

SRM University
M.Tech Automotive Hybrid Systems Engineering
 (Collaborative program with NFTDC, Hyderabad)
 (Proposed syllabus from the academic year 2015-16)

Core courses

		L	T	P	C
AH2102	AUTOMOTIVE CHASSIS & TRANSMISSION SYSTEMS	3	2	0	4
	Total Contact Hours-75				
	Prerequisites				
	Nil				
PURPOSE					
To study chassis and transmission systems used in automobiles					

UNIT I - CLUTCH & GEAR BOX

Different types of clutches and requirement of transmission system – Principle, construction, torque capacity and design aspects of friction clutches – Objective of the gear box -Different types of gear boxes-Determination of gear box ratios & design of gear box for different vehicle applications – Typical problems.

UNIT II - DRIVE-LINE STUDY, FRONT AXLE & REAR AXLE

Propeller shaft, Universal joints, Final drive – Different types, double reduction and twin speed final drives - Rear axle construction – Full floating, three quarter floating and semi-floating arrangements – Differential lock, Non-slip differential, Hotchkiss and torque tube drives – Effect of driving thrust and torque reaction, radius rods – Front axle construction, materials, constant velocity universal joint and front wheel geometry.

UNIT III- STEERING, SUSPENSION, WHEELS AND BRAKING SYSTEM

Condition of true rolling motion of road wheels during steering- Ackermann and Davis steering – Different type of steering gear boxes and linkages – Hydraulic and Electronic power steering. Factors influencing ride comfort – Independent suspension- Rubber, pneumatic, hydro-elastic suspension, shock absorbers.

Construction of wheels and tyres – Braking torque developed by leading and trailing shoes – Disc brake theory – Factors affecting brake performance – Engine Exhaust Brake – Power brake-Regenerative braking – ABS.

UNIT IV- HYDRO-DYNAMIC, HYDRO-STATIC & ELECTRIC DRIVES

Fluid coupling and Torque converters: Principle, construction and performance – Reduction of drag torque in fluid coupling – Converter couplings – Multi-stage and poly-phase torque converters – Construction and working principle of typical Janny hydro-static drive – Principle of early and modified Ward Leonard electrical control system – performance characteristics – advantages and limitations.

UNIT V- AUTOMATIC TRANSMISSION, OVERDRIVE, HYDRAULIC CONTROL SYSTEMS AND APPLICATIONS

Ford-T model gear box – Wilson gear box – Cotal electromagnetic transmission, Chevrolet turboglide transmission – Powerglide transmission – Mercedes Benz automatic transmission – Hydraulic control systems of automatic transmission.

References:

1. Heldt. P. M., *Torque converters*, Chilton Book Co., 1992
2. Newton and Steeds, *The Motor vehicle*, Iliffe Publishers, 1985
3. Judge. A.W., *Modern Transmission systems*, Chapman and Hall Ltd., 1990
4. SAE Transactions 900550 & 930910
5. Crouse. W.H., Anglin. D.L, *Automotive Transmission and Power Trains construction*, McGraw Hill, 1976
6. Birch, *Automotive Braking Systems*, Thomson Asia, 1999
7. Birch, *Automotive Chassis Systems*, Thomson Asia, 2000
8. Birch, *Automotive Suspension and Steering Systems*, Thomson Asia, 1999
9. Newton, Steeds & Garrot, *The Motor vehicle*, SAE - Butterworths, India, 13th edition, 2001
10. Judge A.W., *Mechanism of the car*, Chapman and Halls Ltd., London, 1986
11. John Peter Whitehead, Donald Bastow, *Car Suspension and Handling*, 4th Edition, Allied publishers limited, SAE Department, 2004
12. **Automotive Transmissions Authors: Naunheimer, H., Bertsche, B., Ryborz, J., Novak, W. Springer-2011**