

B.E Semester: V
Automobile Engineering
Subject Name: Automobile system (AE 504)

Course Objective:

- To present a problem oriented in depth knowledge of automobile system.
- To address the underlying concepts and methods behind automobile system.

Teaching / Examination Scheme:

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs	Hrs	Marks	Marks	Marks	Marks	Marks	
AE504	Automobile system	3	0	2	5	4	3	70	30	20	30	150

Detailed Syllabus:

Topic no	Details
1.	Vehicle Classification and Layouts: Study various vehicle layouts as 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.

Lesson Planning:

Sr.No.	Date/Week	Unit No.	% Weightage	Topic No:
1	1 st , 2 ^{ed} , 3 ^{ed}	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	Unit 5	20 %	8

Instructional Method & Pedagogy:

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.

- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- 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.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.
 - To understand different vehicle layouts.
 - Demonstrations and study of clutch.
 - Demonstrations and study of gear boxes.
 - Demonstrations and study rear axle, final drive and differential.
 - Demonstrations and study of Automatic Transmission system.
 - Demonstrations and study of tyres and wheels.
 - Demonstrations and study of automobile brakes.
 - Demonstrations and study of steering systems.
 - Demonstrations and study of suspension system.

Practical / Oral: The candidate shall be examined on the basis of term-work.

Students Learning Outcomes

- The student can identify different areas of automobile system.
- Can find the applications of all the areas in day to day life.

Recommended Study Materials

- **Text & Reference Books:**
 1. Automotive mechanics by W. Crouse, TMH.
 2. Automobile Engineering Vol-I & II by Dr. K.M. Gupta.
 3. Automobile Engineering, Vol-I by Dr. Kripal Singh.
 4. Motor vehicle by Newton and steed.
 5. Automobile engineering by GBS Narang.
 6. Vehicle Technology by Heinz Heizler.
 7. Automobile system by W. Judge.
 8. Automobile mechanics by Dr. N.K.Giri.
 9. Automobile engineering by R.B.Gupta.