AUTOMOBILE ENGINEERING (5ME6.2A) CO

CO-1 To interpret the functions, constructional features of chassis and working of clutches and brakes.

CO-2 To describe the working of transmission system with their necessity and application.

CO-3 To analyze tyres, steering system and geometry with utility of suspension system.

CO-4 To identify automotive electrical system, ignition system and requirement of automotive lighting, air conditioning and safety

CO MAPPING WITH PO-PSO															
SUBJECT CODE	**Subject Name**		**PO 1**	**PO2**	**PO 3**	**P O4**	**PO 5**	**P O6**	**P O7**	**P O8**	**PO 9**	**PO1 0**	**PO11**	**PO12**	**PSO1**	**PSO2**
5ME6.2A	**Autom obile Engg.**	CO-1	3	2	1	0	0	0	0	0	0	0	2	2	3	1
		CO-2	3	0	0	0	1	1	0	0	0	0	2	0	3	1
		CO-3	3	0	1	1	3	0	0	0	0	0	0	0	3	1
		CO-4	3	0	1	0	2	3	1	0	0	1	0	2	3	2

Course Plan	
Subject- Automobile Engineering	**Subject Code: 5ME6.2A**

Vision and Mission of Institute:

Vision: To become a renowned center of outcome based learning, and work towards academic, professional, cultural and social enrichment of the lives of individuals and communities.

Mission:

M1: Focus on evaluation of learning outcomes and motivate students to inculcate research aptitude by project based learning.

M2: Identify, based on informed perception of Indian, regional and global needs, areas of focus and provide platform to gain knowledge and solutions.

M3: Offer opportunities for interaction between academia and industry.

M4: Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.

Vision and Mission of Department:

Vision: The Mechanical Engineering Department strives to be recognized globally for excellent technical knowledge and to produce quality human resource, who can manage the advance technologies and contribute to society through entrepreneurship and leadership.

Mission:

M1: To impart highest quality technical knowledge to the learners to make them globally competitive mechanical engineers.

M2: To provide the learners ethical guidelines along with excellent academic environment for a long productive career.

M3: To promote industry-institute linkage.

Course outcomes

CO -1	CO-1 To interpret the functions,constructional features of chassis and working of clutches and brakes.
CO -2	CO-2 To describe the working of transmission system and drives with their necessity and application .
CO -3	CO-3 To analyze tyres, steering system and geometry with utility of suspension system.
CO -4	CO-4 To identify automotive electrical system, ignition system and requirement of automotive lighting, air conditioning and safety

Unit No.	Lect. No.	Topics to be discussed	Relevant CO	Objective of unit	Outcome of Lecture (After completion of this lecture students will be able to)	Teaching Methods	Book reffered	From page to
1	1	Frame & Body: Layout of chassis	CO1	To give detail knowledge e.g. functions and working of clutches and brakes and their constructional features	Understand structure of vehicle	Chalk and Talk	Kirpal Singh, R K Rajpoot,	21,409
	2	Types of chassis frames and bodies	CO1		Understand about various types of chassis and bodies	Chalk and Talk	Kirpal Singh, R K Rajpoot,	25-27,406
	3	Constructional features and materials of chassis ,frame and bodies	CO1		Understand the constructional features of vehicle	Chalk and Talk	Kirpal Singh	22-24
	4	Clutches: single plate, multi-plate, cone clutch,	CO1		Understand about various types of clutches	Chalk and Talk	Kirpal Singh	28-46
	5	Semi centrifugal, electromagnetic, vacuum and hydraulic clutches	CO1		Understand the working of centrifugal, electromagnetic , vacuum and hydraulic clutches	Chalk and Talk	Kirpal Singh	30
	6	Fluid coupling. Brakes: Classification and function	CO1		Understand the function of brakes and fluid coupling	Projector	Kirpal Singh	51-54

