform engine compression test (with the help of assistant) applying manufacturer's 	 Trainee will be able to: Describe precautionary measures adopted for performing engine tests Describe working principle of different engines Identify parts of Petrol engine Identify parts of 4 stroke Petrol engine Identify parts of 2 stroke Petrol engine Identify parts of diesel engine Identify parts of diesel engine Describe construction and function of Engine parts Explain in detailed usage of engine compression tester step by step. 	T ot al: 1 1 h r s . T h e o r y : 2 . 2 h r s	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Engine compression Tester 	Class room and Institute's workshop

	recommendation • Perform engine wet compression test by applying manufacturer's recommendation	 Describe steps of performing dry compression test Describe steps of performing wet compression test Interpret engine testing as per Manufacturer's recommendation Interpret engine inside and outside pictorials 	P r a ti c a l 8 8 h r s		
I-2 Perform engine oil pressure test	 Trainee will be able to: Station vehicle for performing engine oil pressure test Make arrangements to perform oil pressure test Perform oil pressure test on engine by applying manufacturer's 	 Trainee will be able to: State the reason of performing engine oil tests Describe installation method of oil pressure gauge Interpret oil pressure gauge Describe steps to perform engine oil pressure test 	T ot a I: 1 h r s T h e	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Engine oil pressure Tester RPM Meter 	Class room and Institute's workshop

	recommendation • Document outcomes of oil pressure test	• Describe steps of performing wet compression test	or y: 2 h r s P r a c ti c a I 8 8 h r s		
I-3 Remove engine from vehicle	Trainee will be able to: • Position vehicle as per Manufacturer's	Trainee will be able to:Describe precautionary measures adopted for	T o t a	 Tool Trolley Personal protective equipment's (PPEs) 	Class room and Institute's

recommendation	removing engine from	I:	Special Service Tools workshop
Remove electrical	venicie	1	(SST)
connectors without	 Describe engine 	3	Repair Manual
damage	removing procedure as	h	e Engine lifting jook
 connectors without damage Remove peripheral /parts attached/connected with the engine Remove engine mountings Manufacturer's recommendation. Lift engine from vehicle with the help of an assistant Place engine on over-bauling 	 Describe engine removing procedure as per service manual. 	3 h r s T h e o r y : 2 6 h	 Repair Manual Engine lifting jack
table/stand.		r	
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I-4 Dismantle engine components	Trainee will be able to: • Document engine information • Drain fluids from Engine Manufacturer's recommendation • Remove Following by applying Manufacturer's recommendation Ignition system • Flywheel • Cylinder head • Valves • Crankcase cover • Oil pump • Camshaft and the valve lifters	 Trainee will be able to: Enumerate engine dismantling engine procedure Describe: Modified fuel-air cycle considering heat losses and valve timing Engine dynamics and torque Use of Combustion chart Thermodynamic cycle with supercharging in engines Limits of Supercharging, Methods of Supercharging and Superchargers 	T ot a I: 1 3 h r s T h e o r Y : 2 6 h	 Tool Trolley Personal protective equipment's (PPEs) SST Repair Manual Power Tool (Pneumatic) 	Class room and Institute's workshop

	 Piston Connecting rod assembly Crankshaft Bearings or seals disassembling engine 	 Fuels & combustion in SI engines knocking and fuel rating Energy balance volumetric efficiency measurement of indicated and brake horse power(BHP) Exhaust emissions and its measurement and control 	r s P r a c ti c a I 1 0 4 h r s		
I-5 Perform necessary measurement	 Trainee will be able to: Perform measurements on necessary engine components as per manufacturer's recommendation Select components to be cleaned as per 	 Trainee will be able to: Describe precautionary measures adopted while taking precision measurements. Give reason for engine inside components measurement. Describe inside parts on which measurement is 	T o t a l : 1 2 h r s	 Tool trolley Personal protective equipment's (PPEs) SST Parts Washing tray Measuring Instruments Repair Manual 	Class room and Institute's workshop

	 manufacturer's recommendation Select components to be machined as per manufacturer's recommendation Select components to be replaced by applying manufacturer's recommendation 	required while engine overhauling • Describe Tools and equipment used to perform engine physical measurements on engine parts Trainco will be able to:	T h e o r y : 2 . 4 h r s . P r a c ti c a I 9 . 6 h r s . T <tht< th=""> T T T</tht<>		Class
1 1-6	• Trainee will be able	I rainee will be able to:	T	 Tool Trollev 	

Repair engine parts	to: • Perform cylinder block service Manufacturer's recommendation, • Perform machining on engine parts as per specifications • Perform cylinder head and valve train service Manufacturer's recommendation, • Perform engine valve /valve train service Manufacturer's recommendation, • Perform engine valve /valve train service Manufacturer's recommendation, • Perform engine cam shaft/drives service as per Manufacturer's	 Describe precautionary measures adopted while working on engine components Explain trouble shooting method for 2 stroke engine Explain trouble shooting method for four stroke engine Explain trouble shooting method for diesel engine Describe machining of engine parts Select Tools and equipment and consumables/adhesives used to perform engine re assembling 	otal: 11hrs. Theory: 2.2hrs	 Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual 	room and Institute's workshop
	 Manufacturer's recommendation, Perform engine cam shaft/drives service as per Manufacturer's recommendation, Perform engine Piston service as per Manufacturer's recommendation, Perform engine Annufacturer's recommendation, Perform engine Annufacturer's recommendation, Perform engine Annufacturer's recommendation, Perform engine Annufacturer's recommendation, 	consumables/adhesives used to perform engine re assembling	2 2 h r s P r a c ti c		

	 Iubrication and cooling systems service as per Manufacturer's recommendation, Perform engine exhaust system service as per Manufacturer's recommendation, Perform engine timing as per Manufacturer's recommendation, Perform front-end service as per Manufacturer's recommendation, 		a 8 8 h r s		
I-7 Re build engine	 Trainee will be able to: Verify Measurement of all dismantle parts as per specification given in Manufacturer's recommendation Re-assemble 	 Trainee will be able to: Describe precautionary measures adopted while Re-building engine Describe engine assembly method as per service manual. Give importance of gasket 	T o t a l : 1 2 h r s	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Torque Wrench 	Class room and Institute's workshop

