

AUTOMOTIVE TRANSMISSION SYSTEMS

CourseCode	20ME5502	Year	III	Semester	I
Course Category	Minor in AE	Branch	ME	Course Type	Theory
Credits	4	L – T – P	3 – 1 – 0	Prerequisites	NIL
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes		Skill	Level	Units
Upon successful completion of the course, the student will be able to				
CO1	Understand the fundamentals and existing technology of various components of Automobiles	Understand	L2	1,2,3,4,5
CO2	Illustrate the significance, operational functions of Clutch and Gear transmission systems	Apply	L3	1,2,3
CO3	Contrast the common types of special transmission and drive axles used in heavy duty commercial vehicles.	Analyse	L4	3,4,5

Contribution of Course Outcomes towards achievement of Program Outcomes														
Strength of correlations (3: High, 2: Moderate, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3									2	2	1
CO2	3		3									2	2	1
CO3	3		3									2	2	1

Syllabus		
UNIT	Contents	Mapped COs
I	CLUTCH: Necessity of clutch in an automobile, different types of clutches, friction clutches namely Single plate clutch, multi plate clutch, cone clutch, centrifugal clutch, electromagnetic clutch, hydraulic clutches, Clutch adjustment /troubles and their causes, requirements, Clutch materials, lining, Vacuum operated clutch, Fluid coupling	CO1, CO2
II	GEAR BOX: The need for transmissions, Necessity of gear box, Desirable ratios of 3-speed & 4-speed gear boxes Constructional details of sliding-mesh gear box, constant-mesh gear box, synchromesh gear box, automatic and semi-automatic transmission, overdrive	CO1, CO2
III	TORQUE CONVERTER AND AUTOMATIC TRANSMISSION: Principal of torque conversion, single, multi stage and polyphase torque converters, performance characteristics, constructional and operational details of typical hydraulic transmission drives. Automatic transmission: relative merits and demerits when compared to conventional transmission	CO1, CO2, CO3

	epicyclic and hydromatic transmission continuously variable transmission.	
IV	<p>SPECIAL TRANSMISSION SYSTEMS: Hydrostatic drives: principles, construction and working of hydrostatic drives, Janney Hydrostatic drive, advantages and limitations Electrical drives: principles of Ward Leonard system of control Modern electric drive for buses and performance characteristics, advantages and limitations</p>	CO1, CO3
V	<p>DRIVE LINE: Effects of driving thrust and torque reaction. Hotchkiss drive. Torque tube drive, radius rods. Propeller shaft Universal joints. Final drives – different types, double reaction final drive. Two speed rear axles. Rear axle construction – full floating, three quarter floating and semi-floating arrangements. Differential conventional type, no-slip type. Differential locks</p>	CO1, CO3

Learning Resources

Text books
<ol style="list-style-type: none"> 1.Fischer and Pollack, “The automotive transmission book”, Springer, 2014 2.Light and Heavy Vehicle Technology, M.J. Nunney, Elsevier, Fourth Edition
Reference books
<ol style="list-style-type: none"> 1.Newton K and Steeds. W. “The Motor Vehicle”, Butter Worth’s & Co., Publishers Ltd, 2001 2Automatic vehicle transmission, John Wiley Publications 1995 3.Crouse. W.H., Anglin. D.L., "Automotive Transmission and Power Trains construction ", McGraw-Hill 4.Heldt P.M - Torque converters- Chilton Book Co.-1992
E- Resources & other digital material
<ol style="list-style-type: none"> 1.https://nptel.ac.in/courses/107/106/107106088/ 2.https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-de06 3.https://nptel.ac.in/courses/116/102/116102012/