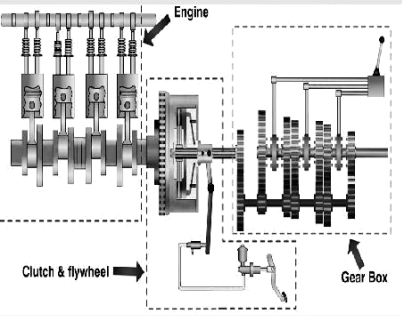

16AE3(AUTOMOTIVE TRANSMISSION

Hours Per Week :

L	T	P	C
2	1	2	4

Total Hours :

L	T	P
30	-	30

WA/RA	SSH/HSH	CS	SA	S	BS
2	40	2	2		-

Course Description and Objectives:

This course offers fundamental and advanced concepts of transmission system based on different vehicle layouts. The objective of the course is to provide comprehensive knowledge on various transmission systems and their components such as gear boxes and hydraulic drives. It also imparts understanding of various automatic transmission systems and their applications along with hydrostatic and electric drives.

Course Outcomes:

The student will be able to:

- understand the competing technologies in current use to provide mechanical power transmission
- understand the fundamental operational principles of modern vehicle based transmission systems
- theorize on the practical application of any of the major common designs to a specific application
- predict and analytically determine the most appropriate transmissions system to satisfy a stated operational need
- review new technologies based on the technical merits and technological extensions employed or proposed

SKILLS:

Conceive and design new layouts and transmission systems based on requirement

Disassemble, inspect and assemble different trasmission systems

Troubleshoot gear box and drive lines

Design alternative/advanced drive concepts.

UNIT - 1 **L-7**

VEHICLE LAYOUTS: Introduction, Classification of automobile, Types of chassis layout with reference to power plant locations and type of drive, Types of chassis- Full forward, Semi forward, Truck or bus chassis

Clutches: Principle, Functions, General requirements, Torque capacity, Types of clutches, Cone clutch, Single-plate clutch, Diaphragm spring clutch, Multi-plate clutch, Centrifugal clutch, Electromagnetic clutch, Lining materials, Over-running clutch, Clutch control systems.

UNIT - 2 **L-7**

GEAR BOX AND HYDRODYNAMIC DRIVES: Objective of the gear box.Problems on performance of automobile such as Resistance to motion, Tractive effort, Engine speed & power and acceleration.Determination of gear box ratios for different vehicle applications. Different types of gear boxes.

Principles, Performance and limitations of fluid coupling, Constructional details of a typical fluid coupling, Reduction of drag torque, Principle, Construction and advantages of hydrodynamic torque converters, Performance characteristics, Converter couplings, Multi-stage Torque converter and poly phase torque converter.

UNIT - 3 **L-5**

AUTOMATIC TRANSMISSION : Ford T model gear box, Wilson gear box, Cotal electric transmission, Hydraulic control systems of automatic transmission.

UNIT - 4 **L-6**

HYDROSTATIC DRIVE AND ELECTRIC DRIVE : Principle of hydrostatic drive systems, Construction and working of typical drives, Advantages and limitations, Control of hydrostatic transmissions, Principle of electric drive, Early and modified Ward Leonard control systems.

UNIT - 5 **L-5**

AUTOMATIC TRANSMISSION APPLICATIONS : Chevrolet Turboglide transmission, Toyota's Automatic transmission with Electronic control system, Continuously Variable Transmission (CVT) types and Operations.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS Total Hours: 30

1. Demonstration and comoparison on different vehicle layouts
2. Constructional features and working of single plate clutch
3. Estimation of power transmission through multiplate clutch
4. Estimation of torque and power trasmission through sliding mesh gear box
5. Construction and operation of continuous variable transmission unit (CVT)
6. Dismantling, inspection and assembling various final drives

ACTIVITIES:

- *Differentiate between different vehicle layouts*
- *Dismantle and assemble different clutches*
- *Estimate power transmission through clutch.*
- *Dismantle, inspect and assemble gear box*
- *Estimate torque and power transmission through sliding mesh gear box*

TEXT BOOKS:

1. T.K. Garrett, K. Newton and W. Steeds, "Motor Vehicle", 13th edition., Butterworth Heinemann, 2001.
2. N K Giri, "Automotive Mechanics", 8th edition., Khanna Publishers, 2012.

REFERENCE BOOKS:

1. J.G.Giles, "Steering, Suspension and Tyres", Lliffe Book Ltd,1995.
2. W.Steed, "Mechanics of Road Vehicles", Lliffe Book Ltd, 2000.
3. Heisler, "Vehicle and Engine Technology", 2nd edition, SAE International Publication,1997.
4. Heisler, "Advanced Vehicle Technology", 2nd edition, SAE International Publication,1998.
5. Mark Hambaum, Chek Chart, "Automatic Transmission and Transaxle Set: Classroom Manual and Shop Manual Package", 4th edition, Prentice Hall PTR, 2004.