SHIVAJI UNIVERSITY, KOLHAPUR
CENTRE FOR COMMUNITY DEVELOPMENT

CERTIFICATE COURSE IN TWO WHEELAR MECHANIC

Course duration: six months or 26 Weeks

Expected number of students: 10-30

Eligibility– 10 th pass

Fees per student – 3000/- + 250/- Evaluation charges

Objectives:

Student should be able to aqua ire skill of mechanic regarding maintenance and repair

Staff Qualification:

a) Teaching staff- Diploma in Automobile or I.T.I. Four Wheeler Mechanic course .Pass with two years experience.

b) Attendant -working experience in Garage for last 5 years.

Job opportunities:

1. Student can set up their own garage
2. General two wheeler mechanic
3. Dealers service mechanic
4. Garage assistant

Infrastructure: well-equipped classroom with all facilities.
Well equipped Garage with all facilities

Evaluation:

Theory	100 Marks
Practical	100 Marks
Internal	100 Marks

Course syllabus

Course syllabus for the 6 months is as follows.

1. Induction and safety training	01 week
2. Servicing and lubrication work	02 week
3. Suspension and steering work	01 week
4. Brake work	01 week
5. Transmission work	03 week
6. Engine work	02 week
7. Electrical work	02 week
8. Further practice in engine repair work	02 week
9. Trouble shooting	02 week
10.Diesel Engine repair work	01 week
11. Engine fault diagnosis	0 1week
12. Driving	01 week
13. Service station work	01 week
14. Industrial visit and shop floor practice	06 week
15. Revision and test	01 week
Total	26 weeks

Course division:	**Hours/week**
1. Practical/ shop floor practice	30
2. Theory	12

A) Theory:

1. General introduction to the course: course content working hour time table importance of safety and general precautions to be observed in the shop, fire extinguishers used for different types and its use. Elementary first aid. Study of special tools and gauges.
2. General description of motor vehicle – Measure assemblies- description location and function of each locking methods and devices used in vehicles
3. Description of wheels and tires. Types- selection of tires- ply rating- inflation pressure and carrying capacity storage of tires- tire rotation. Tire wear- types, causes and remedies Study of new alloy wheels tire vulcanizing.
4. Frames – description and functions- common troubles.

   Suspension system. Special features in each system. Shock absorber telescopic front suspension. Terminology of engine parts. Basic working principles of C.I. engine.

   Frame alignment

   Description and maintenance of new type shock absorbers.
5. Packing and gaskets-material their importance, Two stroke cycle petrol engine – description and working. Four stroke cycle engine, Description and working. Function of engine parts. Difference between two strokes & four stroke cycle.

   Study of engine fundamentals like combustion, atmospheric pressure, vacuum etc. study of engine measurements like HP, BHP, stroke, C.C.etc.
6. Lubricants – types, properties.

   Engine lubricating system – dry sump system, petrol oil system, force lubrication system, engine oil pump, filters. Engine oil change procedure, lubrication diagrams. Lubrication and cooling of gears and clutch, lub, oil classification by SAE, API etc. gears types and uses.

Practical:

1. Formalization with institute, importance of the trade. Machinery used in course, importance of safety general precautions to be observed in the shop. Fire extinguisher used for different types of fire, familiarization of the tools and machinery.
2. General servicing of motor vehicles- washing, cleaning, oiling, greasing & lubrication of vehicle. .
3. Removing wheels from vehicle dismantling tires and tubes – checking puncture- assembling, inflating to correct pressure. Rotating the wheels in vehicle Minor repairs to wheels and tires.
4. Inspection of vehicle checking alignment of vehicle frame. Tightening all loose nut bolts. Maintenance of all lubrication of front suspension system, removing testing and lifting shock absorber. Overhauling of front telescopic suspension.
5. Selecting material and cutting packing. Practice in the use of locking devices such as lock, nuts, cotters and split pins, keys, circlips, lock rings, location where they are used.
6. Cleaning and checking wheel bearings, changing bushes in shock absorber. Removing, dismantling, assembling testing and refitting oil pump on engine. Engine-oil changing.

Achievement:

The trainees should be able to:

a) Be familiar with tools, equipments etc.
b) Be aware of safety precautions and use of safety equipments and use of first aid.
c) Do general service and lubrication work in two wheelers.
d) Do general repair to suspension springs, shock absorbers and front suspension.
e) Do general service of wheel bearings.
f) Follow safety precautions while performing the above repairs and jobs.

