

1. Preamble

Students undergoing this course are expected to gain knowledge on testing and certification of passenger vehicles and its component.

2. Pre-requisite

NIL

3. Links to Other Courses

NIL

4. Course Educational Objectives

Students undergoing this course are expect to

- To understand the vehicle classifications, regulations and need for certification
- To learn the various static & dynamic test to be done on vehicle
- To impart knowledge about the various tests performed on engine

5. Course Outcomes

Upon the successful completion of the course, learners will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
C01	Classify the vehicle and identify the regulations governing for each vehicle type	K2
C02	Perform and analyze the Static & Dynamic test of any vehicle	K2
C03	Perform various test related to vehicle engine emissions	K2
C04	Test and analyze the performance of vehicle components	K2
C05	Perform the tests to be done on the vehicle lighting system	K2

6. Correlation of COs with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	H	H	H	M	L		L	L		M	L	M	H
CO2	H	H	H	H	M	L		L	L		M	L	M	M
CO3	H	H	H	H	M	L		L	L		M	L	M	H
CO4	H	H	H	H	M	L		L	L		M	L	M	H
CO5	H	H	H	H	M	L		L	L		M	L	L	H

H- Strong; M-Medium; L-Low

7. Course contents**UNIT I INTRODUCTION**

L-9

Specification & Classification of Vehicles (Including M, N And O Layout), Homologation & Its Types, Regulations Overview (EEC, ECE, FMVSS, AIS, CMVR), Type Approval Scheme, Homologation for Export, Conformity of Production, Various Parameters, Instruments and Types of Test Tracks.

UNIT II STATIC TESTING OF VEHICLE

L-9

Photographs, CMVR Physical Verification, Tyre Tread Depth Test, Vehicle Weightment, Horn Installation, Rear View Mirror Installation, Tell Tales, External Projection, Wheel Guard, Arrangement of Foot Controls for M1 Vehicle, Angle & Dimensions Measurement of Vehicle, The Requirement of Temporary Cabin for Drive – Away - Chassis.

UNIT III DYNAMICS TESTING OF VEHICLE **L-9**

Hood Latch, Gradeability, Pass-By Noise, Interior Noise, Turning Circle Diameter & Turning Clearance Circle Diameter, Steering Effort, Constant Speed Fuel Consumption, Cooling Performance, Speedo-Meter Calibration, Range Test, Maximum Speed, Acceleration Test, Coast-Down Test, Brakes Performance ABS Test, Broad Band / Narrow Band Emi Test. Engine Power Test (Petrol & Diesel), Indian Driving Cycle, Vehicle Mass Emission, Evaporative Emission (Petrol Vehicles).

UNIT IV VEHICLE COMPONENT TESTING **L-9**

Horn Testing, Safety Glasses Test - Windscreen Laminated and Toughened Safety Glass, Rear View Mirror Test, Hydraulic Brakes Hoses Fuel Tank Test - Metallic & Plastic, Hinges and Latches Test, Tyre & Wheel Rim Test, Bumper Impact Test, Side Door Intrusion, Crash Test With Dummies, Demist Test, Defrost Test, Interior Fittings, Steering Impact Test (Gvw<1500 Kg), Body Block Test, Head Form Test, Driver Field of Vision, Safety Belt Assemblies, Safety Belt Anchorages, Seat Anchorages & Head Restraints Test, Airbag Test, Accelerator Control System.

UNIT V VEHICLE LIGHTING TESTING **L-9**

Installation Requirement for Lighting, Signaling & Reflective Devices Installation, Conspicuity & Reflective Marking, Photometry Test - Performance Requirement for Lighting, Signaling and Reflective Devices - Head Lamp, Front Lamp, Direction Indicator Lamp, Signaling Lamp and Warning Triangles.

8. Text Books

1. Vehicle Inspection Handbook by American Association of Motor Vehicle Administrators
2. Michael Plint & Anthony Martyr, "Engine Testing & Practice", Butterworth Heinemann, 3rd edition, 2007

9. References

1. Proceedings- Automotive Testing & Certification held on 20th to 24th July 2010 at ARAI, Pune
2. Bosch Automotive Handbook
3. Motor Vehicle Manual
4. BIS & AIS
5. ECE
6. EEC
7. FMVSS
8. CMVR