SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Automobile Engineering	LP: **AE18601** Rev. No: **00** Date: **19.07.2021**
B.E/B.Tech/M.E/M.Tech : B.E **Automobile Engineering** Regulation: **2018A** PG Specialisation : NA Sub. Code / Sub. Name : **AE 18601 / AUTOMOTIVE COMPONENTS DESIGN** Unit : **III**	

Unit Syllabus:

DESIGN OF CLUTCH AND GEAR BOX **12**

Design of single plate, multi-plate and cone clutch.
Layout of different types of gearbox, gear train calculation, bearing load calculation and selection of bearings, Design of three speed and four speed gearboxes.

Objective: To impart the knowledge to the students about the various automotive chassis components.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Design of single plate clutch	2,Ch.8, Pg. 24 -30	PPT & BB
2	Solving design problem in single plate clutch	2,Ch.8, Pg. 30 - 38	PPT & BB
3	Design of multi plate clutch	2,Ch.8, Pg. 30 - 38	PPT & BB
4	Solving design problem in multi plate clutch	2,Ch.8, Pg. 30 - 38	PPT & BB
5	Design of cone clutch	2,Ch.8, Pg. 30 - 38	PPT & BB
6	Solving design problem in cone clutch	2,Ch.8, Pg. 30 - 38	PPT & BB
7	Layout of different types of gearbox	2,Ch.8, Pg. 30 - 38	PPT & BB
8	Gear train calculation	2,Ch.8, Pg. 119 - 127	PPT & BB
9	Solving design problem in gear box	2,Ch.8, Pg. 334 - 354	PPT & BB
10	Bearing load calculation and selection of bearings	2,Ch.8, Pg. 385 - 388	PPT & BB
11	Design of three speed gearbox	2,Ch.8, Pg. 389 - 392	PPT & BB
12	Design of four speed gearbox	2,Ch.8, Pg. 389 - 392	PPT & BB
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: **AE 18601 / AUTOMOTIVE COMPONENTS DESIGN**

Unit : **V**

Unit Syllabus:

VEHICLE FRAME AND SUSPENSION 12

Study of loads, moments and stresses on frame members. Design of frame for passenger and commercial vehicle, design of leaf springs, coil springs and torsion bar springs.

Objective: To know the various frames and Suspension systems, selection of frames and springs

Session No *	Topics to be covered	Ref	Teaching Aids
13	Study of loads on frame members	2,Ch.10, Pg. 32 - 36	PPT & BB
14	Solving problem on frame members	2 Ch.10, Pg. 180 - 183	PPT & BB
15	Solving problem on frame members	2 Ch.10, Pg. 180 - 183	PPT & BB
16	Study of moments and stresses on frame members	2,Ch.10 Pg. 152 - 163	PPT & BB
17	Solving problem on moments and stresses on the frame members	2,Ch.10, Pg. 167 - 175	PPT & BB
18	Solving problem on moments and stresses on the frame members	2,Ch.10, Pg. 167 - 175	PPT & BB
19	Design of frame for passenger vehicle	2,Ch.10, Pg. 199 - 221	PPT & BB
20	Design of frame for commercial vehicle	2,Ch.10, Pg. 213	PPT & BB
21	Design of leaf springs	2,Ch.10, Pg. 316 - 322	PPT & BB
22	Design of coil springs	2,Ch.10, Pg. 322 - 325	PPT & BB
23	Design of torsion bar springs	2,Ch.10, Pg. 325 - 328	PPT & BB
24	Solving design problem in springs	2,Ch.10, Pg. 328 - 331	PPT & BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: **AE 18601 / AUTOMOTIVE COMPONENTS DESIGN**

Unit : **I**

Unit Syllabus :

DESIGN OF CYLINDER, PISTON AND CONNECTING ROD 12

Fundamental of engineering design, choice of material for cylinder and piston, design of cylinder, piston. material for connecting rod, determining minimum length of connecting rod, small end design, shank design, design of big end cap bolts.

Objective: To make the students understand the design concept and principles of various engine components.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Fundamental of engineering design	2,Ch.11, Pg. 35 - 36	PPT & BB
26	Choice of material for cylinder and piston	2,Ch.11, Pg. 226 - 241	PPT & BB
27	Design of cylinder	2,Ch.11, Pg. 230 - 231	PPT & BB
28	Problem solving on cylinder design	2,Ch.11, Pg. 232 - 234	PPT & BB
29	Design of piston	2,Ch.11, Pg. 343 - 345	PPT & BB
30	Problem solving on piston design	2,Ch.11, Pg. 226 - 241	PPT & BB
31	Material for connecting rod and design	2,Ch.11, Pg. 250 - 253	PPT & BB
32	Design of connecting rod small end	2,Ch.11, Pg. 254 - 260	PPT & BB
33	Design of connecting rod shank	2,Ch.11, Pg. 186 - 196	PPT & BB
34	Design of connecting rod big end caps bolt	2,Ch.11, Pg. 196 - 198	PPT & BB
35	Problem solving on connecting rod	2,Ch.11, Pg. 198 - 200	PPT & BB
36	Problem solving on connecting rod	2,Ch.11, Pg. 200 - 202	PPT & BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: **AE 18601 / AUTOMOTIVE COMPONENTS DESIGN**

Unit : **II**

Unit Syllabus:

DESIGN OF CRANKSHAFT AND FLYWHEEL 12

Balancing of Internal Combustion engines, significance of firing order, material for crankshaft, design of crankshaft under bending and twisting, balancing weight calculations, development of short and long crank arms.