	7	Mechanical, hydraulic, vacuum air and self engineering brakes;	CO1		Know various types of brakes	Chalk and Talk	Kirpal Singh	324-325, 334-339
	8	Brake shoes and lining materials.	CO1		Know about brake shoe and lining material	Chalk and Talk	Kirpal Singh	384-388
2	9	Gear Boxes: Sliding mesh, constant mesh,	CO2	To understand the working of various gear boxes , transmission system and drives and their applications	Know the mechanism of gear boxes	Projector	Kirpal Singh	78-81
	10	Synchromesh and epicyclic gear boxes,	CO2		Know the working of synchromesh gear box	Projector	Kirpal Singh	81,102
	11	Automatic transmission system	CO2		Understand the working of automatic transmission system	Projector	Kirpal Singh	113-123
	12	Hydraulic torque converter;	CO2		Know the working of hydraulic torque converter	Projector	Kirpal Singh	109
	13	Drives: Overdrive, Propeller shaft, Universal joints,	CO2		Know about the drives, propeller shaft and universal joint	Chalk and Talk	Kirpal Singh, R K Rajpoot,	132-138,507
	14	Differential; Rear axle drives.	CO2		Understand about differential	Projector	Kirpal Singh, R K Rajpoot,	153-160
	15	Hotchkiss and torque tube drives;	CO2		Understand about Hotchkiss and torque tube	Chalk and Talk	Kirpal Singh	160-161

					drives			
	16	Rear axle types; Front wheel and All wheel drive.	CO2		Know about front wheel and all wheel drive	Chalk and Talk	Kirpal Singh	161-162
3	17	Wheels and Tyres: Tyre types, Tyre construction; Tyre inflation pressure,	CO3	To study the tyres and steering mechanism and requirement of suspension system	Understand the type of tyres and construction of tyre	Chalk and Talk	Kirpal Singh	266-278
	18	Tyre wear and their causes; Re-treading of the tyre,	CO3		Know tyre wear and retreading	Chalk and Talk	Kirpal Singh	290-292
	19	Steering system: steering gear boxes, Steering linkages, Steering mechanism,	CO3		Understand steering system and mechanism	Chalk and Talk	Kirpal Singh	221
	20	Under and Over steering. Steering Geometry, Effect of camber, caster, king pin inclination,	CO3		Understand the steering parameters and their effect	Projector	Kirpal Singh, R K Rajpoot,	214-219,535
	21	Toe in and toe out; Power steering; Integral and linkage types	CO3		Know the mechanism of power steering	Projector	Kirpal Singh	244
	22	Suspension system: objective and requirements,	CO3		Need of suspension system	Chalk and Talk	Kirpal Singh	170-172
	23	Suspension spring, front and rear suspension systems,	CO3		Use of suspension spring, front and rear suspension	Chalk and Talk	Kirpal Singh	172-190,
	24	Independent suspension system Shock absorbers.	CO3		Need of shock absorber	Chalk and Talk	Kirpal Singh, R K Rajpoot,	180-190,422

4	25	Automotive Electrical System: Battery construction,	CO4	To know the working and construction of various ignition system With use of electrical devices in automobile	Understand the working of automotive electrical system	Chalk and Talk	D.S. Kumar	463-471
	26	Charging and testing, battery types, Starting and Battery Charging System	C04		Understand the method of charging and testing of batteries	Chalk and Talk	D.S. Kumar	473-476
	27	Starter motor construction, types of drive,	CO4		Know the starter motor construction	Chalk and Talk	D.S. Kumar	485-499
	28	Alternator construction, regulation and rectification.	CO4		Know the alternator regulation and rectification	Chalk and Talk	D.S. Kumar	500-517
	29	Ignition System: Magneto and coil ignition systems,	CO4		Understand the working of various ignition system	Chalk and Talk	D.S. Kumar	518-519
	30	System components and requirements,	CO4		Requirements of ignition system component	Chalk and Talk	D.S. Kumar	520
	31	Automotive lighting: Wiring systems	CO4		Understand about the automotive lighting and wiring system	Chalk and Talk	D.S. Kumar	542-548
	32	Electrical instruments; head lamp, electric horn, fuel level indicator.	C04		Use of various electrical instruments	Chalk and Talk	D.S. Kumar	549-565

