

Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	Name of Course	Diploma Course in Auto Engineering Technician (Revise W.E.F.2017-18)																																																																																																			
2	Course code	306402																																																																																																			
3	Max. No. of Students Per Batch	25																																																																																																			
4	Duration	2 year																																																																																																			
5	Course Type	Full Time																																																																																																			
6	No. of Days per week	6 days																																																																																																			
7	No. of hours per day	7 Hrs																																																																																																			
8	Space require	1) Theory Class Room – 200 sqft, 2) Lab Sub. – 500 sqft, 3) Lab Elective – 400 sqft, 4) Garage + Parking – 300 sqft Total = 200 + 500 + 400 + 300 = 1400 sqft MOU with Automotive Service Station																																																																																																			
9	Entry qualification	S.S.C. Pass																																																																																																			
10	Objective of syllabus	1) Prepare student about various activities related to automobile Servicing of a four wheeler. 2) Orient students about various methods and technique used in automobile servicing.																																																																																																			
11	Employment opportunities	1) To work as a automotive technician in automotive dealer workshop 2) To start own repairs, maintenance and service workshop																																																																																																			
12	Teachers Qualification	1) Degree / Diploma in automobile engineering with certificate course in Vocational Teacher Training. 2) Guest Faculty for other subjects.																																																																																																			
13	Teaching Scheme –																																																																																																				
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Subject Name - Automobile engineering - I – 1st Year

Subject Code : 30640012

	KNOWLEDGE CRITERIA (Theory)		PERFORMANCE CRITERIA (Practical)
1	Invention of wheel, Description of wheels	1	Able to describe the Invention of wheel
2	Invention of wheel cart and animal powered cart	2	Able to describe the wheel cart
3	Use of horse cart and horsepower	3	Able to explain use of horse power
4	Invention of Automobiles and Evolution till date	4	Able to describe Invention of Automobiles and Evolution till date
5	Invention of automobile and Evaluation post World War II	5	Able to describe Invention of Automobile and Evolution post World War II
6	Two Wheelers, make, model, specifications	6	Able to identify Two Wheelers used Drawing of Two Wheelers
7	Parts/Components of Three Wheelers	7	Able to identify Three Wheelers used
8	Three Wheelers, make, model, specifications	8	Drawing of Three Wheelers
9	Parts/Components of Three Wheelers	9	Able to identify Passenger vehicles used
10	Passenger vehicle, make, model, specifications	10	Drawing of Passenger vehicle
11	Parts/Components of Passenger vehicles	11	Able to Draw The Components of Passenger Vehicles
12	Commercial vehicle, make, model, specifications	12	a)Able to identify Commercial vehicle used. b)Drawing of Commercial vehicle to identify Agricultural vehicle used.
13	Parts/Components of Commercial vehicles	13	Drawing of Agricultural vehicle
14	Agricultural vehicle, make, model, specifications	14	Able to identify Construction Equipment Vehicle used.
15	Parts/Components of Agricultural vehicles	15	Drawing of Construction Equipment Vehicles, to identify Special Vehicles used.
16	Construction equipment Vehicles, make, model, specifications	16	Drawing of Special Vehicles
17	Parts/Components of Construction Equipment Vehicles	17	Collection of catalogues of the vehicles of different make.
18	Special vehicle, make, model, specifications	18	Comparative statement of details specification of vehicle with cost
19	Parts/Components of Special Vehicles	19	Comparative statement of advantage & disadvantage of various makes of vehicles
20	Use of Active and Passive Safety	20	Able to identify and describe importance of Active and Passive Safety