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engine block	 Describe usage of 	<u>.</u>		
 Install crank shaft 	torque wrench.			
and its peripherals	 select gaskets 	n e		
 Install the timing 	 Identify cylinder head 	0		
chain or belt to	components	r		
specification	 Described method of 	У		
 Install pistons, 	cylinder head	:		
rings, gaskets, and	components.	2		
seals	Select Tools,			
 Assemble cylinder 	equipment and	4 h		
head components as	consumables/adhesives	r		
recommendation	used to perform engine re	s		
a Install boad gookat	assembling	·		
 Install head gasket Manufacturer's 		P		
recommendation		r a		
Install new valve in		c		
heads		ti		
Inspect re build		C		
engine for		a		
recommended		I Q		
fasteners tightness.				
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I-8	Trainee will be able	Trainee will be able to:	Т	Tool trolley	Class
Re-install engine on vehicle	 Reinstall engine on vehicle by applying manufacturer's recommendation Fasten engine on the chassis as per Manufacturer's recommendation. Re-connect electrical engine fittings as per manufacturer's recommendation. Re-connect fuel fittings with engine as per Manufacturer's recommendation Re-connect fuel fittings with engine as per manufacturer's recommendation Re-connect transmission with engine as per manufacturer's recommendation. 	 Describe precautionary measures adopted for engine installation Describe engine installation procedure 	• ot al: 12hrs. Theory: 2.4hrs.Prac	 Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Engine Lifting Jack 	room and Institute's workshop
			l u		

	manufacturer's recommendation. • Perform engine tune up procedure by applying manufacturer's recommendation		c a 9 6 h r s		
I-9 Test Performance after engine Overhauling	 Trainee will be able to: Go through a careful initial start-up Check engine performance as per manufacturer's recommendation Inspect engine leakage by applying manufacturer's recommendation Communicate after service precautions to the vehicle user 	 Trainee will be able to: Describe engine test performance as per specification. Described engine leakage areas. 	Tota I: 11hrs. Theor Y: 2	 Seat cover, foot mat, Valid Driving License Scanner 	Class room and Institute's workshop

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Module J Title: Maintain Vehicle Infotainment system

Objective of the Module: Overview: This competency standard (J) refers to the development of skills and competences service and repair vehicle infotainment system for example audio video device, navigation system and park assist system

Duration Theory:	Practice	Credit
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62 hours	12.4 hours	49.6 hours	6
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Learning Unit	Learning Outcomes	Learning Elements	D u r a ti o n	Tool/Equipment Material Required	Learning Place
J-1 Check Infotainment System	Trainee will be able to: • Locate infotainment	 Trainee will be able to: Describe precautionary measures adopted while 	T O t	Repair ManualSeat cover, foot mat,	Class room and Institute's
,	equipment on/in to vehicle	working on vehicle infotainment system	a I:	Multi-meter	workshop
	 Adjust audio equipment as per costumer's desire 	 Describe typical automobile infotainment equipment 	2 h r		
	 Adjust Radio channels as per costumer's desire 	 Describe working of typical automobile infotainment equipment 	s T		
	 Adjust video equipment as per costumer's desire 	 Interpret Service Manual of vehicle infotainment equipment 	h e o r		
	 Adjust navigation equipment as per costumer's desire 	 Describe Tools & equipment required to operate vehicle 	у :		

		infotainment equipment	2		
			. 4 h r s . P r a c ti c a I 9 . 6 h r s		
J-2 Replace audio Device	 Trainee will be able to: Remove audio device from vehicle by applying manufacturer's recommendation Mount audio 	 Trainee will be able to: Describe installation procedure of audio equipment Interpret (wiring) manual audio equipment 	T o t a l : 3 h	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual 	Class room and Institute's workshop

 Test performance of audio device in/on to vehicle as per manufacturer's recommendation R P r a c ti c ti c 1 0 . 4 h 	device in/on to vehicle by as per manufacturer's recommendation • Perform wiring & cabling of audio device in/on to vehicle as per schematics • Test performance of audio device in/on to vehicle as per manufacturer's recommendation	 Describe tools, equipment and consumables required to perform automotive audio equipment installation 	r • Seat cover, foot mat, s • Multi-meter T • h • e • o r y • 2 • 6 • h • r • S P r • a c ti • 1 •	
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J-3 Replace video device	 Trainee will be able to: Remove video device from vehicle as per Manufacturer's recommendation Mount video equipment in/on to vehicle as per Manufacturer's recommendation Perform wiring & cabling of video equipment in/on to vehicle as per schematics Test performance of video equipment in/on to vehicle as per Manufacturer's recommendation 	 Trainee will be able to: Describe installation procedure of video equipment Interpret (wiring) manual video equipment Describe Tools, equipment and consumables required to perform automotive video equipment installation 	Total: 13hrs. Theory: 2.6hrsPra	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Seat cover, foot mat, Multi-meter 	Class room and Institute's workshop

			c ti c a l 1 0 4 h r s		
J-4 Replace Parking Camera	 Trainee will be able to: Test performance of parking camera for normal functioning Trace Parking camera wiring/caballing Remove Parking camera from the vehicle by applying manufacturer's recommendation Re-install Parking camera on the vehicle as per 	 Trainee will be able to: Describe operation of parking camera Interpret: vehicle wiring diagram Parking camera manual Describe Tools, equipment and consumables required to replace parking camera on vehicle. 	T o t a l : 1 3 h r s . T h e o r v	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) Repair Manual Seat cover, foot mat, Scanner 	Class room and Institute's workshop

	manufacturer's recommendation. • Adjust parking camera according to manufacturer's recommendation		: 2.6 h r s P r a c ti c a l 1 0.4 h r s .		
J-5 Install navigation equipment	Trainee will be able to: • Mount navigation equipment in/on to vehicle as per manufacturer's recommendation.	 Trainee will be able to: Describe device connections Interpret safety precaution during installation of 	T 0 t 1: 1	 Tool trolley Personal protective equipment's (PPEs) Special Service Tools (SST) 	Class room and Institute's workshop

 Perform wiring & cabling of navigation equipment in/on to vehicle as per schematics Connect communication device in vehicle according to schematics Test performance of navigation equipment in/on to as per manufacturer's recommendation. Adjust navigation device as per manufacturer's recommendation 	communication device • Describe about installation procedures of interface cables • Interpret safety precaution during installation of interface cables	1 h r s T h e o r Y : 2 2 h r s P r a c ti c a l 8 8 h	 Repair Manual Seat cover, foot mat, Scanner 	
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Module K Title: Perform Communication

Objective of the Module: This competency standard is about proper communication with external and internal customers through various modes of communication.

