

# **SYLLABUS**

**ON**

## **TRADE TECHNOLOGY (TT) – I**

**TRADE OF MECHANIC MOTOR VEHICLE**

**3-MONTHS MODULE**

**FOR**

**CRAFTS INSTRUCTOR TRAINING SCHEME**

List of members attended the workshop for designing the syllabus on  
**“TRADE TECHNOLOGY-I” for Mechanic Motor Vehicle Under**  
**Craft Instructor Training Scheme on 28.05.2009 at ATI Gill Road**  
**Ludhiana.**

Sl. No	Name of member & Designation S/Sri...	Representing Organization with address	
1	Dinesh Kumar Nijhawan, Director	ATI, Ludhiana	Chairman
2	C.P.Sharma, Jt. Director	ATI, Ludhiana	Member
3	Sukhdev Singh , DDT	ATI, Ludhiana	Member
4	Gurcharan Singh, ADT	ATI, Ludhiana	Member
5	Baljinder Singh, Principal	ITI, Ludhiana	Member
6	V.K.Bansal. Principal	ITI Patiala	Member
7	Rajesh Sharma, C.I.	ITI Patiala	Member
8	Subhash Gupta, C.I.	ITI Patiala	Member
9	P.S.Khrabanda, Ex. ADT	ATI, Ludhiana	Member
10	M.R.Sharda, Trg. Officer	ATI, Ludhiana	Member
11	Jagdish Singh, ADT	ATI, Ludhiana	Member
12	Vipan Kumar, Trg. Officer	ATI, Ludhiana	Member
13	Harbans Singh,Trg. Officer	HMT Ltd. Pinjore	Member
14	Vijay Kumar ,Trg. Officer	ATI, Ludhiana	Member
15	P.L.Arora	Munjral Casting (Hero Group), Ludhiana	Member
16	Karnail Singh,Trg. Officer	ATI, Ludhiana	Member
17	Manish Gossain	Bhagat FORD, Ludhiana	Member
18	P.K.Aggarwal	Vardhman Textile Ltd.Ludhiana.	Member
19	Harmet Singh	Gulzar Motor Ltd.,G.T.Road , Dholewal, Ludhiana	Member
20	Sat Pal, Asstt. Director (Mech.)	MSME,D1, Ludhiana	Member
21	Harbans Lal ,Trg. Officer	ATI, Ludhiana	Member

### Available Sessions:

1. Monday to Friday 5 days x 8 Sessions = 40 Sessions  
(Each Session of One Hour duration)
2. Total Session : 40 x 13 = 520 Sessions
3. Admission & Final Test: = 40 Sessions.
4. Industrial visit = 40 Sessions.
5. Available Sessions = 520 – 80 = 440 Sessions.
6. Practical = 264 Sessions  
Theory = 176 Sessions.

### Evaluation Scheme: -

		Maximum Marks	Pass Marks
1.	Theory	= 100	60
2.	Sessional	= 50	30
3.	Practical	= 200	120
4.	Sessional	= 50	30
	Total	= 400	240

# SYLLABUS FOR THE TRADE OF MECHANIC MOTOR VEHICLE FOR CRAFT INSTRUCTOR

## SYLLABUS FOR TRADE TECHNOLOGY (TT) -I

### THREE MONTH TRAINING MODULE - RELATED INSTRUCTION AND TRADE PRACTICAL

TOPIC	WEEK No.	THEORY	PRACTICAL
<b>ENGINE UNIT</b>	1	Admission, introduction, facility available in the institute, importance of safety and general safety. Automobile, vehicle, types of automobile,	Study of tools/ equipments, cut section model etc.
	1	Definition of engine, types, internal combustion and external combustion engine, classification of engine, parts of conventional engine, working parts of conventional engine. Working of four stroke and two stroke petrol and diesel engine. Difference between petrol and diesel engine, comparison between two stroke and four stroke petrol/ diesel engine. Valve timing diagramme of the Petrol and Diesel engine.	Removing a petrol / Diesel engine from motor vehicle –dismantling cylinder head, checking valve, checking cam shaft end play and correct it, cutting valve seats, replacing worn guides and valve spring.
	2	Inlet and exhaust manifold description and purpose of manifold, function and uses of turbocharger, exhaust pipe and sensor box. Constructional details and purpose and type silencer. Common trouble in exhaust system and there remedy. Catalytic converter, its function and advantages.	Removing inlet and exhaust manifold-cleaning carbon and checking for war page and crack-checking heat control valve on exhaust manifold for proper working. Removing replacing new manifold gaskets and checking leakage of exhaust gases. Servicing and Overhauling the turbocharger.

