

**COURSE TITLE : AUTOMOBILE SERVICING AND MAINTENANCE**  
**COURSE CODE : 4031**  
**COURSE CATEGORY : A**  
**PERIODS/WEEK : 4**  
**PERIODS/SEMESTER : 72**  
**CREDITS : 4**

**TIME SCHEDULE**

<b>MODULE</b>	<b>TOPICS</b>	<b>PERIODS</b>
1	Introduction Engine overhauling	17
	Test I	1
2	Petrol engine Diesel engine	17
	Test II	1
3	Clutch, Gear box, Propeller shaft Differential and Rear axle, Tyre	17
	Test III	1
4	Suspension system, Steering system Brake system, Automobile maintenance	17
	Test IV	1
	<b>Total</b>	<b>72</b>

**OBJECTIVES**

Upon completion of the study of this subject, the student should be able to:

- 1.1.0 Apply procedures of overhauling of engines
  - 1.1.1 Distinguish between servicing and maintenance
  - 1.1.2 Indicate the signs showing the necessity of engine overhauling
  - 1.1.3 Recognize decarbonizing methods like oxygen decarbonizing, chemical decarbonizing, scraping methods etc
  - 1.1.4 Conduct compression test, vacuum test and cylinder leakage test
  - 1.1.5 Explain the procedure for engine dismantling and assembling
  - 1.1.6 Check piston, cylinder, connecting rod, crank shaft, flywheel, valves and valve operating mechanism
  - 1.1.7 Describe the servicing of different engine components
  
- 2.1.0 Apply the procedures of servicing ignition system and fuel system of petrol engines
  - 2.1.1 Predict the need for servicing and testing of components of coil ignition system
  - 2.1.2 Locate the correct ignition timing
  - 2.1.3 Locate the defects in the fuel system components and suggest the servicing
- 2.2.0 Apply the procedures of servicing fuel system components of diesel engine
  - 2.2.1 Outline the procedures of servicing F.I. system of Diesel engine
  - 2.2.2 Write the procedures for bleeding and testing of F.I. pump, and testing of nozzles
  
- 3.1.0 Servicing of transmission system

- 3.1.1 Perform the servicing and adjustment of clutch
- 3.1.2 Write the procedure for dismantling and assembling of Clutch
- 3.1.3 Locate defects of clutch
- 3.2.0 Apply the procedure for dismantling and assembling of gear box
  - 3.2.1 Write the procedure for dismantling and assembling of gear box
  - 3.2.2 Locate the defects of gear box
- 3.3.0 Apply the procedures of rectifying defects in propeller shaft
  - 3.3.1 Write the procedure for dismantling and assembling Propeller Shaft
  - 3.3.2 Locate the defects of Propeller Shaft
- 3.4.0 Apply the procedure for servicing of differential and rear axle
  - 3.4.1 Suggest the procedure for removal of axle in full floating, three quarter floating and semi floating types
  - 3.4.2 Discuss the troubles and adjustment of differential
- 3.5.0 Maintain tyres and tubes
  - 3.5.1 Explain the tyre replacing method
  - 3.5.2 Draw the tyre rotation
  - 3.5.3 Perform tube repair
  - 3.5.4 Discuss the causes of rapid tyre wear
  - 3.5.5 Describe the methods of tyre retreading
  - 3.5.6 Perform the balancing of tyres
- 4.1.0 Servicing of suspension, steering and brake systems
  - 4.1.1 Demonstrate the adjustment of front height of cars by setting torsion bars
  - 4.1.2 Rewrite the points for replacing suspension rubber bushes
  - 4.1.3 Explain the adjustment of front wheel alignment
  - 4.1.4 Discuss the care and maintenance of vibration dampers
- 4.2.0 Understand the adjustment of free play and end play in various steering gear boxes like worm and roller, re-circulating ball, and rack and pinion types
  - 4.2.1 Write the procedure for centralizing steering wheel
  - 4.2.2 Discuss the troubles in steering system
- 4.3.0 Apply the procedure for brake shoe removal and re-lining
  - 4.3.1 Show brake adjustment and brake bleeding
  - 4.3.2 Write the procedure for servicing wheel cylinder and master cylinder
  - 4.3.3 Explain the checking of braking efficiency
  - 4.3.4 Discuss the troubles in hydraulic and air brake systems
- 4.4.0 Apply the procedure for the maintenance of automobiles
  - 4.4.1 Explain the types of maintenance – preventive and breakdown
  - 4.4.2 Prepare maintenance schedule of automobiles
  - 4.4.3 Outline the cleaning of vehicles in a service station
  - 4.4.4 Explain the equipment used in a service station