B) Theory:

7. Special features of each steering system-Front wheel Geometry-caster checking fork out/ Bend or a damage or defect and remedies. Steering head lubrication.
8. Arrangement of brake on two/tree wheeler-and brake-description and purpose. Layout of Mechanical and Hydraulic braking. Running in period, periodic cylinder and master cylinder, Brake bleeding. Running in period, periodic maintenance.
   Disc brake system difference between disc and drum brake system.
9. Power transmission –clutch-purpose, working care and maintenance. An adjustment causes and remedies of clutch failure, C.V.T. drive arrangement various.
10. Gear box purpose, description types, lubrication on arrangements, chain drive mechanism. Belt drive Mechanism Routing attention.
11. Centrifugal clutch Mechanism – principle function, care and maintenance, shoes assembly from engine to wheel transmission. Centrifugal weight for starting Uniratio Gear box-function Ancillary transmission.
12. Engine cranking system:
    a) Mechanical-paddle stars, kick start, Handle start.
    b) Electrical cranking system batter starter motor and cranking circuit.

Practical:

7. Front wheel removing and refitting.
   Front fork overhauling, Handle bar Adjusting setting saddle height.
8. Adjusting brake pedal play. Dismantling front and rear brake assemblies. Brake shoe relining cleaning, inspecting, refitting and adjusting the brakes, overhauling, and bleeding of hydraulic brakes.
9. Transmission work: removing clutch assembly, clutch overhauling, refitting and adjusting.
10. Removing to stud:
    a. Centrifugal clutch (Luna. suvega)
    b. Multi plate clutch.

    Removing to study:

    Uniratio gearbox (Luna) and Ancillary transmission.
12. Removing to study paddle start, kick start Mechanism, removing, cleaning and refitting parts. Removing starter motor from engine, test and refit.

Achievements:

The trainees should be able to:

1. Do general repair to steering system.
2. Do general service of front fork of two/three wheelers.
3. Dismantle, inspect, repair and assemble the brake assembly.
4. Adjust and bleed the hydraulic brake.
5. Overhaul the hydraulic braking system.
6. Repair defects in clutch assembly and gearbox.

C) Theory:

13. Valve mechanism, valve timing. Electrical faults causes and remedies. Working of starter really, Battery, coil ignition system. Circuit diagram ignition timing.
14. Magnetto Ignition system circuit diagram, parts working of each part.
    Ignition Timing-
    Basic electrical definition like fuses , diodes solenoid switch etc. wire cal our conding etc.
    Wire color coding etc.
    Battery operated cranking system
    Double spark ignition system description
15. Fuel system carburetor air cleaner, fuel filter, and air fuel ratio. Carburetor tune up, Engine trouble shooting. SPACO carburetor circuits. Motor vehicle Act-pollution standard PUC certificates. Euro norms etc.
16. Petrol Engine tune up.

Practical:

13. Dismantling, cleaning assembling and starting petrol engine, stop light switch testing, starter relay testing. Battery maintenance and testing Repair in valve mechanism, adjusting valve clearance.
14. Removing and refitting magneto rotor. Repairing and replacing the C.B. point set, Adjusting point gap and the ignition timing. Testing the ignition coil and condenser. Remove clean and refit petrol tank.
15. Removing dismantling, cleaning assembling and refitting carburetor and adjust the slow running. Air cleaner servicing, Fault diagnosis.
16. Tune-up the petrol engine. De carbonizes the petrol engine.
    Achievement after 16 weeks of training from 13 to 16 weeks.

The trainees must be able:

1) Dismantling and assembling of different components of the engine.
2) Set the valve lining.
3) Check and adjust valve clearness.
4) Able to check the service and battery.
5) Repair operations of engine, valve re facing, valve seat cutting, de-carbonizing, fitting of bearings piston rings etc.
6) Able to replace and adjust C.B. point gap, set the ignition timing.
7) Repair test and adjust carburetor for correct speed.

D) Theory:

17) Petrol engine De-carbonizing, compression Ignition engine (Diesel Engine)- General description Difference between petrol and Diesel Engine. Injector function testing fuel injection pump.

18) Fuel injection pumps timing. Fuel filters. Care and maintenance governor. Electrical system symbols definitions of electrical terms. Charging circuit generator AC and DC Regulator. De carbonizing have Diesel Engine licensing and Registration, insurance.
Description of air cooled & oil cooled engines.
Description of secondary air injection system
Description of exhaust system, different types of silencer.

19) Wires, cables. Auto bulbs and fuses. Lighting circuits-Head light taillights park lights-side indicating lights-brake light Electrical Horns, Wipers, stop light switch. etc
Head light setting – speed limit, emergencies, and correct maneuvering techniques. Defensive driving, fuel economy, road markings, Road traffic signs, manual signals, Accidents, Non-use when vehicle remains out of use for long periods. Difference between petrol and diesel engine.