Duration	Theory:	Practice	Crec	lit	
87 hours	17.4 hours	69.6	9		
Leanning Unit	Learning Outcomes	Learning Elements	u r a ti o n	waterials / Equipment Required	Learning Place
K-1 Practice active listening	 Trainee will be able to: perform desired physical actions on verbal commands accordingly Determine communication styles elegantly Display body 	 Trainee will be able to: Describe types of customer behaviors Describe advantages of "Less speaking & more listening" Describe verbal communication techniques 	T o t a l: 1 3 h r s		Class room and Institute's workshop

S S		 language while listening to a customer to show attention Demonstrate use of typical dictionary 	Describe advantages of being humble during conversation	T h e o r y : 2 6 h r s P r a c ti c a I 1 0 4 h r s	
-----	--	---	---	---	--
K-2	Trainee will be able to:	Trainee will be able to:	Т	Class	
------------------------------	--	--	---	-------------------------------------	
Ask appropriate questions	 Investigate issue /problem through relevant questions Demonstrate courteous behavior while listen to the people actively Record information about customer's enquiry or complaint as per company practice 	 Develop vehicle history questionnaire Describe the necessity of being polite while asking questions 	o t a l: 1 3 h r s . T h e o r y : 2 . 6 h r s P r a c ti c	room and Institute's workshop	

			a 1 0 4 h r s	
K-3 Demonstrate telephone etiquette	 Trainee will be able to: Demonstrate courteous behavior and listen actively to customer Greet at the beginning & ending of phone call Opt non- abusive and Jargons less words 	 Trainee will be able to: Describe telephonic communication ethics / norms Record information about enquiry or complaint as per company's practice 	T o t a l: 1 2 h r s T h e o r y : 2	Class room and Institute's workshop

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			. 4 h r s P r a c ti c a I 9 . 6 h r s	
K-4 Instruct semi- skilled workers	 Trainee will be able to: Opt professional & clear language for commanding Use language which labor could understand elegantly 	Trainee will be able to:Describe the methods overcome the sentiment	T o t a l : 1 2 h r s	Class room and Institute's workshop

 Assign helper his/her 		
job clearly	Т	
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K-5 Communicate with supervisor	 Trainee will be able to: Convey ideas to the supervisor precisely Report safety hazards to supervisor urgently Maintain good working relation with supervisor elegantly Help supervisors with the purchasing auto parts, tools , equipment and consumables for economical prices and timely delivery 	 Trainee will be able to: Describe the Importance of accurate communication Write work reports Fill indent form Maintain work history 	T o t a l: 1 3 h r s . T h e o r y : 2 . 6 h r s P r a c ti	Class room and Institute's workshop
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			a 1 0 4 h r s	
K-6 Maintain relations with Parts dealers	 Trainee will be able to: Apply negotiation skills while dealing with shop owner / dealer elegantly Maintain telephone/address diary up to date. 	 Trainee will be able to: Describe names and address of trade related shops/agencies/ traders / shops /dealers 	T o t a l: 1 1 h r s T h e o r y : 2	Class room and Institute's workshop

			. 2 h r s . P r a c ti c a l 8 . 8 h r s	
K-7 Perform E-Mail correspondence	 Trainee will be able to: Select appropriate medium and channels for communication and follow organization's strategy 	 Trainee will be able to: Types of communications, medium, and channels Policy and communication strategy of the organization Hierarchy of the organization and 	T o t a l : 1 3 h r	Class room and Institute's workshop

 Assign and Describe a clear task / goal with Described deadline for reply and completion 	 appropriate contacts External stakeholders/customers of the organization 	s T h e
completion • Maintain record of all communication (by phone, E-mail, Inter office memos etc.)		e o r y : 2 6 h r s P r a c ti c a I 1 0
		h r s

Module L Title: Pursue Professional Development

Objective of the Module: This competency standard refers to the development of skills and competences to meet the ever changing market demands and challenges are a key job role in the occupation of Sales and Customer Service Officer. He/she must evaluate his/her performance, attend capacity building programs and exhibit positive attitude towards attaining the organization's goals.

Duration	Theory:	Practice	Credit	
117 hours	23.4 hours	93.6 hours	11.7	

Learning Unit	Learning Outcomes	Learning Elements	Du rati on	Materials/ Equipment Required	Learning Place
L-1 Obtain automotive technician certification	Trainee will be able to: • Attend competency based automotive technician training program with at least 80% attendance and satisfaction of training providers	 Trainee will be able to: Differentiate between certified and non-certified automotive technician Describe duties of a competent technician 	Tot al: 12 hrs Th eor		Class room and Institute's workshop

	Get admit card for competency testing test/examination from concerned authority/Board	automobile technician	y: 2.4 hrs Pr act ica I: 9.6 hrs	
L-2 Maintain Driving license	Trainee will be able to: • Exhibit self-learner (at least) Light Transport Vehicle License obtained from concerned/authorized government department	Trainee will be able to:Interpret traffic signsInterpret road signs/marks	Tot al: 12 hrs Th eor y: 2.4 hrs Pr act ica I: 9.6 hrs	Class room and Institute's workshop
L-3	Trainee will be able to:	Trainee will be able to:	Tot	Class room

Attend Training programs	 Attend at plant training regularly Participate in scheduled working plan meeting courteously Attend skill up gradation training/ seminars regularly Visit assorted industrial units regularly Participate in skill competitions regularly Demonstrate to-do attitude in profession elegantly 	 Recognize the importance of Auto technician in process and manufacturing industry Describe technical regulations for process plant State the importance of teamwork State the principles of solid, semi-solid and liquid processing State the importance and application of electro chemical process 	al: 11 hrs Th eor y: 2.2 hrs Pr act ica I: 8.8 hrs	and Institute's workshop
L-4 Consult experts colleagues	Trainee will be able to: • Get technical advice from pro workers properly	Trainee will be able to:Collect plant structural data	Tot al: 12 hrs Th eor y: 2.4	Class room and Institute's workshop

			hrs Pr act ica I: 9.6 hrs	
L-5 Visit trade exhibitions	Trainee will be able to: • Report information collected from trade exhibition visit concisely	 Trainee will be able to: Recognize the purpose of visit 	Tot al: 11 hrs Th eor y: 2.2 hrs Pr act ica I: 8.8 hrs	Class room and Institute's workshop
L-6 Join trade	Trainee will be able to: • professionalism by	Trainee will be able to: • Identify the	Tot al:	Class room and Institute's

