3RD SEM 01.10.2021-08.01.2022(WINTER)

LESSON PLAN

AUTOMOBILE COMPONENT DESIGN

ER. KULADEEP MOHAPATRA

(LECTURER IN AUTOMOBILE ENGG.)

B.O.S.E.,CUTTACK

AUTOMOBILE ENGINEERING DEPATMENT

VISSION:

To develop competent, disciplined imaginative Automobile engineers, equipped with core competency and technical skills useful to the learning / teaching community and the industrial fraternity.

MISSION:

M1: To provide with operational and technical inputs to get innovative and research ideas in the field of automotive engineering.

M2: To give inputs for higher education with management qualities for the betterment of the society.

M3: Skilling with modern engineering tools necessary to meet and solve engineering problems.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: To provide technical skills to diagnose and apply the concept of automotive system

PEO2: To prepare to design, fabricate and innovate in automobile sector to face the industrial challenges.

PEO3: To inculcate with good communication skills, ethics and entrepreneurship skills to play the key role in automotive industry.

Discipline:-**Automobile Engg.**	Semester :- **5TH**	Name of the teaching faculty :- **KULADEEP MOHAPATRA**
Subject Name :- **AUTOMOBILE COMPONENT DESIGN**	No. Of Days/Week Class Allotted :- **04 Periods/Week (Monday, Tuesday , Thursday, Friday – 1 Period Each)**	Semester from Date - **01/10/2021** To Date - **08/01/2021** **No. of Weeks: 15**
Week	**Class Day**	**Theory topics**
1st	01/10/2021	**1. Basic concepts of design** 1.1 Introduction to design 1.2 Classification of design
2nd	04/10/2021	**1.3** Design Consideration
	05/10/2021	1.4 Design procedure
	07/10/2021	1.5 Stress analysis 1.5.1 Types of external load
	08/10/2021	1.5.2 Types of induced stresses: tensile, compressive, shear crushing & bearing pressure, bending, torsion
3RD	11/10/2021	1.5.2 Thermal stresses, creep, proof stresses resilience principal stresses.
4th	18/10/2021	1.5.3 Stress- strain diagram for ductile & brittle material and its importance.
	21/10/2021	1.5.4 Variable stresses machine parts, fatigue & endurance limit, stress-timediagrams for variable stresses.
	22/10/2021	1.5.5 Working stresses for static load, variable or fatigue load.
5th	25/10/2021	1.5.6 Factor of safety, selection of factor of safety.Stress concentration causes and remedies.
	26/10/2021	1.5.7 Introduction to theories of failure-maximum

		principal theory.
	28/10/2021	1.5.8 Maximum shear stress theory, Distribution energy theory.
	29/10/2021	1.5.9 Selection of material and justifications of automobile components, advanced materials for automotive components. 1.6 Concept of standardization, preferred numbers & inter chargeability in design practice.
6TH	01/11/2021	1.6.1 Common types of fasteners with their applications-through bolts, tap bolts, top bolts, studies cap screws and machine screws, designation of screw threadaccording to 1.5.
	02/11/2021	1.6.1 stresses in screw fasteners, bolts of uniform strength
	05/11/2021	1.6.2 Bearings – classification, location in automobiles systems & selection of bearings. 1.6.3 Post design aspects ergonomic aspect aesthetic consideration (shape, colour, surface finish) for automobile.
7th	08/11/2021	**CLASS TEST**
	09/11/2021	**2. Design of machine elements** 2.1 Design of socket & spigot type cotter joint
	11/11/2021	2.1 Design of socket & spigot type cotter joint
	12/11/2021	2.2 Design of knuckle joint
8TH	15/11/2021	2.2 Design of knuckle joint
	16/11/2021	2.3 Design of turnbuckle
	18/11/2021	2.3 Design of turnbuckle

9th	22/11/2021	2.4 Application of above machine elements in an automobile.
	23/11/2021	**CLASS TEST**
	25/11/2021	**3. Design of shafts, keys &coupling** 3.1 Conceptual understanding of shaft, axles &spindles.
	26/11/2021	3.2 Design of shaft for torsion rigidity
10th	29/11/2021	3.2 Design of shaft for bending.
	30/11/2021	3.2 combined bending & torsion.
	02/12/2021	3.3 Compression of solid & hollow shafts.
	03/12/2021	3.4 Design of propeller shaft, whirling & critical speed.
11th	06/12/2021	3.5 Design of rear axle. Types of keys design of sunk rectangular key
	07/12/2021	3.5 woodruff key.Effect of keyways on shaft.
	09/12/2021	3.6 Design of coupling-muff, flange and bush pin type flexible
	10/12/2021	**CLASS TEST**
12th	13/12/2021	**INTERNAL ASSESMENT**
	14/12/2021	**4. Design of levers.** 4.1 Types of levers.
	16/12/2021	4.2 Design of Rocker arm
	17/12/2021	4.3 Bell crank lever
13th	20/12/2021	4.4 Hand lever

	21/12/2021	4.5 Pedals for rectangular cross-section& fulcrum Pin only.
	23/12/2021	**CLASS TEST**
	24/12/2021	**5 Design of chassis component** 5.1 Design of clutch- single plate.
14th	27/12/2021	5.1 Design of clutch- multi plate.
	28/12/2021	5.2 Teeth calculation of gears for sliding mesh/constant mesh gearbox of given data.
	30/12/2021	5.3 Design of semi elliptical leaf spring, helical spring-torsion &compression
	31/12/2021	**6. Design of engine components.** 6.1 Data of engine specifications & calculation of cylinder dimensions for given power
15th	03/01/2022	6.2 Design of cylinder head thickness &bolts. 6.3 Design of valve seat & valve lift.
	04/01/2022	6.4 Design of piston crown by bending strength & thermal considerations. 6.5 Design of piston rings & skirt length 6.6 Design of piston pin for bearing, bending & shear considerations.
	06/01/2022	6.7 Design of connecting rod cross-section(I-section)
	07/01/2022	6.8 Design of big end, cap &bolt. 6.9 Design of over hung crankshaft.