

ATF 122 - Automotive Transmission Systems

(02 credits – 50 marks)

Learning Objective:

1. To impart knowledge about the critical importance of the transmission system in an automobile
2. To create awareness about the evolution, components involved and different types of transmission system widely used in automobiles.

Learning Outcomes:

1. Differentiate various types of gearbox, its working, Analyse gear ratios for various types of gear boxes for real time applications
2. Be familiar with epicyclic gear trains, its types, operations, merits & demerits.

Course Content:

Module-I: Clutch

05 hrs

Need for Transmission system, Tractive Effort and Resistances to Motion of a vehicle, Requirements of transmission system, Classification of Transmission systems, Multi axle drives, Clutch principle and constructional details, types of clutches, Modes of operating a clutch – mechanical, hydraulic and Electric, Automatic Clutch, Over-running clutch, numerical on power transmission of clutch.

Module – II: Gearbox

07 hrs

Determination of gear ratios for vehicles, Performance characteristics in different speeds, Different types of gear boxes – sliding, constant and synchromesh type, Need for double declutching and working of synchronizing unit, Power and economy modes in gearbox. Transfer box. Transaxles. Overdrives. Gear shifting mechanisms, Torque convertor, Automatic transmission with intelligent electronic control system.

Module – III: Propeller Shaft and Differential Drive

05 hrs

Introduction, propeller shaft, types of propeller shafts, Universal joint, Slip joint, Two yokes and Spider Universal joint, Final drive, Differential, Arrangements of differential, Backlash, Rear axle, Rear axle drives: Hotchkiss drive, Torque tube drive, Rear axle shaft supporting: Semi-floating axle, Full- Floating axle, Three quarter floating axle, Rear axle casing, Lubrication of rear axle.

Module – IV: Wheel and Tyres

07 hrs

Types of wheels, Desirable tyre properties, types of tyre, Carcass type, tyre materials, tyre designation, Consideration in tread design, Wheel and tyre trouble shooting, tyre designations, tyre manufacture, factors affecting tyre life, tyre wear indicators.

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

References:

1. *Motor Vehicle* by Garrett, T. K. Newton, K. and Steeds, W., Butterworth London,, 13th Edition, (2005), ISBN- 10: 1560918985 ISBN- 13: 9781560918981 .
2. Judge.A.W., " Modern Transmission systems ", Chapman and Hall Ltd (1969), ISBN-13: 9780412094507.
3. Crouse. W.H., Anglin., D.L., "Automotive Transmission and Power Trains construction Tata McGraw -Hill Publishing Co.
4. Design Practices, passenger Car Automotive Transmissions- SAE Hand book.
5. Kirpal Singh, "Automobile Engineering Vol-1", Standard Publications (2007), ISBN-10 8180140997 ISBN-13 9788180140990