

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: AUTOMOBILE ENGINEERING (02)
SUBJECT NAME: VEHICLE MAINTENANCE & GARAGE PRACTICE

Subject Code: - 2170206

B.E 7th SEMESTER

Type of Course: - Advanced / Application

Pre-requisite: - Automobile System

Course Objective: The course is designed to understand maintenance methods/techniques and garage practices. Students will also be able to learn about different documents used and records required in modern service station.

Teaching and Examination Scheme:

Teaching Scheme				Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	Viva (V)	PA (I)	
3	0	2	5	70	30	30	20	150

L: Lectures; T: Tutorial; P: Practical; C: Credits; ESE: End Semester Examination; PA: Progressive Assessment.

CONTENTS:

Sr. No.	Course Contents	Total Hrs	% Weightage
1.	Vehicular Maintenance Practices: Requirements and importance of service & maintenance, Preventive, Predictive & Breakdown maintenance, daily, weekly and monthly maintenance schedule, Periodic maintenance scheduled chart.	06	15
2.	Measuring Instruments: Measuring instruments for wear, Fuel consumption, speed, acceleration, vibration, noise. Methods used for measurement of fuel consumption.	04	9
3.	Garage Practices: Types, functions, operations and activities of service stations. Layouts of modern service station/workshop. Criteria and	06	15

	<p>requirements of service station and its layout. Study of service tools, measuring & gauging instruments and service/repair equipments with testing and repairing processes.</p>		
4.	<p>(a) Maintenance & Overhauling of engine components: Measurement of cylinder bore, cylinder boring and honing, liners fitting. Cylinder head facing, valve seat lapping. Adjustment of valve timing and fuel injection pump timing. Rocker arm gap adjustment/setting procedure. Tuning of carburetor. Fuel injection pumps and fuel injector's calibration. Engine Lubrication circuit and its components, Fuel supply circuit of petrol, Diesel, Bi-Fuel engines, Cooling system layout and its components, Air intake & Exhaust systems and components</p> <p>(b) Maintenance & Overhauling of drive lines: Adjustment of clutch, repair & replacement of clutch parts. Overhauling of all types of gear boxes. Repair & maintenance of Propeller shaft & universal joint. Differential back lash adjustment. Repair & maintenance of differential. Repair & maintenance of final drive/axles.</p> <p>(c) Maintenance & Overhauling of various systems: Lubrication and maintenance of suspension system. Study and adjustment of steering geometry; toe in, toe out, caster, camber, and king pin inclination. Maintenance of steering system. Maintenance of wheel and tyre. Tyre rotation, tyre re-treading, effect of tyre inflation & tyre wear. Wheel balancing. Maintenance of hydraulic brakes; brake adjustments and bleeding of brakes. Study of air brake circuit & system components. Maintenance of radiator and water cooling system. Maintenance of lubrication system; chassis greasing, wheel bearing greasing etc. Hydraulic and Air Brake circuits and its components. Maintenance of electrical system components.</p> <p>(d) Diagnosis, Causes, and Remedies : Causes & remedies of different problems related engine (high fuel consumption, high engine oil consumption, Over heating of engine), clutch, gearbox, propeller shaft, differential, final drive, brakes, suspension, steering, wheels & tires, battery, Starting circuit & Charging circuit etc.</p> <p>(e) Maintenance & repair of vehicle body : Maintenance of vehicle body; minor and major repairs. Body repair tools & equipments. Introduction to denting & painting process of vehicles.</p>	02	
		06	
		08	
			46
		02	
		03	

<p>5.</p>	<p>Workshop management practices : Study of Workshop documents & records like job cards, parts catalogue, parts price list, vehicle history sheet, warranty card, bill & billing procedure of vehicle, logbook of vehicle, customer satisfaction sheet, service book, etc. Activities and responsibilities of workshop management. Study of workflow in service station. Customer complaint Handling & consumer cases in case of any dispute.</p>	<p>06</p>	<p>15</p>
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References:

1. Automotive Mechanics by William H. Crouse & Donald L. Anglin; Tata McGrawHill Publishing Company Ltd.
2. Automobile systems by Anil Chikara, Satya Prakashan.
3. Automobile Engineering by K.K.Ramlingan, SciTech Publication.
4. Auto mechanics by Joseph Heitner, East West Press.
5. Automotive Service Basics by Pattern and Donald, Pearson Publications.
6. Vehicle Service book.
7. Vehicle Workshop Manual.
8. Parts Price List.
9. Parts catalogue of service station.
10. Job cards of modern service station.

List of experiments (any ten):

1. Study of modern workshop layout.
2. Study of different types of job cards & maintenance schedule chart.
3. Study of measuring, gauging & service equipments.
4. Demonstration on tyre inflator and hydraulic hoist.
5. Demonstration on tyre changer and car washer unit.
6. Performance on wheel balancer.
7. Performance on wheel aligner.
8. Cleaning and testing of petrol injector.
9. Cleaning and testing of different types of nozzles.
10. Bleeding of hydraulic brakes.
11. Overhauling of any component or system of a vehicle.
12. Study of different workshop documents & records.

List of equipments:

1. Hydraulic hoist
2. Electronic tyre inflator
3. Tyre changer
4. Wheel aligner
5. Wheel balancer
6. Petrol injector cleaner test setup
7. Diesel nozzle tester and cleaner setup
8. Measuring and gauging instruments

Course Outcomes:

1. Learning of maintenance types/techniques.
2. Learning of different garage equipments and practices.
3. Learning of workshop documents and records.