

ATF 222 - Automobile Systems Design

(02 credits – 50 marks)

Learning Objectives:

The course should enable students:

1. Understand the basic of various automobile systems
2. Explain construction & working of automobile systems.

Learning Outcomes:

After completion of the course, students are expected to be able to:

1. Know requirements and design procedures of automobile systems.
2. Design automobile systems as per specifications.
3. Know recent developments in automobile systems.

Course Content:

Module –I: Components Selection

(4 Hours)

Tyre selection, air resistance, rolling resistance, requirement of engine power, transmission system layout, four wheel drive, transfer case

Module –II: Transmission systems

(8 Hours)

Clutch, types of clutch, clutch design, Gear box, types of gear boxes, gear box design, overdrive gears, Fluid flywheel & torque converter, Epicyclic gear box, semi-automatic & automatic transmission, Propeller shaft, design of propeller shaft, slip joint, universal joint, Final drive, differential, Dead & live axle, axle design, Constant velocity joints

Module –III: Braking system:

(6 Hours)

Types of brakes, brake-actuating mechanisms, factors affecting brake performance, power & power assisted brakes, Brake system design, Recent developments in transmission & braking system

Module –IV: Steering systems:

(6 Hours)

Front axle types, constructional details, front wheel geometry, Condition for True rolling, skidding, steering linkages for conventional & independent suspensions, turning radius, wheel wobble and shimmy, power and power assisted steering,

Module – V: Tutorials, Case studies and presentation based on Module I to IV (06 Hrs)

References

1. Reimpell J., “The Automotive Chassis – Engineering Principle” – 2nd Edition, ISBN 9781493302864
2. P. Lukin, G. Gaspariyarts, V. Rodionov, “Automotive Chassis – Design & Calculation”, MIR Publishing, Moscow, ISBN, 1-55623-603-4

3. P. M. Heldt, "Automotive Chassis" ,Chilton Co. NK, ISBN-13: 9781114312395
4. W. Steed, "Mechanics of Road Vehicles" , Illiffe Books Ltd., London ASIN: B0000CKKGV
5. [Keith J Nisbett](#) and [Richard G Budynas](#), "Mechanical Engineering Design" ,Mcgraw Hill Series, 2013, ISBN 13: 9780073529288
6. R. B Gupta, "Auto design", Satya Prakashan, ISBN-13: 9788176840101
7. V.B.Bhandari, "Design of Machine Elements", Tata McGraw Hill publication, 2010, ISBN: 0070681791