## CONTENT OUTLINE

### MODULE – I

Introduction to servicing and maintenance of Automobiles - various signs showing the necessity of overhauling engine decarbonizing, vacuum test, compression test and cylinder leakage test. Causes of excessive lubricating oil consumption. Engine dismantling and assembling. Checking

of engine components – causes of cylinder wear- cylinder reboring and honing – linear replacement. Servicing of valves. Valve adjustment and defects of valves. Piston defects and reconditioning methods.

Testing of connecting rods. Defects and reconditioning methods. Measurement of bearing clearance and adjustment of connecting rod bearings. Crank shaft balancing and machining processes. Renewal of flywheel ring gear.

### **MODULE – II**

Servicing of petrol engine – defects in coil ignition system like ‘No spark’, weak spark, intermitted spark and spark at some wires. Testing of ignition system components. Setting of ignition timing.

Checking of advancing units. Servicing of spark plug. Trouble shooting of fuel system. Testing of A.C. mechanical pump. Tuning of carburetor. Causes of excessive fuel consumption and defects of carburetor. Engine tuning procedure. Servicing of diesel engine – F.I. pump timing and bleeding of diesel fuel system. Testing of Nozzles. Phasing and calibration of F.I. pump. Defects of F.I. pump and Nozzles. Troubles and diagnosis in MPFI and CRDi systems

### **MODULE – III**

Servicing of clutch assembly. Fitting of clutch, clutch adjustments. Removal and refitting of trans-axle. Dismantling of propeller shaft and universal joint. Defects in propeller shaft. Servicing of differential and rear axle. Removal of axles in full floating, semi floating and three quarter floating types. Differential troubles and adjustments. Tube repair. Causes of tyre wear. Tyre rotation, retreading and balancing of wheels.

### **MODULE – IV**

Servicing of suspension system. Checking of wheel alignment. Adjustment of torsion bars. Care and maintenance of vibration dampers. Replacement of suspension rubber bushes. Play adjustment in steering gear boxes. Centralizing steering wheel. Troubles in steering system. Brake shoe removal and re-lining. Brake bleeding and adjustment. Servicing of master cylinder and wheel cylinder checking of braking efficiency. Troubles in hydraulic and air brake systems. Periodic and break down maintenances. Maintenance schedule. Cleaning of vehicle in a service station. Equipment used in a service station.

### **TEXT BOOKS**

- |                                     |                     |
|-------------------------------------|---------------------|
| 1. Practical Automobile Engineering | - C.P. Nakra.       |
| 2. Auto Mechanics                   | - Anglin And Crouse |

### **REFERENCES**

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|--|----------------------------------|
| 1. Practical Automobile Engineering        | - N. Sreenivasan                 |
| 2. Practical Automobile Engineering        | - Staton Abbey                   |
| 3. Automobile Engineering                  | - N.K. Giri                      |
| 4. Automobile Engineering vol. I, II & III | - Anil Chhikara                  |
| 5. Automotive engines-theory and service   | - James D Halderman              |
| 6. Automotive service basics               | - Donald W Patten & John Remling |
| 7. Maintenance& repair of Motor vehicles   | - ILO Manual                     |

