

B.Tech IV Year I Semester

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

19AME74a- AUTOMOTIVE TRANSMISSION SYSTEM

(Professional Elective-III)

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Course Objectives: The objectives of the course are to make the students learn about

- Explain operation and performance of various clutches and gear boxes.
- Familiarize hydrodynamic drives.
- Teach various types of gear boxes used for automotive transmission
- Impart principle of operation and performance of various hydrostatic and electric drives provide.
- Identify the applications of automatic transmission

UNIT – 1: Clutch & gear box:

10 Hrs

Requirements of transmission system and role of clutch in driving system, Types of Clutches, Construction and Working of Single Plate, Multi Plate, Cone Clutch, Centrifugal and Semi Centrifugal clutch and its operating characteristics, Equation for torque capacity of a single plate clutch. Need for a gear box in an automobile and types of Gear boxes – Construction and working of Sliding mesh, Constant mesh gear box, Synchromesh gear box and principle of synchronizers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the requirements of transmission system L2
- Recognize the role of clutch in driving system L1
- List various types of clutches L1
- Explain the need of gear box in an automobile L2

UNIT – II: Planetary gear trains:

10Hrs

Construction and working Principle of Epi-cyclic gear train, Planetary gear box, Ford T Model gear box, Wilson gear box, Cotal electromagnetic transmission and Automatic over drive. Gear ratios for Wilson gear box and Automatic Over drive. Hydraulic control system for Automatic transmission.

Learning Outcomes:

At the end of this unit, the student will be able to

- Illustrate working of epicyclic and planetary gear boxes. L2
- Explain electromagnetic transmission. L2
- Demonstrate hydraulic control system for automatic transmission. L2

UNIT – III: Hydrostatic drives:

10Hrs

Introduction to hydrostatic drives, Working principle, types, Advantages and limitations of Hydrostatic drives, Comparison of hydrostatic drive with hydro dynamic drive, Construction and working of Janny Hydrostatic drive.

Hydrodynamic and hydrokinetic drives: Introduction to fluid coupling, Fluid coupling – Construction, Principle of operation and Performance characteristics, Drag torque and various drag reducing devices of fluid coupling, Problems on design and torque capacity of fluid coupling, Construction and working of Torque converter, converter coupling, Multistage torque converter, and Poly phase torque converter - Performance characteristic of multistage and poly phase torque converters.

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Learning Outcomes:

At the end of this unit, the student will be able to

- Explain hydrostatic drives L2
- Differentiate hydrostatic and hydrodynamic drives. L2
- Summarize construction and working of Janny hydrostatic drive L2
- Give the advantages and limitations of hydrostatic drives. L1

UNIT – IV: Automatic transmission applications:

8 Hrs

Layout of Automatic transmission system, construction and working of Turbo glide transmission, Power glide transmission, ECT- intelligent transmission , Automatic transmission with intelligent electronic control systems, Hydraulic clutch actuation for Automatic transmission.

Learning Outcomes:

At the end of this unit, the student will be able to

- Draw layout of automatic transmission system L3
- Compare construction and working different types of transmission L4
- Explain the working of turbo glide transmission and power glide transmission L3
- Identify the importance of intelligent electronic control systems in automatic transmission L2

UNIT – V: Electric Drives:

8Hrs

Introduction to Electric drive: Layout Advantages, limitations and performance characteristics of Electric drive, Principle of Early Ward Leonard control system of electric drive. Principle of Modified Ward Leonard control system of electric drive.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concepts of electric drives. L2
- Contrast the advantages and limitations of electric drives L2
- Explain performance characteristics of electric drives L2

Text Books:

1. Harald Naunheimer , Bernd Bertsche , Joachim Ryborz , Wolfgang Novak "Automotive Transmission:Fundamentals, Selection, Design and Application", 2nd Edition, Springer, 2011.
2. Heldt P.M, "Torque converters", Chilton Book Co., 1992.

Reference Books:

1. Newton Steeds & Garrot, "Motor Vehicles", SAE International and Butterworth Heinemann, 2001.
2. CDX Automotive, "Fundamentals of Automotive Technology, Principles and practice", Jones & Barlett Publishers, 2013.
3. SAE Transactions 900550 & 930910.
4. Crouse W.H, Anglin D.L, "Automotive Transmission and Power Train construction", McGraw Hill, 1976.

Course Outcomes:

At the end of this Course the student will be able to

- Understand the working principles of clutches and gearboxes L2
- Remember the working of planetary gear box. L1
- Identify the differences between the hydrostatic and hydrodynamic drives L2
- discuss various types of automatic transmission systems L3

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