Date: 05/01/2016

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: I C Engines
Instructor-in-charge: **Anil Jindal**
Instructors: Ravi Inder Singh and Sachin U Belgamwar

Scope and Objective: This course has been design to make the students familiar with the internal combustions engines, working principle of different engines, combustion, performance testing and alternative fuels Emission control of engines.

Text Book:

T1: V.Ganesan, Internal Combustion Engines, Tata McGraw-Hill Pub. Co. Ltd, New Delhi, 4th Edition.

Reference Book:

R1: M. L. Mathur, R. P. Sharma, "**A Course in Internal Combustion Engines",** Dhanpat Rai and Sons, New Delhi, 2005.

R2: Johan B. Heywood, "**Internal Combustion Engine Fundamentals**", Tata McGraw-Hill Edition, 2013.

Course Plan:

Lect. No	Learning Objectives	Topics to be covered	Ref to text book
1	Introduction to IC Engines	Concept of IC engine, parts of IC Engines, and classifications.	Ch-I
2	Introduction to IC Engines	Working of 4-stroke engine and 2 stroke engine, Comparison of 4-stroke and 2-stroke engine, and comparison of SI and CI engines, valve timing diagrams	Ch-1
3	Air-standard cycles and their analysis	Air standard assumptions, analysis of Otto, Diesel and Dual cycles and their comparison.	Ch-2
4	Fuel-air cycles and actual cycle	Variable specific heats. Dissociation. Valve-timing diagram. Time loss factor. Heat loss factor. Exhaust blow down.	Ch-3 and 4
5	Combustion in SI Engine	Ignition limits, Stages of combustion in SI engine, effect of engine variables on ignition lag and flame propagation	Ch.11
6	Combustion in SI Engine	Knocking, factors affecting knocking and its control	Ch.11

Lect. No	Learning Objectives	Topics to be covered	Ref to text book
7-8	Combustion in CI Engines	Stages of combustion in CI engines and factors affecting Combustion and knocking in CI engines and its control	Ch-11
9	Fuels	Conventional and alternate fuels for IC engines and their rating	Ch. 5 and 6
10	Carburetion.	Principle of Carburetion. Engine mixture requirements. Simple carburetor, Strainers. Float chamber. Choke. Throttle	Ch-7
11	Carburetion.	Calculation of air fuel ratio, Compensation devises, Types of carburetor, Altitude compensation	Ch-7
12-13	Mechanical Fuel injection systems	Classification of injection systems, Air injection system. Solid injection system. Injection pumps. Fuel injection components in CI engines and their importance	Ch-8
14	Electronic injection systems	Types of injection systems, components of injection system, MPFI system.	Ch-9
15-16	Friction and Lubrication.	Lubrication system of IC engine and their working. Types of cooling system and temperature control. Engine emission and pollution control and norms of emission.	Ch.12, Ch.13 and Ch.14.
17	Engine cooling		
18	Emission and control		
19	Pollution control of IC Engines.		
20-21	Performance testing of IC Engines	Performance testing of IC Engines, Heat balance test load test, Morse test and other methods of performance evaluation of IC Engines. Methods of increasing volumetric efficiency. Wankel Engines.	Ch. 15 Ch.16 and Ch.18
22	Load test		
23	Heat balance test		
24	Supercharging and turbo chargers		
25	Rotary IC Engines		
26	Two-Stroke Engines	Types of two-stroke engines, Scavenging parameters, advantages and disadvantages of two stroke engines.	Ch-19

Evaluation Scheme:

Components	Duration	Weightage (%)	Date & Time	Remarks
Tutorial Tests	50 min	20	Tute Hour, Surprise in nature	4 best out of 6 (Open Book)
Lecture/Class Performance	50 min.	10	Lecture Hour, Surprise in nature	Best one out of two (Closed-Book)
Mid Semester Test	90 min	30	16/3 2:00 -3:30 PM	Closed-Book
Comprehensive Examination	180 min	40	9/5 FN	Open-Book & Closed-Book

Mid-semester grading: It will be announced normally in the month of March. It is done in the same manner as that of the final grading.

Chamber Consultation Hours: Chamber No 2218(A), Timing to be announced in the class.

Notices: All notices related to this course will be put on the Mechanical Engineering Group notice board or Nalanda Website.

Make-up Policy: Make-up will be given only to the genuine students. The request application for make-up test must reach the Instructor-in-charge before commencement of the scheduled test (documentary proof is essential). **No make-up will be allowed for the Tutorial tests and Class performance/participation tests.**

Anil Jindal
Instructor-in-charge
IC Engines (ME F242)