Practical:

17) Testing petrol engine compression pressure. PRM Testing of petrol engine.
Replacing control cable – clutch, brake, accelerator and gears, injector overhauling and Testing.

18) Removing and refitting of fuel injection pump on Diesel engine with correct Inj-timing, Replacing fuel fitter and bleed the fuel line, Decarbonising Diesel Engine, Driving practice.

19) To study wiring of all types, of changing bulbs electrical horn servicing, testing and tunning. Electrical wiper servicing, testing and refitting, Head light setting, Driving practice.

Achievements after 19 weeks of training from 17 to 19.

The trainee should be able to:

1. Test the engine compression pressure.
2. Test the engine RPM and adjust it
3. Able to change control cables.
4. Overhaul and testing of injectors.
5. Able to fit and adjust the F.I. pump.
6. Able to check and repair electrical circuits.
7. Able to drive vehicle and test it.

20 to 25 industrial visits and shops floor practice.

26. Revisions and Test.

Engine performance- simple calculations, bhp, ihp, cc etc. body working – Upholstry work, washing pitas/ramps. Painting of the vehicle – pai and repairing.

Course material

A) Equipment.

List of tools and Equipment.

For a batch of unit of 15 trainees.

Sr. No.	Trainees Kit	For Instructor	For trainee
1.	Hammer Ball pein 1 1 / 2 lb	1	15
2.	Chisel cold flat 3 / 4″	1	15
3.	Centre punch 4″	1	15
4.	Screw driver 3″ x1 / 4″ blade	1	15
5.	Screw driver 8″ x 3 / 8″ blade	1	15
6.	Spanner D. E. set of 6 b.S.F.	1	15
7.	Piler combination of 6″	1	15
8.	Hand file 8″ second cut	1	15
9.	Steel rule 6″	1	15

Tools, measuring Instruments and General shop outfit

1.	Steel rule 12″	2
2.	Hammer B.P. 1 /2 lb	2
3.	Hammer B.P.I. lb	2
4.	Hammer copper 1lb.	2
5.	Hacksaw frame adjustable for 8″ – 12″	1
6.	‘V’ Block 3″ x 1 1 / 2″ pair with clamps.	1
7.	Punch hallow 1 /4 ″, 5 / 16″, 3 / 8″, 7 / 16″, 1 / 2″ set	1 set
8.	Surface plate 24″ x 24	1
9.	Screw driver electrician type. 6″	2
10.	File flat 10″ second cut	1
11.	File flat 8″ smooth	1
12.	File flat safe edge 10″ second cut	1
13.	File triangular 6″ second cut	1
14.	File half round 6″ second cut	1
15.	File square 8″″ second cut	1
16.	File square 12″ rough	1
17.	Drill twist metric 3 to 12 mm x 1 mm	1 set
18.	Drill twist 1 / 8″ to 1 / 2″ x 1 / 64” set	1 set
19.	Taps and dies complete set in box B.A., B.S.W.B.S.F., American and metic.	1 box
20.	H.S.S. Hand reamer taper pin 5 ″/ 16 to 1 / 2″ by 1 / 16″	1 set
21.	H.S.S. Hand reamers parallel 5 / 16″ to 1 / 2″ by 1 / 16″	1 set
22.	H.S.S. hand reamers Adjustable 7 / 16″ to 5 / 32”, 15 / 32″ to 17 / 32″, 17 / 32 to 19 / 32″ to 21 / 32″	1 set
23.	Scraper triangular 10″	2 Nos.
24.	Scraper half round	2 Nos.

