BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI-HYDERABAD CAMPUS

FIRST SEMESTER 2022-2023

Course Handout (Part II)

29/08/2022

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 F242
Course Title: IC Engines
Instructor-in-charge: Mrinal K. Jagirdar

Course Description:

Working cycles and operation of two strokes, four stroke SI and CI engine cycles. Ignition, combustion, alternative fuels, emission and their control.

Scope and Objective:

This course has been 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.

Text Books:

V. Ganeshan, *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.
A. R. Rogowski, Elements of I. C. Engines, Tata McGraw-Hill.

Course Plan:

Lect No.	Learning Objectives	Topics to be covered	Chapter in the Text Book

1-3	Introduction to IC Engines	Working principle, classification and performance parameters of an IC Engines	Ch 1
4-6	Air standard cycles and their analysis	Auto, Diesel and Dual cycle.	Ch 2
7-9	Fuel-air cycles and their analysis	Variable specific heats, Dissociation, Comparison of air standard and fuel air cycle	Ch 4
10-11	Actual cycle and their analysis	Valve-timing diagram, Time loss factor, Heat loss factor, Exhaust blow down	Ch 5
12	Conventional and	Conventional fuel, Liquid fuels, Possible	Ch 6 & 7
	Alternative Fuels	alternative fuels	
13-14	Carburetion	Carburetion, Engine mixture requirements, Simple carburetor, Calculation of air fuel ratio	Ch 8
15-16	Mechanical and Electronic injection system	Classification, Fuel feed Pump, Injector, Nozzle, MPFI and ECU	Ch 9 & 10
17-18	Ignition	Battery ignition system, Magneto ignition system, Modern ignition systems	Ch 11
19-20	Engine friction and lubrication	Mechanical friction. Lubrication, Properties of lubricant	Ch 13
21-22	Heat rejection and cooling	Temperature distribution, Liquid and Air cooling system	Ch 14
23	Engine Emissions and their control	Hydrocarbon and other emissions, Converter	Ch 15
24-25	Measurement and Testing, Performance parameters and characteristics	Measurement of IP, BP, etc, Efficiency and heat balance sheet	Ch 16 & 17
26	Supercharging	Supercharger, Supercharging methods	Ch 19
27-28	To know the engines	All the systems of an IC engines	Lab Visit

Evaluation Scheme:

Sr.	Evaluation	Duratio	Weighta	Date, Time and	Nature of

No.	Component	n	ge (%)	Venue	Component
01	Mid Semester Test	90 min	30	TBA	Closed Book
02	Class Test	50 min	10	lecture hour	Open Book
03	Assignment	-	20	-	Open Book
04	Compre.	3 hours	40	TBA	Closed Book

Chamber Consultation Hours:

To be announced in the class.

Notices:

All notices related to this course will be put on the CMS/Mechanical Engineering Group Notice Board.

Make-up Policy:

Make-up will be given to extremely genuine student, but prior permission is required. No make-up will be given for the surprise tests. Surprise tests may be conducted in either lecture hour or tutorial/common hour.

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 F242