

In addition to part-I (general handout for all courses in the time-table), this handout provides the specific details regarding the course.

Course No.: ME F317

Course Title: Engines, Motors and Mobility

Instructor-in-charge: N JALAI AH

Instructor(s): N Jalaiah, S S Deshmukh, G V N Trivedi, M Sitaram, K Monika, S Sanghamitra

- Course Description:** Introduction – injection & ignition systems, lubrication and cooling, measurement and testing, emissions and control; fuel-air cycles; actual cycles; conventional fuels; combustion; alternate fuels; modern mobility solutions; electric and hybrid vehicles; comparison of conventional vehicles with electric vehicles in terms of advantages, disadvantages, and applications.
- Scope and Objective:** This course is designed to make the students familiar with the working principles of an internal combustion engines. It deals with the principle of operations, fuels, combustion and performance of an internal combustion engines; along with working analysis and design of various systems. It also presents the current trends in hybrid and electric vehicles.
- Text Book:**
V. Ganesan, Internal Combustion Engines, Tata McGraw-Hill, 4th Edition, 2012

Reference Books:

- M. L. Mathur and R. P. Sharma, A course in Internal Combustion Engines, Dhanpath Rai and Sons.
- R. Rogowski, Elements of I. C. Engines, Tata McGraw-Hill.

4. Course Plan:

Lecture Nos.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1-5	Introduction to IC Engines, Air standard cycles and their analysis, Fuel-air cycles and their analysis	Working principle, classification and performance parameters of an IC Engines, Otto, Diesel and Dual cycle, Variable specific heats, Dissociation, Comparison of Otto standard and fuel air cycle	1, 2 & 3
6-7	Actual cycle and their analysis	Valve-timing diagram, Time loss factor, Heat loss factor, Exhaust blow down	4
8	Conventional and Alternative Fuels	Conventional fuel, Liquid fuels, Possible alternative fuels	5 & 6
9-10	Carburetion	Carburetion, Engine mixture requirements, Simple carburetor, Calculation of air fuel ratio	7
11-12	Mechanical and Electronic injection system	Classification, Fuel feed Pump, Injector, Nozzle, MPFI and ECU	8 & 9
13-14	Ignition	Battery ignition system, Magneto ignition system, Modern ignition systems	10

Lecture Nos.	Learning Objectives	Topics to be covered	Chapter in the Text Book
15-16	Engine friction and lubrication	Mechanical friction. Lubrication, Properties of lubricant	12
17-18	Heat rejection and cooling	Temperature distribution, Liquid and Air cooling system	13
19	Engine Emissions and their control	Hydrocarbon and other emissions, Converter	14
20-22	Measurement and Testing, Performance parameters and characteristics	Measurement of IP, BP, etc, Efficiency and heat balance sheet	15 & 16
23	Supercharging	Supercharger, Supercharging methods	18
24-28	Electric and hybrid vehicles	Engine electronics, Electric and hybrid vehicles and their comparison	17 & Class notes

5. Evaluation Scheme:

Evaluation Component	Duration (min)	Weightage (%)	Date & Time	Nature of the Component
Tutorial Test	---	30	Tutorial Class (Best 8 out of 10)	OB
Mid-Sem Test	90	30	04-11-2022, 9.00 – 10.30 AM	CB
Comprehensive Exam	180	40	27-12-2022, FN	CB

6. **Chamber Consultation Hour:** To be announced in the classroom.

7. **Notices:** Students are advised to visit regularly **CMS** (institute's web based course management system) for updates and notices.

8. **Make-up Policy:** Make-up shall be given only to the genuine cases with prior intimation.

9. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge
ME F317