

II B. Tech – II Semester
(20ME4646) AUTOMOBILE ENGINE DESIGN

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	4

Pre-Requisites: Thermal Engineering, Machine design

Course Objectives:

The Students will acquire the knowledge

- To interpret the engineering materials and their physical properties applied to design.
- To discuss the concepts Limits, fits, tolerances, surface finish and design shafts and springs.
- To outline the concepts of design of cylinder and piston.
- To discuss design of connecting rod, crankshaft.
- To outline the design of valves and flywheel.

UNIT –I: Introduction:

Engineering materials and their physical properties applied to design, selection of materials, factor of safety, endurance limit, notch sensitivity, principles of design optimization, future trends, computer aided drafting.

UNIT–II: Limits, fits, tolerances, surface finish, shafts and springs:

Definitions, types of tolerances and fits, design considerations for interference fits, surface finish, surface roughness, design of power transmission shafts, design of helical springs.

UNIT – III: Design of cylinder and piston:

Choice of material for cylinder and piston, piston friction, piston slap, design of cylinder, piston, piston pin, piston rings, piston failures, lubrication of piston assembly.

UNIT – IV: Design of connecting rod, crankshaft:

Material for connecting rod, determining minimum length of connecting rod, small end and big end design, shank design, design of big end cap bolts, connecting rod failures, balancing of I.C. Engines, significance of firing order, material for crankshaft, design of crankshaft under bending and twisting, balancing weight calculations.

UNIT – V: Design of valves and flywheel:

Design aspects of intake and exhaust manifolds, inlet and Exhaust valves, valve springs, tappets, valve train. Materials and design of flywheel.

Course Outcomes:

A student who successfully fulfills this course requirement will be able to:

S. No	Course Outcome	BTL
1.	Illustrate the concepts of engineering materials and their physical properties applied to design.	L2
2.	Explain the concepts Limits, fits, tolerances, surface finish and design shafts and springs.	L2

3.	Summarize the concepts of design of cylinder and piston.	L3
4.	Describe the theory of design of connecting rod, crankshaft.	L3
5.	Outline the concepts of design of valves and flywheel.	L3

Correlation of Cos with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	1	3	3	1	1	1	1	1	2	2
CO2	3	3	2	2	1	2	1	0	3	2	1	1	3	3
CO3	3	3	2	3	1	1	3	1	2	1	0	1	3	2
CO4	3	3	3	3	1	3	1	1	2	3	2	0	3	2
CO5	3	3	2	2	2	3	2	0	3	1	1	1	3	2

Text Books

1. R.K. Jain, "Machine Design", Khanna Publishers, New Delhi, 1997.
2. "Design Data Book", PSG College of Technology, Coimbatore, 2000.

References:

1. P.M.Heldt "High Speed Combustion Engines", Oxford-IBH Publishing Co., Calcutta, 1965.
2. A.Kolchin and V.Demidov, "Design of Automotive Engines", MIR Publishers, Moscow, 1984.
3. Sundararaja Murthy T.V "Machine Design", Khanna Publishers, New Delhi, 1991.