Determination of engine flywheel mass for a given co- efficient of speed fluctuation, stresses on flywheel rim. Design of hubs and flywheel arm, turning moment diagram, flywheel materials.

Objective: To familiarize the various steps involved in the automotive engine components.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Balancing of Internal Combustion engines	2,Ch.12, Pg. 340 - 343	PPT & BB
38	Significance of firing order	2,Ch.12, Pg. 1 - 23	PPT & BB
39	Material for crankshaft and design consideration	2,Ch.12, Pg. 355 - 358	PPT & BB
40	Design of crankshaft under bending and twisting	2,Ch.12, Pg. 360 - 361	PPT & BB
41	Problem solving on design of crankshaft	2,Ch.12, Pg. 361 - 365	PPT & BB
42	Balancing weight calculations	2,Ch.12, Pg. 367 - 372	PPT & BB
43	Development of short and long crank arms	2,Ch.12, Pg. 268 - 273	PPT & BB
44	Determination of engine flywheel mass for a given co-efficient of speed fluctuation	2,Ch.12, Pg. 268 - 273	PPT & BB
45	Stresses on flywheel rim	2,Ch.12, Pg. 268 - 273	PPT & BB
46	Design of hubs and flywheel arm	2,Ch.12, Pg. 268 - 273	PPT & BB
47	Turning moment diagram, flywheel materials	2,Ch.12, Pg. 268 - 273	PPT & BB
48	Solving design problem on flywheel	2,Ch.12, Pg. 268 - 273	PPT & BB
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: **AE 18601 / AUTOMOTIVE COMPONENTS DESIGN**

Unit : **IV**

Unit Syllabus:

DRIVE LINE AND REAR AXLE 12

Design of propeller shaft, final drive gearing, semi floating, three quarter floating, full floating and rear axle housings.

Objective: To impart a comprehensive knowledge of power train components.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Design of propeller shaft	2,Ch.9, Pg. 61 - 64	PPT & BB
50	Solving problem in propeller shaft design	2,Ch.9, Pg. 66 - 70	PPT & BB
51	Solving problem in propeller shaft design	2,Ch.9, Pg. 66 - 70	PPT & BB
52	Design of final drive gearing	2,Ch.9, Pg. 71 - 82	PPT & BB
53	Solving problem in final drive gearing	2,Ch.9, Pg. 301 - 307	PPT & BB
54	Solving problem in final drive gearing	2,Ch.9, Pg. 301 - 307	PPT & BB
55	Design of semi floating axle	2,Ch.9, Pg. 301 - 307	PPT & BB
56	Problem solving in semi floating axle	2,Ch.9, Pg. 129 - 143	PPT & BB
57	Design of three quarter floating axle	2,Ch.9, Pg. 95 - 103	PPT & BB
58	Problem solving in three quarter floating axle	2,Ch.9, Pg. 103 - 105	PPT & BB
59	Design of full floating axle	2,Ch.9, Pg. 105 - 108	PPT & BB
60	Problem solving in full floating axle	2,Ch.9, Pg. 108 - 111	PPT & BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub Code / Sub Name: AE 18601 AUTOMOTIVE COMPONENTS DESIGN

TEXTBOOKS:

1. Bhandari V, "Design of Machine Elements", 3rd Edition, Tata McGraw-Hill Book Co, 2016.

2. U.C. Jindal, "Machine Design", Pearson Education, 2013.

REFERENCES:

1. Richard G Budynas Richard Gordon Budynas, J.Keith Nisbett., "Shigley's Mechanical Engineering Design", 10th edition, Tata McGraw-Hill, 2015.

2. R.S. Khurmi& J. K. Guptha, "A Textbook of Machine Design, 34th edition", S. Chand publication, 2014.

3. Giri, N.K., "Automobile Mechanicsǁ, Khanna publishers", New Delhi, 2007.

4. Jain. R. K, "Machine Design", Khanna Publishers", New Delhi, 2005.

5. Dean Averns, "Automobile Chassis Design", Illife Book Co., 2001.

6. Heldt, P.M., "Automotive Chassis", Chilton Book Co., 1992.

	Prepared by	Approved by
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Date	2/1/24	02/01/2024
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD