SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Automobile Engineering	LP: AE18604
B.E/B.Tech/M.E/M.Tech : BE- Automobile Engineering Regulation:2018	Rev. No: 00
PG Specialisation : NA	Date: 11-01-2021
Sub. Code / Sub. Name : AE18604- VEHICLE DESIGN DATA CHARACTERISTICS	
Unit : I	

Unit Syllabus: INTRODUCTION

Assumptions to be made in designing a vehicle Range of values for Gross Vehicle Weight, Frontal Area, maximum speed, maximum acceleration, gradability in different gears, Basics of Automobile Design. Design variables and operating variables affecting performance and emission.

Objective:

Students have to collect important technical specifications of an automobile from Automobile Journals and keeping this, as a guide.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Assumptions to be made in designing a vehicle	1-Ch.20; Pg.854	PPT
2	Range of values for Gross Vehicle Weight	1-Ch.20; Pg.854	PPT
3	Frontal Area calculation	1-Ch.4; Pg.854	PPT
4	Maximum speed Calculation	1-Ch.20; Pg.854-859	PPT
5	Maximum acceleration calculation	1-Ch.20; Pg.854-859	PPT
6	Gradability in different gears	1-Ch.20; Pg.854-859	PPT
7	Tutorial	1-Ch.20; Pg.854-859	PPT
8	Basics of Automobile Design	1-Ch.1; Pg.19	PPT
9	Design variables affecting performance and emission	1-Ch 3; Pg.183-185 3-Ch 16; Pg.499-512	PPT
10	Operating variables affecting performance and emission	1-Ch 3; Pg.183-185	PPT
11	Tutorial	1-Ch 3; Pg.183-185	PPT
12	Tutorial	3-Ch 16; Pg.521	PPT
Content beyond syllabus covered (if any): Vehicle Design consideration			

* Session duration: 50 minutes

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Sub. Code / Sub. Name: AE18604 - VEHICLE DESIGN DATA CHARACTERISTICS
Unit : II

Unit Syllabus: RESISTANCE TO VEHICLE MOTION
Calculation, Tabulation and Plotting of Curves for Air and Rolling Resistances at various vehicles speeds, Calculation and Plotting of Driving force, Power requirement for different loads and acceleration, Maximum Power calculation.

Objective:
Students have to collect important technical specifications of an automobile from Automobile Journals and keeping this, as a guide, they have to calculate and tabulate various vehicle air Resistances Rolling Resistances and to calculate , Maximum Power calculation

Session No *	Topics to be covered	Ref	Teaching Aids
13	Calculation of Air Resistances at various vehicle speeds	1-Ch.20; Pg.855-859	PPT
14	Tabulation and Plotting of Curves for Air Resistances at various vehicle speeds	1-Ch.20; Pg.855-859	PPT
15	Tutorial	1-Ch.20; Pg.855-859	
16	Calculation of Rolling Resistances at various vehicle speeds	1-Ch.20; Pg.856	PPT
17	Tabulation and Plotting of Curves for Rolling Resistances at various vehicle speeds	1-Ch.3; Pg.178	PPT
18	Tutorial	1-Ch.3; Pg.179	PPT
19	Calculation and Plotting of Driving force	1-Ch.3; Pg.179	PPT
20	Calculation and Plotting Power requirement for different loads	1-Ch.20; Pg.856-858	PPT
21	Calculation and Plotting of Power requirement for different acceleration	1-Ch.20; Pg.856-858	PPT
22	Maximum Power calculation	1-Ch.20; Pg.856-858	PPT
23	Tutorial	1-Ch.20; Pg.856-858	PPT
24	Tractive and Braking Properties of Tyres, Air flow over the vehicle	1-Ch.20; Pg.860-873	PPT
Content beyond syllabus covered (if any): Tractive and Braking Properties of Tyres, Air flow over the vehicle.			

* Session duration: 50 mins

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Sub. Code / Sub. Name: AE18604 - VEHICLE DESIGN DATA CHARACTERISTICS	
Unit : III	

Unit Syllabus: PERFORMANCE CURVES – I

Calculation, Tabulation and Plotting of Torque and Mechanical Efficiency for different vehicle speeds, Interpolation of Pressure – Volume diagram, Calculation of frictional Mean Effective Pressure, Calculation of Engine Cubic Capacity, Bore and Stroke Length, Calculation of Power and torque curve.

Objective:

Students have to collect important technical specifications of an automobile from Automobile Journals and keeping this, as a guide, they have to calculate and tabulate various vehicle performance parameters and design parameters and to draw curves using these data.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Calculation of Torque for different vehicle speeds	1-Ch.3; Pg.167-181 3-Ch 16; Pg.499-512	PPT
26	Tabulation and Plotting of Torque for different vehicle speeds	1-Ch.3; Pg.167-181	PPT
27	Calculation, Tabulation and Plotting of Torque and Mechanical Efficiency for different vehicle speeds,	1-Ch.3; Pg.167-181 3-Ch 1; Pg.22-25	PPT
28	Interpolation of Pressure – Volume diagram	1-Ch.3; Pg.167-181 3-Ch 2; Pg.52-55	PPT
29	Calculation of frictional Mean Effective Pressure,	1-Ch.3; Pg.167-181 3-Ch 2; Pg.52-55	PPT
30	Calculation of Engine Cubic Capacity	1-Ch.3; Pg.167-181 3-Ch 1; Pg.21-30	PPT
31	Tutorial	1-Ch.3; Pg.167-181 3-Ch 1; Pg.21-30	PPT
32	Calculation of Bore and Stroke Length	1-Ch.3; Pg.167-181	PPT
33	Calculation of Power and torque curve.	1-Ch.3; Pg.167-181	PPT
34	Calculation of maximum acceleration, maximum Tractive effort	1-Ch.3; Pg.167-181	PPT
35	Tutorial	1-Ch.3; Pg.183-189	PPT
36	Tutorial	1-Ch.3; Pg.183-189	PPT
Content beyond syllabus covered (if any): Calculation of maximum Acceleration, maximum Tractive Effort			

* Session duration: 50 mins

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Sub. Code / Sub. Name: AE18604 - VEHICLE DESIGN DATA CHARACTERISTICS

Unit : IV

Unit Syllabus: PERFORMANCE CURVES – II

Connecting rod length to Crank Radius Ratio, Plotting of Piston Velocity and Acceleration against Crank Angle, Plotting Gas force, inertia force and Resultant force against Crank Angle, Turning Moment and Side Thrust against Crank Angle.

