



Diploma branch in which subject is offered: - Automobile Engineering

Objective: The course aims to impart basic understanding of the importance and necessity of vehicle testing

Credits Earned: 4

Course Outcomes:

After learning the course, the students should be able to:

- Understand Engine performance measurement methods.
- Understand automobile noise Characteristics
- Analyze real time vehicle components and system testing.
- Analyze the exhaust emission in Automobiles

Pre-requisite of course: Automobile system and transmission, Automobile engine

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
3	0	2	4	50	30	20	25	25	150

Contents:

Sr. No.	Topics	Teaching hrs.	Weightage
1	Introduction: Need of vehicle testing, Vehicle testing organizations Hierarchy of vehicle testing, Individual component approval System level approval and whole vehicle approval, Type of approval and conformity of production tests.	4	10
2	Engine, fuel system and emission testing: Engine Testing- Brake Power Measurement methods, Indicated Power Measurement Methods, Friction Power Measurement Methods, Air and Fuel Supply Measurement, Engine Exhaust gases Measurement methods for CO, HC, NOx, Orsat apparatus	8	17



3	Noise and noise control: Sound wave –properties Automotive noise criteria, Noise inside and outside the vehicle, Human response to sound, Sources of noise-intake, exhaust, combustion, mechanical, auxiliary assemblies, wind, transmission, brake squeal, structural noise, Noise control method, control of in cabin noise, Pass by noise testing method.	8	17
4	Vehicle performance testing: Effect of vehicle condition Tyre and road condition and traffic condition and driving habits on fuel, Gradeability test, Turning circle diameter test, Steering Impact test, Steering effort test, Mechanism of corrosion- three chamber corrosion testing, Wind tunnel testing, Road testing, Two wheel &four-wheel dynamometers	10	22
5	On road testing: Initial inspection, PDI, Engine running in and durability, Intensive driving, Maximum speed and acceleration, brake testing on the road, hill climbing, handling and ride characteristics, Safety, Methods for evaluating vehicle performance- energy consumption friction losses, transmission line losses, heat balance, performance engine ,gear box ,differential, aerodynamic loss, emission etc.	8	17
6	Wheels: Vehicle testing lanes - side slip testers, Wheel alignment testing, Wheel balancing.	3	7
7	Vehicle component and system testing: Wheel rim testing for cornering and radial fatigue, Bumper test, Crash test, Dummies crash test sensor, sensor mounting positions, Side impact test, Rollover test, Safety belt test, Safety belt anchorages, Seat anchorages & head restraints, Side door intrusion test, Head light alignment and light intensity testing.	6	10

References:

a) List of Books

1. Raymond M. Brach and R. Matthew Brach, "Vehicle Accident Analysis and Reconstruction Methods", SAE International, 2011
2. J. G. Giles – Vehicle operation and performance, Wildlife Publications, London, 1969.



3. W. H. Crouse and L. Anglin – Motor vehicle inspection, McGraw Hill Book Co. 1978.
4. Dr. N.K.Giri- Automotive technology – Khanna publishers, 2009
5. Ulrich Seiffert and LotharWech, “Automotive Safety Handbook”, SAE International, 2007

Suggested Theory distribution:

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
30%	30%	20%	20%	0	0

Suggested List of Tutorials/Experiments

1. To study the performance characteristics of automobile petrol, diesel and alternative fuel engine
2. Testing and Calibration of fuel injection pump.
3. Calibration of Diesel Injectors.
4. Head light beam alignment and testing.
5. Measurement of Brake stopping distance.
6. Vehicle testing on chassis dynamometers.
7. Analyze the emissions of petrol, diesel and CNG vehicles using exhaust gas analyzer.
8. Performance of Gradeability test.
9. Measurement of steering effort.
10. Study Pass by noise test.

Instructional Method:

1. Lectures with PPT and Notes