			1	
associations	joining electrical ,	objectives of trade	12	workshop
	electronics and other	association	hrs	
	related associations			
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			eor	
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			2.4	
			hrs	
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			ica	
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			9.6	
			hrs	
			-	
L-7 Interpret auto	Trainee will be able to:	Trainee will be able to:	Tot	Class room
industry			al:	and
nublications	Apply skills montions in Technical	Describe the core	12	Institute's
			12 bre	workshop
	builetins	publication	1115	
	 Adopt skill up 		Th	
	gradation suggested in		eor	
	books and websites		v:	
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			9.6 hrs	
L-8 Document work performed	 Trainee will be able to: Perform error free documentation using MS Excel Write work reports on MS office Document activity log on prescribed forms produce hard copy of work done on computer in error free format Produce basic drawing using AutoCAD Complete various reports including work orders. Maintain work shop inventory. 	 Trainee will be able to: Describe M.s office short keys Interpret log books, Manufacturer reports and other Relevant documents. Describe short keys for MS Excel Record the Basic lab. Documentation and plant data 	Tot al: 11 hrs Th eor y: 2.2 hrs Pr act ica I: 8.8 hrs	Class room and Institute's Computer Lab

L-9 Browse internet	 Trainee will be able to: Use error free language in writing letters/emails Ensure format or structure of the correspondence is according to company's practice Browse website as per desire Download related software as per desire Perform accurate communication via internet with in specified time limits 	 Trainee will be able to: Describe procedure of Creating E-mail account Describe procedure of sending E-mail Describe short keys for MS office 	Tot al: 12 hrs Th eor y: 2.4 hrs Pr act ica I: 9.6 hrs	Class room and Institute's Computer Lab
L-10 Mentor new staff	 Trainee will be able to: Motivate newly inducted staff for hard working & more learning Be polite while giving instructions Demonstrate problem solving 	Trainee will be able to: • Describe the necessity of being mentor for new staff	Tot al: 12 hrs Th eor y: 2.4 hrs	Class room and Institute's workshop

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		9	9.6	
		h	hrs	

Module M Title: Demonstrate safety

Objective of the Module: The competency standard (M) is about demonstrating skill and knowledge of personal health, safety, Tools, equipment and consumables safety, firefighting, first aid procedures, quality and environment related regulations, reaction on accidents & safe placement of automobile on work station in automotive repairing workshop.

Duration	Theory:	Practice	Credit
93 hours	18.6 hours	74.4 hours	9.3

Learning Unit	Learning Outcomes	Learning Elements	Du rati on	Tool/Equipment Material Required	Learning Place
M-1 Follow company procedures, policies	 Trainee will be able to: Review company safety SOP/Policy Demand safety equipment Check physical 	 Trainee will be able to: Describe company safety SOPs/policies ISO safety standards Safety risks & hazards 	Tot al: 12 hrs Th eor		Class room and Institute's workshop

	equipment • Wear safety equipment during operation as per requirement of SOP/policy • Keep workplace environment clean • Report safety risks and hazards • Report accident • Perform basic fire fighting	 First aid Safety equipment Reporting procedures Work permit Best safety practices Basic fire fighting 	2.4 hrs Pr act ica I: 9.6 hrs		
M-2 Wear personal protective equipment as required	 Trainee will be able to: Select personal protective equipment in terms of type and quantity according to work orders. Use personal protective equipment to ensure correct fit and optimum protection in compliance with company procedures. 	 Trainee will be able to: Describe Personal safety equipment Personal safety risk & hazards Personal health & hygiene Anger & stress management First aid Basic firefighting Injuries reporting 	Tot al: 11 hrs Th eor y: 2.2 hrs Pr act ica	 Helmet Goggle Gasmasks, Face shields Gloves(latex, cotton gloves) Overall Combination Safety Shoes 	Class room and Institute's workshop

	 Maintain personal protective equipment to ensure correct fit and optimum protection in compliance with company procedures. Ensure personal protective equipment is cleaned and stored in proper place. 	procedures House keeping Safe work habits 	I: 8.8 hrs	
M-3 Use tools and equipment according to manufacturer's specifications	 Trainee will be able to: Check machine for normal earthling Keep tools & equipment secured Manufacturer's recommendation Check oil leakage of machines Check operation of emergency levers as per scheduled Follow operating instructions discussed in machines operating manuals 	 Trainee will be able to Describe: Fire fighting First aid Storage of tools & equipment Safety covers Emergency shutdown procedure Environmental hazards Electricity hazards 	Tot al: 12 hrs Th eor y: 2.4 hrs Pr act ica I: 9.6 hrs	Class room and Institute's workshop

	 Check unusual mechanical noise Manufacturer's recommendation Stack selective tools in box/bin Place safety/dust covers on machines/ equipment when they are not in use 			
M-4 Handle hazardous materials according to guidelines	 Trainee will be able to: Store hazardous material at specified room/place according to SOPs Use hazardous materials as per instructions/ direction mentioned/printed on container/manual Report spoilage of hazardous materials immediately to the senior Dispose of hazardous material according to SOPs 	 Trainee will be able to: Describe typical hazardous materials in automobile workshop Interpret precaution mention on container of material used in automotive workshop e.g. acids, coolants, adhesives, flammable materials, grease etc. 	Tot al: 12 hrs Th eor y: 2.4 hrs Pr act ica I: 9.6 hrs	Class room and Institute's workshop

M-5 Maintain clean shop environment	 Trainee will be able to: Implement the safety culture of the department; Ensure the adherence of safe work practices Demonstrate : Application of self-tidiness after work Maintenance of workplace after work Application of scheduled cleaning/dusting Placement of tools and equipment 	 Trainee will be able to: Describe advantages of personal Hygiene Describe advantages of tidiness on work place 	Tot al: 11 hrs Th eor y: 2.2 hrs Pr act ica I: 8.8 hrs		Class room and Institute's workshop
M-6 Use firefighting equipment	 Trainee will be able to: Inform safety violation/accident before attempting to extinguish Confirm self-safety before starting to extinguish a fire Demonstrate 	 Trainee will be able to: Describe the operation of typical firefighting installations Enumerate fire extinguisher Describe stands for of P.A.S.S. (Pull, Aim, Squeeze, Sweep) 	Tot al: 12 hrs Th eor y: 2.4	 Fire Extinguishers, A, B,C Type First Aid Box Sand Buckets Fire Fighting Blanket 	Class room and Institute's workshop

	operation of : 1. Firefighting Blankets 2. Fire buckets 3. Fire extinguisher 4. Fire hose 5. Fire alarm	related with fire extinguisher	hrs Pr act ica I: 9.6 hrs	
M-7 Report safety violations	 Trainee will be able to: Communicate safety breach to the authority orally. Prepare safety violation report in writing Communicate safety breach to the authority orally. • 	Trainee will be able to: • Describe hazard reporting procedure.	Tot al: 12 hrs Th eor y: 2.4 hrs Pr act ica I: 9.6 hrs	Class room and Institute's workshop
M-8	Trainee will be able to:	Trainee will be able to:	Tot	

Station vehicle on specified work place	 Drive /Drag vehicle to workplace safely using SOPs Lift Vehicle up to desired height safely using SOPs Demonstrate operation of car lifter 	 Describe car lifting machine Differentiate mechanical and hydraulic Jacks Describe working of workshop car lifter. 	al: 11 hrs Th eor y: 2.2 hrs Pr act ica I: 8.8 hrs	Valid Driving License	
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Modules for Computer, English, Life skills, Secondary Skills and Activity

Module N: Computer Skills I Aim: Learn to use Computer effectively	See Annexure A
Module Q: English Skills I Aim: To enhance students understanding about English language for reading, listening and speaking	See Annexure B
Module P:Life Skills I	See Annexure C

Aim: Add values to technical	
skills through intra- personal	
and inter-personal skills	
Secondary skills and activities I	
Aim: To add value in monthly assessment and extra curriculum activities	See Annexure D
Module Q: English- II	
Aim: To improve their writing capacity	Soo Δηροχικό Β
and enable them to speak English	See Amexure D
language fluently	
Module N: Computer Skills II	
Aim: Get awareness of latest drawing and designing tools through computer applications used in the industry	See Annexure A
Module P: Life Skills- II	See Appevure C
Aim: Add value to technical skills	See Amexure C
Secondary skills and activities II	See Annexure D
Aim: To add value in monthly assessment and extra curriculum activities	

Module O1 Title: On-job Training (OJT)

Objective of the Module: Gain real work place experience, understanding of different job, Skills and environment.

Duration	Theory:	Practice	Credit
800 hours	0 hours	800 hours	80

Month	Recommended Rotation Plan	Applied Knowledge and Skills Related to
1	Company Orientation (Department wise)	Awareness of chain of command on the plant site, process unit wise orientation and understanding
	HSE Procedures and regulations of local authority and the company	Heath, Safety and Environment manuals and policies; Equipment specifications, study of company's safe working procedures
	Usage of PPEs as per requirements of job	as above
2		Follow checklists to ensure that all critical parts are examined
		Remove and repair or replace worn parts
	O1.2 Perform preventive Maintenance	Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately
3	O1.3 Maintain Vehicle Engine	Follow checklists to ensure that all critical parts

		are examined
		Remove and repair or replace worn parts
		Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately
4		Use testing equipment to ensure that repairs and maintenance are effective
	O1.3Repair Body Electrical System	Follow checklists to ensure that all critical parts are examined
		Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately
5		Follow checklists to ensure that all critical parts are examined
	01 4 Maintain HV/AC System	Remove and repair or replace worn parts
	01.4 Maintain HVAC System	Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately
6	O1.5 Maintain Suspension System	Follow checklists to ensure that all critical parts are examined
		Remove and repair or replace worn parts

	Ordered and installed replacement parts
	Follow repair checklist to ensure all services are completed accurately

Module O2 Title: On-job Training (OJT)

Objective of the Module: Gain self-learning, time management on job, implementation of best practices of phase I in real work place experiences, creation of solution of different critical job, improve Skills from basic to other high level and show responsible mature behavior about our environment and their protection.

Duration	Theory:	Practice	Credit
800 hours	0 hours	800 hours	80

Month	Recommended Rotation Plan	Applied Knowledge and Skills Related to
1	Review of OJT phase I	
		Follow checklists to ensure that all critical parts are examined
	O2.1 Maintain Transmission System	Remove and repair or replace worn parts
		Follow repair checklist to ensure all services are completed accurately
2	O2.2 Maintain Brake System	Follow checklists to ensure that all critical parts are examined
		Remove and repair or replace worn parts
		Ordered and installed replacement parts

		Follow repair checklist to ensure all services are completed accurately
3		Follow checklists to ensure that all critical parts are examined
	O2.3 Perform On-Board Diagnostic	Remove and repair or replace worn parts
		Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately
4		Follow checklists to ensure that all critical parts are examined
	O2.4 Perform Engine Overhauling	Remove and repair or replace worn parts
		Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately
5		Follow checklists to ensure that all critical parts are examined
	O2.5 Maintain Vehicle Infotainment System	Remove and repair or replace worn parts
		Ordered and installed replacement parts
		Follow repair checklist to ensure all services are completed accurately

6		Use testing equipment to ensure that repairs and maintenance are effective
		Follow checklists to ensure that all critical parts are examined
	Revision and Final Examination Preparation	OJT mock test
		Final Exam / Evaluation (Theory & Practical)

14. Assessment Guidance

Assessment is the process of collecting evidence and making judgments on whether competence has been achieved. This confirms that an individual can perform to the standard expected in the workplace as expressed in the nationally endorsed competency standards (where they exist); Good assessment practices should be adopted for sessional and final assessments. Such practices by vocational training providers during sessional and final assessments will form the basis of qualifying the trainees.

Difference between Sessional and Final Assessments

Sessional assessment shall be on an all-time basis. Its purpose is to provide feedback on what students are learning:

To the student: It will identify achievement and areas for further teaching and its level.

To the teacher: It will evaluate the effectiveness of teaching, and guide to determine the future plan.

Assessors need to advise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy.

Final assessment is the assessment, usually carried out on completion of a course or module. This determines whether or not the student has "passed". It is - or should be - undertaken with reference to all the objectives or outcomes of the course, and is often fairly formal. Considerations of security - ensuring that the student who gets the credit is the person who did the work - assume considerable importance in final assessment.

Methods of Assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For work place lessons, assessment will focus on the quality of planning and executing the related process along with the quality of the product and/or evaluation of the process.

Direct assessment

Direct assessment is the most desirable form of assessment. For this, evidence shall be obtained by directly observing the student's performance.