25. Dial indicator to read 00.1″	2 Nos.
26. Screw pitch gauge with 22 pitches from 9 to 40 TPI	2 Nos.
27. Micrometer outside 0 – 1″	1 Nos.
28. Micrometer outside 0-20mm. 25-50mm, 50-75mm.	1 each.
29. Micrometer 50-100mm with extension rod	1
30. Vernier calliper to read both inches and mm	1.
31. Safety goggle (clear glass)	1
32. Mallet (wooden)	1
33. Blowlamp.	1
34. Soldering iron 120 watts.	1
35. Soldering iron copper 10.025 (fire heated)	1
36. Piler nose round and straight.	1 each.
37. Ship straight 8″	1
38. Spanner double-ended set of 12 metric size (t to 32)	2 sets.
39. Spanner DF set of 12 (3 / 8″ to 1″ x 1 / 16″) B.S.F. size.	1 set
40. Spanner double offset d.r. Set of 12 metric size (6 to 32)	2 sets
41. D.F. ignition spanner of B.A. 6 x 7 to 8 x 9 set of 5	1 SET.
42. Spanner clyburn 6″	1
43. Spanner adjustable 8″	1
44. Spanner ring set of 12 (6 to 32)	1 set.
45. Spanner of sparking plugs 14mm.	2 Nos.
46. Magnetospanner set o 8.	1 set.
47. Double o ended spanner of American A/F size from 6 /16″ x 3 / 8″ to 25 / 32″ x 13 /16″ set of 6.	1 set.
48. Double open-ended tapper spanner. 7/ 16 x 1 / 2 to 11 / 16 x 5 / 8	1
49. Spanner T tlex for screwing up and unscrewing	1
50. Drift copper 3 / 8″ x 6″	1
51. Gun paraffin pressure	1
52. Gun grease pressure	1
53. Oil cans 1 /4 ltr.	1
54. Spanner socket set 52 (Inches, mm and American speeder) With extension rod, T-handle, ratchet, handle speeder and universal.	1
55. Piston ring compressor (Different size) one no each	1
56. Lifter valve spring.	1
57. Tool valve grinding suction type	6 Nos.
58. Valve seat cutting tools complete with guides and Pilot bars and handles.	
59. Extractor stude “Ez-out” type	1
60. Compression gauge to lbs/sa. In read to 250 lbs.	1

61.	Vacuumed gauge to read 0-30″	1
62.	Cylinder gauge capacity 2 1 / 2″ x 6″	1
63.	Ring expander and remover.	1
64.	Torque wrench (0 to 150 lb fit)	1
65.	Work bench 8’ x 4’ x 2 1 / 2’ with two vices 5″ jaw	2
66.	Feeler gauges 26 blades.	2
67.	Tachometer (counting type)	1
68.	Tester sparking plugs NEON type.	1
69.	Air compressor piston type 200 psi motorized portable	1 Nos.
70.	Tire lever in pair	2 Pair.
71.	Equipment puncture in box	2
72.	Cell Tester.	1
73.	Hydrometer	2
74.	Battery charger set up to 72 volts	1 set.
75.	Tyre pressure gauge to read 0 to 120 lbs /0″	1 Nos.
76.	Spring tension scale 0-10 lb	1
77.	Valve key inserter	1
78.	Connecting raw aligner	1
79.	Valve reface	1
80.	Spark plug cleaner and tester	1
81.	Ignition coil and condenser Taster	1
82.	C.D.I. Unit tester	1
83.	Trey cleaning 18″ x 12″	15
84.	Drilling machine drench to drill up to 1 / 2″	1
85.	Locker with 8 compartment (standardize size)	2
86.	Metal rack 6’ x 5’ x 18’	2
87.	Carburetor (Different types)	2 each
88.	Filing jig for adjusting the piston ring gap	1
89.	Black board with easel	1
90.	Desk or Table	1
91.	Fire extinguisher	2
92.	Fire bucket with stand	4
93.	Voltmeter 100v	1
94.	Ammemeter 0-30A	1
95.	Battery 6 v. 12 v	1
96.	Grinder with 7″ wheels with twist drill grinder attachment	1
97.	Arbor press hand operated 1 / 2 Ton	1
98.	Motor cycle in running condition	1
99.	Scooter in running condition	1
100.	Moped in running condition	1

101.Valve screen compressor assembly with adapter	1
102. Clutch holder	1
103.Valve guide reamer	1
104.Valve guide arbor	1
105.Crankcase splitting tool	1
106.Magneto rotor puller (different types)	1 each
107.Magneto rotor holder	1
108.Circlip pilere (inside) 8″	1
109.Circlip pilere (outside) 8″	1
110.Special tools for various vehicles	1 Kit each.

111.Cut section two stroke petrol engine

112.Cut section four stroke petrol engine

113.Cut section of moped engine with transmission

114.Cut section with carburetor

115. Cut section with shock absorber.

116. Wall charts –

a) Fuel system
b) Air filtration system
c) Two stroke engine (working)
d) Spring and shock absorber
e) Ignition system battery
f) Ignition system coil
g) Transmission system of m/c
h) Transmission system of mopes.
i) Engine cooling
j) Brake system.
k) Wiring diagram.

Raw material:

The normal raw material required for their course will petrol, oil, kerosene, rags, cork sheets. Asbestos sheets, oilpapers. Shellac/Gasket cement, spare parts, Grease, brake oil, Diesel, Battery charging solution, and Distilled water.

B) Books and periodicals.

C) Audio & Video cassettes

Project – I

a) Garage Survey
b) Inventory of recent vehicles
c) Pollution norms and control
d) Listing of available spare parts.
e) After sale services.

Project - II

a) Preparation of garage layout and loan proposal for the same

Passing: 40% of total marks.