21	Importance safe practices	21	Able to make a drawing of Active Passive Safety
22	Safe and responsible driving	22	Able to make sketch of various describe the rules
23	Road Signs, Traffic signals and rules	23	a)Able to describe driving rules b)Able to fill forms for driving and registration
24	Driving rules and registration	24	Visit to RTO office
25	License rules	25	a)Able to describe different license forms
			b)Able to write License rule
			c)Able to fill form of License
26	Air Pollution and norms	26	Able to list Air pollution norms
27	Air Pollution and Automobiles	27	a)Able to observe Air Pollution and Automobiles
28	Auto emissions and EU/ BS Standards	28	a) Able to identify various Standards like EU/ BS, PUC Certification
			b) Able to make list of various standards
29	PUC Certification	29	a) Able to describe about PUC Certification.
30	Innovation & Development in auto mobile	30	Collection of Information on latest vehicle with new technology. Make, specification of new generation vehicle
31	Fasteners & their type & uses	31	Able to identify various fasteners used in a vehicle
32	Various procedure used for removal of fasteners in a vehicle	32	Able to handle rusty, broken, spoiled threaded fasteners
33	Various special tools for handling of fasteners	33	Able to use special tools for removal of defected/ affected fasteners
34	Importance of specified torque values for tightening the fastener	34	Able to select appropriate fasteners & tightening at appropriate torque
35	Dial gauge, telescopic gauge & bore gauge & their least count	35	a)Able to set & use the dial gauge, telescopic gauge
			b)Able to set & handle the bore gauge
36	Vernier caliper & type depth gauge	36	Handling & use of Vernier caliper & tyre depth gauge
37	Micrometer	37	Setting & uses of micrometer
38	Hydrometer & bevel gauge	38	Handling & use of hydrometer & bevel gauge
39	Torque wrench & filler gauge	39	Handling & use of torque wrench & filler gauge
40	Dashboard & indicators in a vehicle	40	Identification of various symbolic (gauges)information on dashboard in a vehicle

Subject Name - Automobile engineering – I – 2nd Year

	KNOWLEDGE CRITERIA (Theory)		PERFORMANCE CRITERIA (Practical)
1	Use of electrical symbol & circuit diagram	1	Able to read the electrical symbols & circuit diagram, color code & specification of cables & wiring harness
2	Multi meter & Oscilloscope its uses	2	Able to use multi meter, timing light (stroboscope) & oscilloscope for resistance, amperage & voltage
3	Battery & its maintenance	3	a)Able to do regular maintenance of the battery importance of earthing b)Able to do topping Up of battery electrolyte c)Able to do replacement of positive/ negative battery cable
4	Electrical connection, lights & their uses	4	Able to check electrical connection, test & replace of head Light/ indicator/ brake Bulbs
5	Fuse Amperage	5	Able to do replacement of fuses & do continuity test
6	Horn Assembly, electrical fuel gauge & fuel pump	6	Able to do replacement of Horn assembly, electrical fuel gauge & fuel pump their application & maintenance
7	Battery charging system	7	Able to draw & check the circuit for battery charging system with alternator
8	Self starter circuit diagram & its components	8	Able to draw & check self starter circuit & its component
9	Circuit diagram for ignition system & component	9	Able to draw & check circuit diagram for ignition system
10	Wiper & its servicing method	10	Able to carry out the servicing of the wiper system
11	Heater Ventilator/Air Condition system in a vehicle & its uses	11	a)Identify the components of HVAC system in a vehicle b)Electronics & Air conditioning system
12	Car Electrical starting system, Battery charging system, power supply system	12	Able to measure a electrical parameter, Electric signals
13	sensors & their location, functions	13	Sensors testing, replacement of faulty sensors
14	Battery & Electromagnetic Induction System	14	Testing of system om [TATA, MAHINDRA, MARUTEE, TOYATA etc]
15	Electronic Fuel Ignition Systems	15	Checking of fuel Ignition systems on TATA, MAHINDRA, MARUTEE, TOYATA vehicle

16	Electronic Fuel Ignition Systems	16	Able to conduct on board diagnostic procedure
17	Supplementary Restrain system (SRS), Networking & Other system	17	Able to conduct SRS, Networking of system
18	Electrical Safety Procedures	18	Electrical safety practices
19	Operation Of electronics & electric engine system(Electrical component, functions, electrical inputs, outputs, voltage & oscilloscope pattern, digital & fibre optics principle)	19	Able to test electronics & electric engine system & locate & repaired the faults
20	External/internal modification to digital computer management system, improving the performance of ECU controlled engine	20	Programming, repair & reset airbag(ECU)