	2	Description and functions of piston, connecting rod, material used. Reason for cylinder wear –method for reconditioning worn out cylinder. Big ends and main bearing shell.	Removing piston and connecting rod assembly from the engine, dismantling, cleaning, inspection, checking clearances, Removing crank shaft from engine. Measuring cylinder bore, ovality and taperness.
	2	Piston pins and locking methods of piston pins.	Checking piston ring groove and cleaning, measuring piston size, removing gudgeon pin and brushes-checking wear-refitting new brushes and pins.
	3	Crank shaft-description, function and types, vibration damper, Common troubles and remedies.	Removing connecting rods assembly, checking bearing clearances, fitting new bearing shell and setting correct oil clearances. Measuring wear in crank pins and main journals in crank shaft. Checking and cleaning oil passages in crank shaft and engine block.
	3	Engine assembly procedure as recommended by makers, precaution to be observed while assembling engine components.	Assembling piston and connecting rod, crank shaft, camshaft and timing gear. Fitting cylinder head and checking valve tappet clearance.
<b>ENGINE LUBRICATION SYSTEM:</b>	4	Definition of lubrication system, purpose, types of lubricant, property of lubricating oil, types of lubrication system, method of lubrication system, types of oil pump, oil release valve, types of oil filter, oil relief valve, Oil cooler, different types of oil gauge and warning light, causes of high oil consumption, causes of high and low oil pressure.	Trace the lubrication oil flow system in engine, servicing oil filters, oil pump, oil strainer and setting the oil pressure release valve for correct pressure.

<b>COOLING SYSTEM:</b>	4	Purpose of cooling system, types, radiator, radiator pressure cap, expansion tank, types of fan and relay, water pump, fan belt, water jackets, heater core, types of thermostat valve, hose pipe, purpose and types of coolant, types of ant freezing solution, water temperature gauge, causes of engine overheating.	Checking cooling system for over-heating, cleaning radiator, dismantling, cleaning, assembling and testing water pump, reverse flushing the system and adjusting the fan belt tension. Check thermostat valve. Trouble shooting in cooling systems. Checking up and correcting water level and water leaks, changing defective packing and gaskets. Testing radiator and thermostat valve.
<b>FUEL SUPPLY SYSTEM IN PETROL ENGINE</b>	5	Fuel feed system in petrol Vehicles, description and lay out of the system. Operation, maintenance of fuel pumps, filters and carburetors, injectors and throttle body. Type of fuels and their properties.	Simple repairs in fuel feed system overhauling of fuel pump, carburetors, fuel filters and air cleaners. Fuel injector (MPFI), throttle body, fuel tank, fuel rail. Trouble shooting in fuel feed system.
<b>FUEL SUPPLY SYSTEM IN DIESEL ENGINE</b>	5	Type of fuel injection system- air injection & airless injection. Fuel feed pump-description operation common troubles & remedies. Common Rail Direct Injection System.	Cleaning & servicing of primary fuel filter & pressure stage filter-removing feed pump-dismantling, cleaning, reassembling refitting & testing the fuel pump. Servicing & testing of CRDI injector
	5	Need for governor-types- pneumatic & mechanical governor. The pump phasing & calibration of pump. Checking & fixing injection timing. Governor -type, there description & function.	Dismantling unserviceable fuel injection pump and high pressure pump (CRDI engine) & clearing inspecting, studying parts & reassembling. Removing F.I pump from running engine changing oil in it-fitting back to engine- testing the governor & setting injection timing.
	6	Injector nozzle -type, description operation testing of injection. Special features of pintle nozzles & CRDI injectors.	Testing injector for missing on the vehicle -removing, dismantling, cleaning, and inspection replacing defective parts -reassembling the injector.
	6	Rotatory fuel injection pump flange type pump & there special feature. Care & maintenance of single cylinder pump.	Servicing and testing distributor type fuel injection pump, adjusting tappet & setting injection timing.

	6	Need for governor -types- pneumatic & mechanical – governor, maintenance of governor reason for black, white & blue smoke in exhaust.	Trouble shooting with special references to adjustment in fuel feed system-checking exhaust gases, & checking the governor- slow speed adjustment & venture control adjustment. Fuel & exhaust gas leaks & correct them.
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**ELECTRICAL SYSTEM**

7	Simple electrical circuit and parallel circuit. Identification of A.C & D.C meter. Insulator, conductors, type of resistance Ohm's law and its application. Common electrical term & symbols.	Practice in joining wires & soldering. Forming simple electrical circuit. Measuring of current, voltage and resistance.
7	Primary and secondary cell; lead acid battery-description – construction-common trouble and remedy. Care while handling battery. Effect of mishandling batteries on environment.	Cleaning and topping up of a lead acid battery. Testing battery with a hydrometer cell tester, charging battery.
7	Introduction to electronic. Definition of resistor, capacitor & inducer & their principle of working. Different type of diode, transistor, power supply for electronic circuit.	Identification of electronic control unit. Testing of electronic control circuit. Fault finding in electronic circuit and remedy.
7	Different gauge used in automobiles, their function.	Checking instrument & gauge on dash board. Rectify/replace defective gauge.
7	Description of light circuit-different component in light circuit-description & function of each. Prefocused bulbs & sealed beams. Fuse & their importance. Layout of different sensor & malfunctioning indicating lamp in vehicle.	Trace the light circuit-test bulbs, align head lamp, and find out short and open circuit in the light wiring, replacing fuses testing the tail & the brake light in vehicle. Checking function of malfunctioning indicating lamp.
8	Electrical horn circuit-descriptions of electric horn-operation of relay & horn operation-operation of relay & horn switches. Common trouble and their remedies.	Removing & electrical horn from the vehicle-dismantling, cleaning point, testing wire, assembling the horn & adjusting the horn for correct sound, tuning double horn, repairing of horn relay & horn switches.
8	Description and operation of an electric wiper motor, care and maintenance. Common trouble and remedies.	Removing a wiper motor – dismantling, cleaning, inspecting, repairing electrical wiper motor, assembling and fitting, setting blade for correct functioning.