	33	Automotive Air Conditioning: Introduction	C04	To know the working of automotive airconditioning system and automotive safety system in automobiie		Chalk and Talk	D.S. Kumar	566
	34	Loads, Air conditioning system Components	CO4		Know about the air conditioning system components	Chalk and Talk	D.S. Kumar	566
	35	Refrigerants, fault diagnosis	CO4		Know about the refrigerant and fault diagnosis	Chalk and Talk	D.S. Kumar	569
5	36	Automotive Safety: Safety requirements	CO4		Need of automotive safety	Chalk and Talk	D.S. Kumar	**573**
	37	Safety Devices, Air bags, belts	CO4		Know about the safety devices	Chalk and Talk	D.S. Kumar	**584**
	38	Radio ranging, NVS (Night Vision System	CO4		Know the Night Vision system	Chalk and Talk	D.S. Kumar	589
	39	GPS (Global Positioning system)	CO4		Know the Global Positioning system	Chalk and Talk	D.S. Kumar	**590**
	40	PROBLEMS					D.S. Kumar	
BS -1	41	Introduction to BAJA event and ATV vehicle			Manufacturing Aspects	Projector		
BS -2	42	Recent Advancement in Automobile Engineering			VTVT, VDI, IVTec	Projector		
BS -3	43	Latest Safety systems in automobile			Use of ABS	Projector		

Details of Books

S.NO.	Name of Books	Author	Publication
1	A Text book of Automobile Engineering	Kirpal Singh	Standard

2	A Text book of Automobile Engineering	D.S. Kumar		Katson
3	A Text book of Automobile Engineering	R K Rajpoot		Laxmi
4	A Text book of Automobile Engineering	P S Gill		Katson

SYLLABUS

5ME6.2A: AUTOMOBILE ENGINEERING

B.Tech. (Mechanical) 5th semester **Max. Marks: 100**
3L+0T **Exam Hours: 3**

UNIT	CONTENTS	CONTACT HOURS
I	**Frame & Body:** Layout of chassis, types of chassis frames and bodies, their constructional features and materials.	**3**
	Clutches: single plate, multi-plate, cone clutch, semi centrifugal, electromagnetic, vacuum and hydraulic clutches. Fluid coupling.	
	Brakes: Classification and function; Mechanical, hydraulic, vacuum air and self engineering brakes; Brake shoes and lining materials.	**5**
II	**Gear Boxes**: Sliding mesh, constant mesh, synchromesh and epicyclic gear boxes, Automatic transmission system; Hydraulic torque converter;	**4**
	Drives: Overdrive, Propeller shaft, Universal joints, Differential; Rear axle drives. Hotchkiss and torque tube drives; Rear axle types; Front wheel and All wheel drive.	**4**
III	**Wheels and Tyres**: Tyre types, Tyre construction; Tyre inflation pressure, Tyre wear and their causes; Re-treading of the tyre,	**2**
	Steering system: steering gear boxes, Steering linkages, Steering mechanism, Under and Over steering. Steering Geometry, Effect of camber, caster, king pin inclination, toe in and toe out; Power steering; Integral and linkage types	**3**
	Suspension system: objective and requirements, Suspension spring, front and rear suspension systems, Independent suspension system Shock absorbers.	**3**
IV	**Automotive Electrical System:** Battery construction, Charging and testing, battery types, Starting and Battery	

	Charging System: Starter motor construction, types of drive, Alternator construction, regulation and rectification. **Ignition System:** Magneto and coil ignition systems, System components and requirements, Automotive lighting: Wiring systems Electrical instruments; head lamp, electric horn, fuel level indicator	**4** **4**
V	**Automotive Air Conditioning:** Introduction, Loads, Air conditioning system Components, Refrigerants, Fault Diagnosis. **Automotive Safety:** Safety requirements, Safety Devices, Air bags, belts, radio ranging, NVS (Night Vision System) GPS (Global Positioning System)	**4** **4**

TEXT BOOK		
1	RP SHARMA,A Course in Automobile Engineering,Dhanpat Rai & Sons	
2	P S Gill,A Text book of Automobile Engineering,KATSON Books VOL 1&2 2010	2010
3	Kirpal Singh,Automobile Engineering, Standard	2003
REFERENCE BOOKS		
SN	**Name of Authors /Books /Publisher**	**Year of Pub.**
1	R. K. Rajpoot,A Text book of Automobile Engineering, Laxmi publications	2007
2	Jornsen Reimpell, Helmut Stoll, The Automotive Chasis: Engineering Principle, Jurgen Betzler (P) Ltd.	2001