Subject Name - Automobile Engineering - II – 1st Year

Subject Code : 30640013

	KNOWLEDGE CRITERIA (Theory)		PERFORMANCE CRITERIA (Practical)
1	Classification of vehicles. Internal combustion engines & their types	1	Study of various parts of two wheelers
2	Working principle of two stroke & Four stroke engines	2	Drawing of two wheelers & labeling various parts
3	Difference between spark ignition & compression ignition engines	3	Comparative study of various makes of two wheelers available in the market w.r.t. specifications & cost
4	Description of chassis frame & auto body	4	Identification & description of chassis frame & auto body
5	Description of transmission system	5	Drawing of chassis frame & auto body
6	Description of Engine & its components	6	Identification & description of engine & its components. Drawing of engine & its components.
7	Description of Lubrication system	7	a) Identification & description of the lubrication & its components.
			b) Drawing of lubrication system & its components
8	Description of Cooling system	8	a) Identification & description of the cooling system
			b) Drawing of cooling system.
9	Description of Fuel supply system	9	a) Identification & description of the fuel supply system
			b) Drawing of fuel supply system.
10	Description of Transmission system	10	a) Identification & description of the transmission system
			b) Drawing of transmission system.
			c) Able to understand the function of different units used to transmit engine power
			d) Able to clean & lubricate cycle chain drive
			e) Able to adjust chain drive
11	Description of Clutch maintenance	11	a) Able to inspect the functioning clutch linkage for free movement
			b) Able to lubricate the clutch linkage
			c) able to tighten the fasteners as per need

12	Description of Clutch adjustments	12	a)Able to set free play adjustment of clutch
			b)Able to set pedal travel adjustment of clutch pedal
			c)Able to inspect the power transmission from clutch assembly
13	Description of Lubrication of gear box	13	a)Able to check the level of lubricating oil & quality of oil in the gear box
			b)Able to change the lubricating oil from the gear box
14	Setting of gears	14	a)Able to check the various combination of gears
			b)Able to set gear lever & selecting mechanism
			c)Able to check the power transmission through respective gears.
15	Use of front & Rear Axle	15	a)Identification & description of the front & Rear Axel
			b)Drawing of front & Rear Axel
16	Use of Steering	16	a)Identification & description of the steering
			b)Drawing of steering
17	Use of suspension system	17	a)Identification & description of the suspension system
			b)Drawing of suspension system
18	Use of wheels &Tyres	18	a)Identification & description of the wheels &Tyres
			b)Drawing of wheels &Tyres
19	Importance of wheel, importance of hub greasing & bearing play adjustment	19	a)Able to remove the wheel from axle
			b)Able to remove the hub
			c)Able to replace wheel stud
			d)Able to clean the wheel bearing
			e)Able to do greasing of hub & wheel bearing
			f)Able to adjust wheel play (Bearing) adjustment
20	Tyres& their maintenance	20	a)Able to measure air pressure in the tyres as per specification of manual fracture
			b)Able to rotate tyres for normal wear
			c)Able to repair punctured tubes with hot patch & cold patch
			d)Able to do repairing a puncture of tubeless tyres

21	Use of brake	21	a) Identification & description of the brake
			b) Drawing of wheels & brake
22	Brake & its maintenance, adjustment of brake	22	a) Able to carry out free pedal/lever adjustment
			b) B) Able to carry out checking efficiency of brake
			c) Able to carry out adjustment of rear brake
			d) Able to carry out adjustment of front brake