Objective:

Students have to collect important technical specifications of an automobile from Automobile Journals and keeping this, as a guide, they have to calculate and tabulate various vehicle performance parameters and design parameters and to draw curves using these data.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Connecting rod length to Crank Radius Ratio	1-Ch.2; Pg.30	PPT
38	Plotting of Piston Velocity against Crank Angle	1-Ch.2; Pg.31	PPT
39	Plotting of Piston Acceleration against Crank Angle	1-Ch.2; Pg.31	PPT
40	Plotting Gas force against Crank Angle	1-Ch.2; Pg.34	PPT
41	Tutorial	1-Ch.2; Pg.34	PPT
42	Plotting inertia force against Crank Angle	1-Ch.2; Pg.35	PPT
43	Plotting Resultant force against Crank Angle	1-Ch.2; Pg.35	PPT
44	Turning Moment against Crank Angle	1-Ch.2; Pg.35	PPT
45	Side Thrust against Crank Angle	1-Ch.2; Pg.30-49	PPT
46	Tutorial	1-Ch.2; Pg.30-49	PPT
47	Tutorial	1-Ch.2; Pg.30-49	PPT
48	Multi-Cylinder Engines-The cyclic-torque and the flywheel Effect	1-Ch.2; Pg.30-49	PPT
Content beyond syllabus covered (if any): Multi-Cylinder Engines-The cyclic-torque and the flywheel Effect			

* Session duration: 50 mins

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Sub. Code / Sub. Name: AE18604 - VEHICLE DESIGN DATA CHARACTERISTICS	
Unit : V	

Unit Syllabus: GEAR RATIOS

Requirements of Gear box, Determination of Gear Ratios, Acceleration and Gradability, Typical Problems on Vehicle performance.

Objective:

Students have to collect important technical specifications of an automobile from Automobile Journals and keeping this, as a guide, they have to Determination of Gear Ratios, and Plotting Gear Ratios on Vehicle performance

Session No *	Topics to be covered	Ref	Teaching Aids
49	Requirements of Gear box	1-Ch.15; Pg.597 6-Ch.13; Pg.208-210	PPT
50	Determination of Gear Ratios for sliding mesh gear train	1-Ch.15; Pg.597 – 598 6-Ch.13; Pg.208-210	PPT
51	Determination of Gear Ratios for constant mesh gear train	1-Ch.15; Pg.597 - 598	PPT
52	Determination of Acceleration	1-Ch.15; Pg.597 - 598 1-Ch.20; Pg854-.859	PPT
53	Determination of Gradability	1-Ch.15; Pg.597 - 598 1-Ch.20; Pg854-.859	PPT
54	Typical Problems on Vehicle performance	1-Ch.20; Pg854-.859	PPT
55	Typical Problems on Vehicle performance	1-Ch.15; Pg.597 - 598 1-Ch.20; Pg854-.859	PPT
56	Plotting Gear Ratios on Vehicle performance	1-Ch.15; Pg.608- 611	PPT
57	Epicyclic or planetery Gear train.	1-Ch.15; Pg.608- 611	PPT
58	Tutorial	1-Ch.15; Pg.608- 611	PPT
59	Tutorial	1-Ch.15; Pg.608- 611	PPT
60	Tutorial	1-Ch.15; Pg.608- 611	PPT

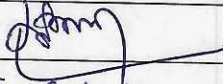**Content beyond syllabus covered (if any):** Epicyclic or planetery Gear train.
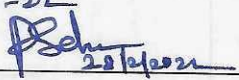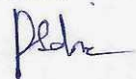
* Session duration: 50 mins

Sub Code / Sub Name: AE18604 - VEHICLE DESIGN DATA CHARACTERISTICS

REFERENCES:

1. Giri. N. K., "Automotive Mechanics", Khanna Publishers, New Delhi, 2008.
2. Heldt, P.M., "High Speed Combustion Engines", Oxford and I.B.H. Publishing Co., Kolkata, 2002.
3. Ganesan V., "Internal Combustion Engines", Fourth Edition, Tata McGraw Hill, 2017.
4. Gupta. R.B., "Automobile Engineering", Sathya Prakashan, 1st edition, 2016.
5. Thomas Bevan, "Theory of Machines", CBS Publishers and Distributors, 3rd edition, 2009.
6. Jain K.K. and Asthana .R.B, "Automobile Engineering", Tata McGraw Hill Publishers, 2002.

	Prepared by	Approved by
Signature		
Name	SAKTHIVEL.R	Dr. J. Venkatesan
Designation	ASSISTANT PROFESSOR	Professor & HoD /AUT
Date	11-01-2021	11-01-2021
Remarks *:	The same lesson plan can be followed for this Academic year 2021-22 _28/2/2022_	28/2/2022
Remarks *:	The Same Lesson plan can be followed for this Academic year 2022-23.	

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

The same Lesson plan can be followed for this Academic year 2023-24 [Even semester]