Examples for direct assessment of an Automotive Technician will include:

Work performances, for example the application of fault Automotive Technician diagnostic techniques

Demonstrations, for example demonstrating the vehicle/engine system operation, function with the help of OBD/TMDEs,

circuit diagrams, repair, service manuals and flow charts.

Direct questioning, where the assessor will ask the student how to select the tool, equipment/safety equipment for going

before any repair/ service performance

Paper-based tests, such as multiple choice or short answer questions at entrepreneurship, hygienic and safety issues,

communicating and working with other.

Practical competency sheet / Portfolio / Handouts as of evidence, such as compilation of all work done during the course.

Indirect assessment

Indirect assessment shall be used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of an Automotive Technician will include:

Selection of accurate products on the basis of market survey.

Taking all health and safety measures in workplace.

Maintenance of automobile system. The methods adopted to maintain the Equipment & tools and housekeeping.

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work produced by the person being assessed).

Principles of Assessment

All assessments must be valid, reliable, fair and flexible:

- **Fairness** means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information. Provide all learners with an equal opportunity for and access to assessment
- **Validity** means that a valid assessment assesses what it claims to assess. For example, if the ability to do a specific gear cutting, the assessment should involve performance criteria that are directly related to gear cutting techniques. An interview about setting of milling machine would not meet the performance criteria.
- **Reliability** means that the assessment is consistent and reproducible. For example, if the preparation procedure of workplace/services area has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.
- **Flexibility** means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

15. Assessment Strategy for Automotive Technician

This curriculum consists of 17 modules:

Module A: Perform Preventive Maintenance Module B: Maintain Vehicle Engine Module C: Repair Body Electrical System Module D: Maintain HVAC System Module E: Maintain Suspension System Module F: Maintain Transmission System Module G: Maintain Brake System Module H: Perform On-board Diagnostic Module I: Perform Engine Overhauling Module J: Maintain Vehicle Infotainment system Module K: Perform Communication Module L: Pursue Professional Development Module M: Demonstrate safety Module N: Computer Skills Module P: Life skills Module Q: English Language Module Secondary Skills and Activity

Suggestions for sessional assessment

• The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Suggestions of final assessment

• Final assessment shall be in two parts:

Theoretical assessment

The final theoretical assessment shall consist of multiple choice and short answer questions, covering all modules.

Practical assessment

For practical assessment, proper procedures of services, management of repair, measurements, health & safety shall be selected to assess the competencies of student expected to be gained after this training course.

(The final assessment marks shall contribute to the final qualification).

It is also proposed that the assessment may take place in such a way that covers each of the modules. Time and markings may be distributed according to the importance of module that is reflected from the time invested during teaching.

The distribution of time and markings for assessment are given below:

Distribution of time and marking of assessment					
Modules	Total	Out of Total Hours/Markin g	Practical	Recommen ded Methodolo gy	Schedule of Assessment

Module A	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module B	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module C	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module D	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module E	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module F	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test

Module G	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module H	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module I	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module J	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module K	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Module L	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test

Module M	6.5 hrs.	2.5 hrs.	4	 Written Checking the Job Viva Voce 	Monthly Test
Total	84.5 hrs.	32.5 hrs.	52		

Few examples that examiner may use for the assessment are given below:

Module		Practical	Theory	
Module A	Perform Preventive Maintenance	Trainee will be able to:	Trainee will be asked for:	
Maintenance A-1 Follow vehicle specific original equipment manufacturers (OEM) recommendation		 Verify vehicle maintenance Schedule according to Manufacturer's recommendation, Transport vehicle to service station safely, Interpret stripe and decal on the vehicle , Requisite necessary materials and equipment needed to perform maintenance, Ensure compliance of 	 Describe precautionary measures adopted for Preventive maintenance in vehicle, Interpret automobile shop work orders, Describe Tools & equipment required Preventive Maintenance, Differentiate types of Auto motive maintenance, Interpret maintenance schedules, Interpret service manuals according to specific model of vehicle, 	

		National/International laws, codes and regulations.	Describe maintenance of tools & equipment.
A-2 Conduct vehicle walk around inspection		 Locate exterior damages on vehicle Conduct vehicle tires/wheels inspection for normal working condition according to Manufacturers recommendations Conduct windshield/wiper/glasses inspection for their damage and condition Locate damage in side-view mirrors Locate physical damage in head and tail lights Locate damage in moldings 	 Describe necessity of vehicle walk around inspection, Describe observations / faults and damages, Describe visual inspection techniques, Select tools, equipment and consumables required for vehicle preventive maintenance.
Module		Practical	Theory
Module B	Maintain Vehicle Engine	Trainee will be able to:	Trainee will be asked for:
B-1 Inspect engine cooling system	 Locate components of vehicle cooling system , Determine functioning of cooling system applying prescribed procedures, Determine leakage in vehicle cooling system applying prescribed procedures, Diagnose Physical damage in vehicle cooling system applying prescribed diagnostic techniques, Diagnose Faulty component / part in the cooling system of vehicle applying prescribed diagnostic techniques. 	 Describe precautionary measures adopted while working on cooling system of vehicle engine, Describe the necessity of engine cooling system, Describe vehicle cooling system component/parts, Describe coolant specifications, Describe tools, equipment and consumables required for working on vehicle engine cooling system. 	
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B-2 Repair engine cooling system.	 Remove Parts from cooling system of vehicle applying method prescribed in service manual, Test engine cooling system component for normal working applying prescribed method, Perform servicing of cooling system as per auto workshop SOPs, Fix engine cooling system component in vehicle for normal function as per auto workshop SOPs, 	 Explain operation of engine cooling system, Explain function of radiator, radiator cap, Thermostat valve, water pump & fan in vehicle cooling system, Enumerate steps to perform pressure test on cooling system. 	

