

Lesson Plan

Subject : **Internal Combustion Engines (MEP-302A)**

Lesson plan Duration : **15 Weeks**

Work load (Lecture/Tutorial/Practical) per week: L / T / P: 3 / 2 / 4 (Hrs)

Lecture No	Theory	Practical	
		Practical Day	Topic
1	Brief detail regarding syllabus and overview of subject, books required	1	To make a trial on single cylinder 4-stroke Diesel Engine to calculate B. H. P., S.F.C. and to draw its characteristics curves.
2	Unit-1 Introduction to heat engines, Internal and external combustion engines; Classification of I.C. Engines.		
3	Cycle of operations in four strokes and two-stroke IC engines		
4	Wankle Engine, Assumptions made in air standard cycles; Otto cycle		
5	Diesel cycle; Dual combustion cycle	2	To make a trial on 4-stroke high-speed diesel engine and to draw its Heat Balance Sheet.
6	Comparison of Otto, diesel and dual combustion cycles		
7	Sterling and Ericsson cycles; Air standard efficiency,		
8	Specific work output. Specific weight; Work ratio	3	To make a trial on Wiley's jeep Engine at constant speed to calculate B. H. P., S. F. C. Thermal efficiency and to draw its characteristic Curves.
9	Mean effective pressure; Deviation of actual engine cycle from ideal cycle.		
10	Problems		
11	Unit-2 Carburetor and Injection systems: Mixture requirements for various operating conditions in S.I. Engines		
12	Elementary carburetor, Calculation of fuel air ratio; The complete carburetor	4	To make Morse Test to calculate IHP of the multi cylinder petrol engine and to determine its mechanical efficiency.
13	Requirements of a diesel injection system; Type of injection system		
14	Petrol injection; Requirements of ignition system		
15	Types of ignition systems, ignition timing; Spark plugs.		
16	Engine parameters and knocking: S.I. engines; Ignition limits; Stages of combustion in S. I. Engines; Ignition lag	5	To calculate the isothermal efficiency and volumetric efficiency of a 2 stage reciprocating air compressor.
17	Velocity of flame propagation; Detonation; Effects of engine variables on detonation		
18	Theories of detonation; Octane rating of fuels; Pre-ignition; S.I. engine combustion chambers		

19	Stages of combustion in C.I. Engines ; Delay period; Variables affecting delay period.		
20	Knocking C.I. Engines; Cetane rating; C.I. Engine combustion chambers. Numericals.		To find out the efficiency of an airBlower.
21	Unit-3 Lubrication and cooling systems: Functions of a lubricating system, Types of lubrication system	6	
22	Mist, Wet sump and dry sump systems; Properties of lubricating oil; SAE rating of lubricants		
23	Engine performance and lubrication		
24	Necessity of engine cooling; Disadvantages of overcooling		7
25	Cooling systems; Air-cooling, Water-cooling; Radiators		
26	Heat balance and emission control: Performance parameters ; BHP, IHP, Mechanical efficiency		
27	Brake mean effective pressure and indicative mean effective pressure, Torque, Volumetric efficiency		
28	Specific fuel consumption (BSFC, ISFC); Thermal efficiency; Heat balance; Basic engine measurements	8	To study the following models; Gas Turbine, Wankle Engine
29	Fuel and air consumption, Brake power, Indicated power and friction power, Heat lost to coolant and exhaust gases		
30	Performance curves; Pollutants from S.I. and C.I. Engines; Methods of emission control		
31	Alternative fuels for I.C. Engines; The current scenario on the pollution front.		
32	Unit-4 Air compressor: Working of a single stage reciprocating air compressor; Calculation of work input	9	To study Lubrication and cooling systems employed in various I. C. Engines in the Lab, Braking system of automobile in the lab
33	Volumetric efficiency; Isothermal efficiency; Advantages of multi stage compression		
34	Two stage compressor with inter-cooling; Perfect inter cooling		
35	Optimum intercooler pressure; Rotary air compressors and their applications		
36	Isentropic efficiency, Gas turbine: Brayton cycle; Components of a gas turbine plant; Open and closed types of gas turbine plants	10	To study a Carburetor
37	Optimum pressure ratio; Improvements of the basic gas turbine cycle		
38	Multi stage compression with inter-cooling; Multi stage expansion with reheating between stages		
39	Exhaust gas heat exchanger; Application of gas turbines.		
40	Numerical & doubts		