

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (I.C. ENGINE & AUTOMOBILE ENGINEERING) (11)

AUTOMOTIVE TESTING AND CERTIFICATION

SUBJECT CODE: 2741102

SEMESTER: IV

Type of course: Advanced

Prerequisite: - Nil

Rationale: This subject is concerned with the automotive testing and certification of Automobile vehicle on a road surface. The course is designed to provide understanding about classification and specification of vehicles and engines. This course also aims to build higher level cognitive skill of future engineers for analyzing vehicle and component related tests. The knowledge of this subject is essential to understand the installation and testing of different types of systems.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
|-----------------|----|---|---------|-------------------|--------|-----------------|--------|----|----|-------------|
| L | T | P | | Theory Marks | | Practical Marks | | | | |
| | | | ESE (E) | PA (M) | PA (V) | | PA (I) | | | |
| | | | | | ESE | OEP | PA | RP | | |
| 3 | 2# | 0 | 4 | 70 | 30 | 30 | 0 | 10 | 10 | 150 |

Content:

| Sr. No | Course Content | Hours | % Weightage |
|--------|---|-------|-------------|
| 1 | <p>Unit 1: INTRODUCTION: Classification of vehicles (including M, N and O layout), regulations overview (ECE, EEC, FMVSS, AIS, CMVR, ADR), specifications of vehicles & engines.</p> | 10 | 22% |
| 2 | <p>Unit 2: 4-WHEELER PASSENGER VEHICLES-M1 CATEGORY (Vehicle Related Tests):</p> <p>Photographs, CMVR physical verification, Vehicle weighment, Coast down test, Brake test, ABS, Turning circle diameter test, Steering effort test, Speedometer calibration, Pass by noise test, External projection test, Wheel guards, Hood latch test, Tell tale symbols, Gradeability test, Documentation VEL, Accelerator control system, Horn installation, Rear view mirror installation, Installation requirements for lighting & signaling devices, Windscreen Wiping system.</p> <p>Wheel Nuts, Wheel Cap & Hub Cap, Vertical orientation for dipped beam - head lamp, Interior Fittings, Driver's field of vision (M1 category), Steering Impact test (GVW < 1500 kg) , Body block test, Head form test, Fixture charges, Crash test, Bumper Testing, Documentation SHL, Engine power & smoke (diesel engine),</p> <p>Engine power (petrol engine), Vehicle - mass emission, Evaporative emission (petrol vehicles only), Broad band / Narrow band EMI test, Safety belt assemblies, Safety belt anchorages, Seat anchorages and head restraints., Engine power petrol, Engine power Diesel, Crash test with Dummy, OBD I,</p> | 18 | 39% |

| | | | |
|---|---|----|-----|
| | Certification Charges. | | |
| 3 | <p>Unit 3 : 4-WHEELER PASSENGER VEHICLES-M1 CATEGORY (Component Related Tests):</p> <p>Size and Ply rating of tyres, Safety Glasses: 1. Windscreen laminated safety glass 2. Side window / door glass 3. Back light / rear toughened glass; Windscreen wiping system, Wiper Blade, Reflector, Horn, Automotive lamps, Hydraulic brake hose, Hydraulic brake fluid, Wheel rims, Rear View Mirror Specifications(Exterior), Rear View Mirror Specifications(Interior),</p> <p>Wheel nuts , wheel discs & hub caps, Door locks & door retention, Performance requirements for Lighting & Signaling devices, Head lamp assembly (Glass lenses), Head lamp assembly (Plastic lens), Head lamp + Fr. Position lamp / Fr. Direction Indicator lamp / Fr. Fog lamp, Rear combination lamp (each additional function), Independent Fr. Position lamp / Fr. Direction Indicator lamp / Fr. Fog lamp, Rear combination lamp (single function), Fuel tank : Metallic, Plastic (excluding fire resistance test), Bumper (F&R), Warning Triangles, Safety belt assemblies, Safety belt anchorages, Seat anchorages and head restraints.</p> | 18 | 39% |

BOOKS & REFERENCES:

- | | |
|------------------------------|-----------|
| 1. Bosch Automotive Handbook | 5. FMVSS, |
| 2. Motor Vehicle Manual | 6. AIS, |
| 3. ECE, | 7. CMVR, |
| 4. EEC, | 8. ADR |

Course Outcome:

After successful completion of the course, student will be able to:

- Classification and Specification of various vehicle and engine.
- Four wheeler vehicle related test.
- Four wheeler component related test.

Design based Problems (DP)/Open Ended Problem:

Group Discussion / Technical Debate on advanced topic.

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.