GUJARAT TECHNOLOGICAL UNIVERSITY

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

FUNDAMENTALS OF I.C ENGINE AND AUTOMOBILE

SUBJECT CODE: 2711109

SEMESTER: II

Type of course: Advanced

Prerequisite: - Nil

Rationale: All automotive vehicles are powered by automobile engines. Hence the fundamental knowledge of automobile engine is most essential for an automobile engineer. This course will help the students to get fundamental knowledge in working of various types of engines, and their different associative systems like lubricating systems, cooling systems, fuel systems, etc. Knowledge of this course will also be helpful to the students in recent advancements in engines and other associative systems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	0	4#	5	70	30	20	10	10	10	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	**Unit-I Introduction to I.C Engine**:; Engine types and their operation; classification; Actual cycle; air fuel cycle; combustion charts (Equilibrium); Two stroke engines; four stroke engine; characteristics of engines; air capacity of engine; valve timing diagram; importance of volumetric efficiency Fundamentals of Automotive Electronics, Microprocessor and micro computer applications in automobiles, Components for engine management system.	10	**24**
2.	**Unit-II Engine Components, Material, construction and design aspects**; piston assembly; connecting rod; crankshaft; cylinder head; cylinder block; flywheel, ports; valves; valve actuating mechanism; cams; camshaft drives; vibration damper.	8	**18**
3.	**Unit-III Fuel Supply in SI Engines**:; Carburetion and mixture requirements; Transfer pump; Carburettors - types, constructional and design aspects; Mixture distribution and inlet manifold; The concept of multipoint fuel injection system, Fuel Supply in CI Engines; Injection system components; Jerk and Distributor pumps; Mechanical and Pneumatic governors; Injectors. CRDI system	10	**24**
4	**Unit-IV** Stratified Charged; Low heat rejection engine; four / three valve engine; OHC engine; MPFI; VVT; cam less engine; New engine technology; Recent developments in I. C. engines.	7	**17**
5	**Unit-V** Automotive electrical system; Basic transmission systems;	7	**17**

	suspension systems; steering systems; tyre and wheel; handling and maintenance; Troubleshooting and repairs.		

Reference Books:

1.Introduction to Internal Combustion Engines", Richard Stone, McMillan, London
2. Internal Combustion Engines Fundamentals – John B. Heyhood, McGraw Hill
3. Vehicle and Engine Technology – Hein Heister
4. I.C. Engine by Maleev V. L., McGraw Hill Book, Co.
5. I. C. Engines – Ferguson
6. I. C. Engines – C. Fayette Taylor & Edward S. Taylor, International text book com
7. I. C. Engine & Air Pollution – E. F. Obert, Harper & Row Publishers, New York
8. Automotive Engines - Herbert E. Ellinger
9. Automobile Electrical & Electronic Equipments - Young, Griffitns - Butterworths, London
10. Fundamentals of Automotive Electronics - V.A.W.Hilliers - Hatchin, London
11. I.C Engine, R.K.Singhal
12. I.C Engine, Mathur and Sharma
13. I.C Engine, Domkundwar

Course Outcome:

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

- Understand the basic concept of I C engine.
- Understand the design and material aspect of various component
- Understand various types of fuel supply and its component
- Understand new development in automobile engine
- Understand various systems of automobiles

List of Experiments:

1. To Study various engine components, material and design aspects.
2. Testing of Internal combustion engine as per IS Standards.
3. Study and Performance analysis of two stroke Petrol Engine.
4. Study and Performance analysis of four stroke Petrol Engine.
5. Study and Performance analysis of four stroke Diesel Engine.
6. Study of MPFI and CRDI systems
7. Study of ignition , cooling, lubrication systems
8. Study of clutch and Transmission systems
9. Study of automotive brakes , suspension and steering systems
10. Study of Recent developments in the field of I.C. Engine and Automobile.

Open Ended Problems:

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.