Subject Name - Automobile Engineering – II – 2nd Year

	KNOWLEDGE CRITERIA (Theory)		PERFORMANCE CRITERIA (Practical)
1	Suspension system in a vehicle with introductory air suspension	1	a) Able to inspect & identify the faulty suspension system
			b) Able to carry out the maintenance
2	Cambering of leaf springs, shackle pin & centre bolt	2	a) Able to trace trouble in suspension system
			b) Replace the defective components of suspension system
3	Strut/shock, absorbers, steering linkages	3	a) able to trace & test working of sturt, shock, absorber & steering linkage
			b) Replace the defective components
4	Manual steering systems	4	Able to check working of the manual steering system
5	Power steering system	5	Able to check working of power steering system
6	Power steering system with EPS & Hydraulic	6	Able to check & handle power steering system with EPS & Hydraulic
7	Wheel balancing	7	Able to do wheel balancing
8	Wheel alignment	8	Able to do wheel alignment
9	Steering adjustment	9	Able to check steering adjustments
10	Clutch adjustment & overhaul procedure	10	a) Able to do adjustment in clutch
			b) able to overhaul clutch assembly used in vehicle & inspection of components

11	Importance of propeller shaft, universal & slip joints	11	Able to do servicing/ overhauling of propeller shaft, universal & slip joints
12	Differential unit & its adjustment	12	Able to do servicing & adjustment of differential unit
13	Introduction to automatic power transmission	13	Identify & understand automatic transmission system used in power transmission
14	Car scanner equipment	14	Analysis & DTC fault finding
15	ECU	15	Able to diagnostic fault using ECU
16	Air bag System	16	Able to programme , repair & reset airbag
17	Immobilizer system	17	Able to programme , repair immobilizer system

Subject Name : Garage management and practice – 1st Year
Subject Code : 30640014

	KNOWLEDGE CRITERIA (Theory)		PERFORMANCE CRITERIA (Practical)
1	Automotive hand rules. Different parts/components of hand rules	1	a) Able to identify automotive hand tools
			b) Drawing of hand rules & labeling the parts
2	Types of measurement rules, make model & specifications.	2	a) Able to identify different measurement tools used
			b) Drawing of measurement tools
3	Types of electrical tools, makes model & specification. Parts/components of electrical tools	3	a) Able to identify electrical tools
			b) Drawing of electrical tools
4	Special tool used in automobile servicing with specification & make	4	a) Able to identify special tools
			b) Drawing of special tools
5	Service workshop equipment, make model, specification	5	a) Able to identify service workshop equipment
			b) Drawing of service workshop equipment
6	Importance of Vehicle Maintenance and Servicing	6	a) Able to perform basic procedure for vehicle maintenance
			b) Able to describe vehicle maintenance
7	Tips to extend the life of vehicles	7	a) Able to list the safe and responsible driving procedures
			b) Able to check the tips

8	Procedures during vehicle servicing	8	Able to perform basic procedures for vehicle maintenance
9	Washing of a Vehicle	9	a) Able to understand washing procedure of vehicle.
			b) Able to do the washing of vehicle
10	Changing of oil and oil filter	10	a) Able to understand procedure of changing of oil & oil filter
			b) Able to change the oil & oil filter
11	Changing of air filter	11	a) Able to understand procedure of air filter changing
12	Changing of fuel filter	12	a) Able to understand procedure of fuel filter changing
			b) Able to change fuel filter
13	Changing of coolant	13	a) Able to understand procedure of changing of coolant
			b) Able to change coolant
14	Inspection of an engine	14	Able to test different leakages like oil, coolant & combustion gases
15	Washing of the engine	15	a)Able to wash an engine externally
			b)Able to handle washing equipments
16	Tuning fuel system of an engine	16	a)Able to test the fuel system in a given vehicle engine
			b)Able to check the fuel line for leakage
			c)Able to conduct fuel pump test & compare the setting with service manual
			d)Able to set the carburetor for ideal speed
			e)Able to test nozzle for pressure
17	Tuning of an ignition system of an engine	17	a)Able to test primary & secondary circuits
			b)Check the terminals for loose connection
			c)Able to clean spark plug & distributor
18	Tuning of engine lubrication system	18	a)Able to check the level & quality of lubricating oil
			b)Able to replace the oil & change the oil filter
			c)Able to check the oil pressure