		 Perform after service test on cooling system of vehicle applying prescribed method. 		
Mod	dule	Practical	Theory	
Module D	Maintain HVAC System	Trainee will be able to:	Trainee will be asked for:	
D-1 Test HVAC		 Perform cooling test on HVAC system performance adopting manufacturer's recommendation 	 Explain HVAC system, Describe precautionary measures adopted while performing tests, on 	
System performa	ance	 Perform pressure test on HVAC System to determine refrigerant pressure adopting manufacturer's recommendation, 	 HVAC system of vehicle, Describe importance of necessity of HVAC system in automobile, 	
		 Perform Cleaning of vehicle HVAC system as per Manufacturer's recommendation Perform trim repairing in vehicle HVAC system as per Manufacturer's recommendation, 	 Describe components of HVAC system, Describe working of HVAC system, components, e.g. A.C compressor, condenser, heater core. evaporator, 	
		 Recycle Refrigerant in vehicle HVAC system as per Manufacturer's recommendation Perform after service electrical test of vehicle for normal HVAC operation. 	 receiver drier, Describe techniques and procedures for servicing and repairing Vehicle HVAC system, Select tools, equipment and consumables required for working on vehicle HVAC system Explain function and operation of the climate control 	

			system and refrigerants	
Мос	dule	Practical	Theory	
Module F	Maintain Transmission System	Trainee will be able to:	Trainee will be asked for:	
F-1 Verify transmiss	ion operation	 Check vehicle for identification of transmission type, Perform basic physical inspection of transmission system, Determine performance of vehicle transmission performance, Diagnose faults in Transmission system of the vehicle. 	 Describe precautionary measures adopted while working on transmission system of vehicle, Differentiate between manual and automatic transmission of automobile, Describe working principle of manual and automatic transmission of automobile, Describe main components of manual transmission system, Identify components of automatic transmission system, Interpret schematics of manual and automatic transmission systems of automobile, Describe symptoms/causes of trouble in manual transmission system of the vehicle 	

			 Describe symptoms/causes of trouble in Automatic transmission system of the vehicle, Describe techniques and procedures of diagnosing faults due to electrical malfunctioning in transmission system of automobile, 	
			 Select tools, equipment and consumables required for working on transmission system of vehicle. 	
Mod	ule	Practical	Theory	
Module H	Perform On- board Diagnostic	Trainee will be able to:	Trainee will be asked for:	
H-1 Perform vehicles	scanning	 Prepare vehicle for scanning using specific method mentioned in Manufacturer's recommendation 	Describe precautionary measures adopted for while performing on board scanning	
		 Connect Data Link Cable with vehicle diagnostic connector. Using specified method mentioned in service manual. Set the scanning system according to the specific vehicle Perform scanning of vehicle 	 Describe parts of on board scanning system Describe method of on board scanning Describe the function of the scanner. Describe the method of connecting data link cable Select tools, equipment and consumables required for vehicle 	

			scanning	
Мос	lule	Practical	Theory	
Module J	Maintain Vehicle Infotainment system	Trainee will be able to:	Trainee will be asked for:	
J-1 Check Infotainm	• Locate infotainment equipment on/in to vehicle • Adjust audio equipment as per• Describe precautionary m adopted while working on v infotainment system		 Describe precautionary measures adopted while working on vehicle infotainment system 	
		costumer's desireAdjust Radio channels as per	Describe typical automobile infotainment equipment	
		 Costumer's desire Adjust video equipment as per costumer's desire Adjust pavigation equipment as per 	 Describe working of typical automobile infotainment equipment Interpret Service Manual of vehicle infotainment equipment 	
		costumer's desire	 Describe Tools & equipment required to operate vehicle infotainment equipment 	
Module		Practical	Theory	
Module L	Pursue Professional Development	Trainee will be able to:	Trainee will be asked for:	
L-1		Attend competency based automotive	Differentiate between certified and non-	

Obtain automotive technician certification		 technician training program with at least 80% attendance and satisfaction of training providers Get admit card for competency testing test/examination from concerned authority/Board 	certified automotive technicianDescribe duties of a competent technician automobile technician	
Мос	lule	Practical	Theory	
Module M	Demonstrate safety	Trainee will be able to:	Trainee will be asked for:	
M-1 Follow company policies	procedures,	 Review company safety SOP/Policy Demand safety equipment Check physical condition of safety equipment Wear safety equipment during operation as per requirement of SOP/policy Keep workplace environment clean Report safety risks and hazards Report accident Perform basic fire fighting 	 Describe company safety SOPs/policies ISO safety standards Safety risks & hazards First aid Safety equipment Reporting procedures Work permit Best safety practices Basic fire fighting 	
M-2 Wear personal p equipment as re	protective quired	 Select personal protective equipment in terms of type and quantity according to work orders. Use personal protective equipment to 	 Describe Personal safety equipment Personal safety risk & hazards Personal health & hygiene 	

 ensure correct fit and optimum protection in compliance with company procedures. Maintain personal protective equipment to ensure correct fit and optimum protection in compliance with company procedures. Ensure personal protective equipment is cleaned and stored in proper place. 	 Anger & stress management First aid Basic firefighting Injuries reporting procedures House keeping Safe work habits
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Structure of the assessment team

The number of assessors must meet the needs of the students and the training provider. For example, where **two assessors** are conducting the assessment, there must be a maximum of **five students per assessor.** In this example, a group of 25 students shall therefore require assessments to be carried out over a five-day period.

Planning for assessment

Sessional assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the above pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment program for each group of five students. Training providers must agree the settings for practical assessments in advance.

Important Notes

Assessment Context

Assessment of trainee has to be made in the class as well as on the job.

Critical Aspects

Candidates can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Assessment must confirm that the candidates are able to:

Work together with other people within the scope of their occupational activity and communicate professionally in English

language

While working apply health and safety procedures for smooth operation of plant and systems, and acting in a responsible manner

With due consideration to environmental regulations

Develop well-founded approaches for the identification of errors and rectification of malfunctions

Using of technical regulations and provision when working with Automotive Technician system

Use the computer as a work tool for operation and troubleshooting of Automotive Technician and its sub-system

Use fire extinguishers

Check and read the measurement values with digital and manual measuring tools

Identify and use the fasteners

Select, handle and use hand tools, workshop tools safely and properly

Apply mathematical formulae & calculations to carry out daily jobs and also consider the technical and business

management values

Take ergonomic, economic, ecological and social aspects into account when planning and executing work

Helping to minimize the negative impact of the work process on the environment by using the appropriate material,

equipment and

working practice

Identify and demonstrate the drawings, understand description, operating instructions and other typical information related to the

Occupation and can prepare such information in comprehensive form for the customers

Assessment / Exams Condition

Assessment will be held after the completion of every module, and the final examinations would be conducted after a completion of each

Year. An assignment will be a part of final exams and must be prepared by the candidate.

The candidate will have to access:

• All tools, equipment, materials, books and documentation required including Automotive Technician simulator or work station

The candidates will be permitted to refer the following documents.

