

B.E Semester: 5 Automobile Engineering
Subject Name: Automobile System(AE504-N)

A. Course Objective:

- This course presents a thorough and systematic coverage of systems of an automobile in theory and practice.
- Subject is designed to provide understanding about the various parts of the automobile systems.
- This course aims to build higher level skill to future engineers for studying different types of transmission and suspension systems.

B. Teaching / Examination Scheme:

Teaching Scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
4	0	2	6	5	3	70	30	20	30	150

C. Detailed Syllabus:

Unit No.	Details
1	Introduction Automobile - History and development, Classification of vehicles and layouts, front engine and front wheel drive, front engine & rear wheel drive, rear engine & rear wheel drive, Components of transmission system, four wheel drives.
2	Clutch Functions, Type of clutches, Single, Multiple, Centrifugal, Electromagnetic and hydraulic clutches, Lining material, Release mechanism, Fluid flywheel.
3	Transmission System Manual transmission - Types of gear boxes, Sliding mesh, Constant mesh, Synchromesh, Epicyclic gear boxes, Gear ratios, Transfer case, Semi-automatic transmission system. Automatic transmission - Requirements, types, Torque converter, Hydro-static and hydro-dynamic transmission, continuously variable transmission, Belt and friction drive.
4	Brakes Principle of braking, types of brakes, drum brake: construction and working, disc brake, hydraulic brake, wheel cylinder, master cylinder, pneumatic brake, electrical brake, engine exhaust brake, vacuum brake and power brake.
5	Drive line and Axles Propellers shaft, Types of drive as torque tube and hotch kiss drive, Final drive types, Bevel, Hypoid, Worm and worm wheel, Type of drive axles & differential, Fully or semi floating and three quarter floating, Dead axle.

6	Suspension System Purpose, Types of suspension system, Front and rear suspension, Coil spring, Leaf spring, Torsion bars, Shock absorbers, Air and rubber suspension, Plastic suspensions, Hydro-pneumatic suspension, Independent suspension.
7	Wheels and Tyres Introduction, Types of wheels, wheel specification, tyres, types of tyres, tyres skeleton, tyre specification, tyre manufacturing and tyre retreading.
8	Steering and Front Axle Steering requirements, Condition for correct steering, Steering system and linkages, Steering gears, Steering geometry, Ackermann linkages, Wheel alignment, Toe-in, Toe-out, Caster, Camber, Under steer and over steer conditions, Power steering, Steering wheel shimmy, Types of front axle, Elliot & reverse elliot type.

Total hours (Theory):64

Total hours (Practical):32

Total hours:96

D. Lesson Planning:

Sr. No.	Date/Week	Unit	Weight age	Topic No
1	1 st ,2 nd ,3 rd	Unit 1	20%	1,2
2	4 th ,5 th ,6 th	Unit 2	20%	3
3	7 th , 8 th ,9 th	Unit 3	20%	4,5
4	10 th .11 th . 12 th	Unit 4	20%	6,7
5	13 th , 14 th ,15 th ,16 th	Unit 5	20%	8

E. Instructional Method & Pedagogy:

1	At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2	Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal Weight age should be given to all topics while teaching and conduction of all examinations.
3	Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4	One/Two internal exams may be conducted and total/average/best of the same may be converted toequivalent of 30 marks as a part of internal theory evaluation.
5	Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6	Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overallinternal evaluation.
7	The course includes a laboratory, where students have an opportunity to build an appreciation for theconcept being taught in lectures. Suggested list of experiment is given below

F. List of Practical:

1	To understand different vehicle layouts.
2	Demonstrations and study of clutch.
3	Demonstrations and study of gear boxes.
4	Demonstrations and study rear axle, final drive and differential.
5	Demonstrations and study of Automatic Transmission system.
6	Demonstrations and study of tyres and wheels.
7	Demonstrations and study of automobile brakes.
8	Demonstrations and study of steering systems.
9	Demonstrations and study of suspension system.

G. Students Learning Outcomes:

1	The student can identify different areas of Automobile System.
2	Can find the applications of all the areas in day to day life.

H. Text Books & Reference Books:

1	Automobile mechanics by Dr. N.K.Giri.
2	Automobile Engineering Vol-I & II by Dr. K.M. Gupta.
3	Automobile Engineering, Vol-I& II by Dr. Kripal Singh.
4	Automobile engineering by R.B.Gupta.
5	Automobile engineering by GBS Narang.
6	Vehicle Technology by Heinz Heizler.