19	Tuning of engine cooling system	19	a)Able to read temperature gauge
			b)Able to check circulation of water in cooling system
			c)Able to trace for coolant leakage
20	Tightening of fastener(Nuts/Bolts/Screws)	20	Able to tight fasteners with specified torque & with sequence in the following components: cylinder head, induction manifold, exhaust manifold & engine foundation nuts & bolt
21	Engine Timing	21	a)Able to understand importance of engine timing
			b)Able to feel the sound change after tuning process

Subject Name : Garage management and practice – 2nd Year

	KNOWLEDGE CRITERIA (Theory)		PERFORMANCE CRITERIA (Practical)
1	Valve mechanism, reasons for leakage	1	Ability to test for leakage from the valve mechanism
2	Importance of reface valve, cutting of the valve seat & valve lapping operations	2	Ability to reface valve, cut the valve seat, valve lapping operations
3	Use of valve spring, valve seat & valve guide	3	Able to inspect valve spring, valve seat & valve guide
4	Piston ring & gaps with piston clearance in cylinder bore	4	a) Able to inspect & replace piston ring
			b) Able to inspect piston clearance in cylinder bore
5	Connecting rod	5	Able to inspect & do replacement of connecting rod
6	Engine bearing	6	Able to inspect & do replacement of engine bearings with appropriate clearance
7	Cooling system functions	7	a)Able to locate faults in the cooling system
			b)Able to replace defective component in the cooling system
8	Importance , advantages & use of MPFI	8	Able to trace & inspect the components of MPFI systems with fuel & air intake
9	Loose connection & reasons	9	Able to trace for the loose connection
10	Nozzle pressure	10	Able to replace faulty nozzle, sensors
11	Throttle chamber	11	Able to service throttle body
12	Importance & use of CRDI	12	Able to trace connection & inspect the components of CRDI systems with fuel & air intake

13	Reasons for loose connection & rectification	13	Able to inspect loose connection
14	Faulty nozzle, sensors	14	Able to replace faulty nozzle, sensors
15	Turbo charger	15	Able to service turbo charger
16	Electronic Central Unit[ECU]	16	Able to connect the process for Repairing & programming
17	Study of MPFI & CRDI sensors	17	Able to test & replace the sensors
18	Electronic fuel injector	18	Able to test & programme
19	Auto lock Break System	19	Able to repair Auto lock Break system
20	Electronics power steering, Hydraulic power steering	20	Able to repair power steering & Hydraulic power steering
21	MPFI & CRDI Engine	21	Able to repair MPFI & CRDI Engine

List of Tools, Equipment And Materials for a batch of 25 Trainees

Sr. No	Name of tools, equipment	Quantity
1	Old Car Petrol	1
2	Old Car Diesel	1
3	Work Table with bench vice	1
4	Oil draining and filling equipment	1
5	Cooling system tester	1
6	Multi meter	1
7	Hydro Meter	1
8	BC clamp Meter	1
9	Coolant tester	1
10	Battery tester	1
11	Diagnostic tools (genesis Evo)	1 set
12	Hand tools	5 sets
13	Pneumatic tools	1
14	Torque wrenches	2
15	Cotton Gloves	5
16	Hard Toed boots	5
17	Floor mats	As required
18	Car seat coves	1
19	Steering Covers	1
20	Gear knob cover	1

21	Fender covers / kits	1
22	Sun glasses	5
23	Bump caps	1
24	Air tester filter machine	1
25	Hydraulic jacks	1
26	Vehicle safety stands	1
27	Parts washing station	1
28	Car pullers	1
29	Sliding Hammer	5
30	Head light Focusing	1
31	AC Machine (124 Robin air)	1
32	General Hand Tools	5 sets
33	AC leakage tester	1
34	Wheel Balancer	1
35	Wheel Aligner	1
36	Car Scanner	1
37	Display Chart	As required

Note: Sr.No. 34, 35, 36 Can be available from nearby service station.