Relevant workplace procedures

Relevant product and manufacturing specifications

Relevant drawings, operational and hardware reference manual of Automotive Technician system

The Candidate will be required to:

Orally or by other methods of communication, answer, questions by the assessor

Identify superiors who can be approached for the collection of competency evidence where appropriate

Present evidence of credit for any on-job training related course

16. List of machinery, equipment, tools & consumables

All the tools, instruments, equipment, machines, books and related consumables are listed below

16.1 List of Machinery/ Equipment/Tools (For a Class of 25 Students)

Name of Trade	Automotive Technician Level-2
Duration of Course	Two Years

Sr. No.	Description	Quantity (No.)
1	A/C Recycling machine	1
2	Air Compressor	1
3	Air pressure gun	1
4	Allen key/torx screw set	4
5	Approved first aid kit	2
6	Axle stands	1
7	Battery (13.2 V , 64 AH)	2
8	Battery tester / charger	1

9	Bench drill machine I	1
10	Bench grinder	2
11	Bench vices	2
12	Brake bleeding machine	1
13	Brake caliper	2
14	Caulking/sealing gun	2
15	Centre punch(Set)	3
16	Chisels(set of different types)	3
17	Coil spring compression	1
18	Combination spanners set	4
19	Compression tester	1
20	Computer	25
21	Cooling system pressure testing equipment	2
22	Creeper	6
23	Creeper Boards	6
24	Crimping tool	3
25	Cushion or knee protectors	4
26	Disc set	4
27	Disc turning machine	1

28	Drill set	4
29	Engine analyzer	1
30	Engine overhauling stand Wheel alignment machine	2
31	Feeler gauge	6
32	File set	6
33	Files	18
34	Flaring tool	2
35	Gap adjusting tool	4
36	Garage jacks	8
37	Gas analyzer	1
38	Gas leak detection equipment (electronic and snoop)	2
39	Grease gun	4
40	Hack saw	6
41	Hammer set	4
42	Hand drill machine	4
43	Hand grinder	4
44	Head light aligner	1
45	Heat Gun	2

46	Hoist/ramp/pit (pit no AF)	
47	Hot glue gun	2
48	Hydraulic jack	4
49	Hydraulic press	1
50	Hydrometer	6
51	Infra-red emission tester	1
52	Inspection lamp	6
53	Knife	2
54	Laptop computer and relevant software	25
55	Lathe machine	2
56	Lead light	4
57	Lifts	2
58	Locktite sealers	2
59	Magnet Rod	4
60	Rubber Mallet	4
61	Metal hole saw	4
62	Micro-meter (digital)	10
63	Multi meter	6

64	Oil can 6		
65	Oil drain Steiner 2		
66	Oil filter (strip) spanner 3		
67	Open end spanners set 8		
68	Overhead winch 1		
69	parts trolley 8		
70	Parts washing trolley 4		
71	Pipe wrench 2		
72	piston compression 2		
73	Piston ring Compression 4		
74	Piston Ring Expender 4		
75	Plastic Gauge	4	
76	Plastic trim tool/craft knife	craft knife 4	
77	Pliers set	4	
78	Pop riveting gun 2		
79	Portable gas proof inspection lamps 4		
80	Power lead 4		
81	Power set	2	

82	Printer	2	
83	Protective eyewear	50	
84	Puller	6	
85	Punch set 4		
86	Radiator leakage tester 2		
87	Relevant safety equipment As requ		
88	Rigid Racks	8	
89	Ring spanners set	8	
90	RPM gauge/Tachometer	1	
91	Scan tool	1	
92	Scanner (Diagnostic)	1	
93	Scissor pain	2	
94	Scrapper	6	
95	Screw driver set	4	
96	Screw extractor set	3	
97	Service Vehicle	2	
98	Sling Set	1	

99	Socket set 4		
100	Soldering equipment 2		
101	Soldering iron 2		
102	Sounds scope 2		
103	Service tool (SST) 10		
104	Spanners Set 1		
105	Spark Plug cleaner 2		
106	Spike guarded jumper leads 2		
107	Steam wash machine		
108	measuring Tape	2	
109	Tappet set	2	
110	Taps and dies set	4	
111	Thermometer	4	
112	Timing light	2	
113	Tire changer	1	
114	Tire pressure gauge 4		
115	Torque wrench 4		
116	Tool box	10	
117	Tools trolley	6	

118	Torsion wrench	4	
119	Transmission jack	1	
120	Tube cutter	2	
121	Universal stereo removal set 2		
122	Vacuum and compression gauges 4		
123	Vacuum cleaner 2		
124	Vacuum tester	2	
125	Valve compressor	2	
126	Venires caliper	10	
127	Welding equipment	1	
128	Wheel balance	2	
129	Wheel chocks	8	
130	Wheel spanner cross type	2	
131	Wire brush	25	
132	Wire cutters	10	
133	Wire strippers	4	
134	Workshop car lifter machine	1	

135	Adequate fire extinguisher (Type A,B & C)	6
136	PLC Based Multimedia complete set	1

16.2 List of consumables

Sr. No.	Description of Consumables
1	Anti-freeze
2	Battery electrolyte

- **3** Brake oil/fluid (assorted)
- 4 Contact cleaner
- 5 Cotton waste
- 6 Diesel
- 7 Distilled water
- 8 Emery paper
- 9 Emery paste
- **10** Engine oil
- **11** fasteners and ties
- 12 Gear oil/fluid
- **13** Grease (assorted)
- 14 Insulation tape
- **15** Kerosene oil
- **16** Knitted hand gloves
- 17 Metal glue
- 18 Paper and Pen
- 19 Petrol
- 20 Plasticine / bluetac
- 21 Radiator liquid

22	Rubber solution
23	Rust cleaner
24	Safety glasses
25	Selection of nuts, bolts, washers, screws
26	soap
27	Solder
28	Washing powder
29	Wire

17. Reference Books:

S/No	Book Name	Author Name	Edition	ISBN Number
1	Automotive Technology A system approach	Jack Erjavec	6 th	
2	Automotive Technology, Principle, Diagnosis and services	James D.Helderman	5 th	10: 0-13-254261-7 13: 978-0-13-254261- 6
3	Automotive Engines, Diagnosis, Repair & Rebuild	Tim Gilles	6 th	13: 978-1-4354-8641- 6 10: 1-4354-8641-2
4	Automotive Mechanics	Crouse-Anglin	10th	0-07-112599-X