

GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Engineering	Branch	Automobile Engineering						
Semester	III	Version	1.0.0.0						
Effective from Academic Year		2019-20	Effective for the batch Admitted in		June 2018				
Subject code	1AU2305	Subject Name	AUTOMOBILE COMPONENT DESIGN						
Teaching scheme			Examination scheme (Marks)						
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	0	0	0	4	Theory	40	60	100
Hours	4	0	0	0	4	Tutorial	0	0	0

Pre-requisites:

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes: <ul style="list-style-type: none"> Design (basic design) various automobile components including selection of proper material for them To reinforce the understanding of the basic features of different automobile components

Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
Unit – I Introduction to Design	1.1 Design and its types, General consideration, factors affecting the design 1.2 General procedure in Machine design 1.3 Material Selection for manufacturing various components of automobile 1.4 Standardisation and its Importance, Various Standards and I.S codes 1.5 S. I. units and definitions of various fundamental and derived quantities 1.6 Mass, Weight, Inertia, Force, Couple, Moment of Inertia, Torque, Power, Work, Energy, Stress, Strain, Young Modulus, Shear Modulus, Bearing Stress, Factor of Safety, Limit, Fit and Tolerances 1.7 Types of loads, stress and strain 1.8 Column and Strut, different end conditions, Rankin’s and Euler’s formula	1a. Explain general considerations and factors affecting the design of automobile components 1b. Describe factors affecting the selection of materials 1c. Explain basic terminologies used in design of automobile parts	12	12

	1.9 Stress concentration and how it can be reduced, Concept of fluctuating load and endurance limit			
Unit-II Design of Piston	2.1 Piston nomenclature 2.2 Function of Piston 2.3 Design considerations for Piston 2.4 Materials for Piston 2.5 Design of Piston head, rings, pin, skirt and barrel	2a. Explain nomenclature of piston 2b. Select proper material of piston 2c. Design different parts of piston	7	7
Unit- III Design of connecting rod	3.1 Connecting rod nomenclature 3.2 Function of Connecting rod 3.3 Shape of Connecting rod 3.4 Length of Connecting rod 3.5 Forces on Connecting rod 3.6 Material for Connecting rod 3.7 Design considerations for Connectingrod 3.8 Design of cross-section of Connecting rod: I-section & Circular 3.9 Design of Crank pin 3.10 Design of Big end cap & bolts	3a. State nomenclature of connecting rod 3b. Select proper material of connecting rod 3c. Design different parts of connecting rod	10	10
Unit- V Design of Flywheel	5.1 Function of flywheel 5.2 Turning Moment Diagram 5.3 Fluctuation of speed 5.4 Fluctuation of energy 5.5 Energy stored in flywheel 5.6 Weight of the flywheel 5.7 Design of flywheel Rim	5a. Explain terminology related to flywheel 5b. Describe design Considerations for flywheel 5c. Design of flywheel rim	6	6
Unit- VI Design of Clutch	6.1 Function of clutch 6.2 Types of clutch 6.3 Materials for friction surfaces 6.4 Design considerations for friction clutch 6.5 Design of disc clutch: (i) Single plate; (ii) Multiplate	6a. Explain material selection for friction lining of clutch 6b. Describe design considerations for friction clutch 6c. Design Single plate and Multiplate clutch.	10	10
Unit- VII Design of Propeller shafts and Axles	7.1 Calculation for finding diameter of Propeller shaft and Section of Dead Axle 7.2 Bearing load on front axle 7.3 Bearing load on rear axle	7a. Describe design considerations for shaft and axle	6	6

Unit– VIII Design considerations for gear	8.1 Gear terminology 8.2 Types of gears 8.3 Design consideration for gear drive 8.4 Relation between number of teeth, speed and torque in meshing gears 8.5 Calculation of number of teeth and torque transmitted	8a. State terminology related to gears 8b. Describe design considerations for gear drive 8c. Compute the gear teeth, speed and torque	9	9
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List of Tutorial Work			
No.	Unit	Name of Tutorial work	
1	I	Basic general considerations of design.	
2	II	Basic Design of Piston.	
3	III	Basic Design of Connecting rod.	
4	IV	Basic Design considerations for crank shaft and valve.	
5	V	Basic Design of Flywheel rim.	
6	VI	Basic Design of propeller shafts and axles.	
7	VII	Basic Design of clutches.	
8	VIII	Basic Design considerations for gear drive to compute the gear teeth, speed and torque.	
List of Instruments / Equipment / Trainer Board			
1	Chart showing various nomenclatures of different components of engine and transmission system		
2			
List of Text Books			
No	Title of Reference Books	Authors	Publication
1	Strength Of Materials(Mechanics)	B.C.Punamia, Arun Kr. Jain	Firewall Media, 2002
2	Strength of Materials	R.S.Khurmi	S. Chand Limited, 2007
List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Strength of Materials	S. Ramamurtham	Dhanpat Rai Publishing Co., New Delhi.
2	Machine Design	R. K. Jain	Khanna Publishers, Delhi
Link of Learning Web Resource			
1	http://courses.washington.edu/engr100/Section_Wei/engine/UofWindsorManual/Piston%20Design. htm		
2	http://confident-instruments.com/Piston_Study.htm		
3	http://www.youtube.com/watch?v=gfNR4kGhChs		
4	http://en.wikipedia.org/wiki/Connecting_rod		
5	http://www.youtube.com/watch?v=M8TF1IY2T-4		
6	For mock test https://www.indiabix.com/mechanical-engineering/automobile-engineering/101007		

CO'S AND PO'S MAPPING

PO'S		CO1	CO2
PO1	An ability to apply knowledge of mathematics and engineering science.	SUB	SUB
PO2	An ability to demonstrate, develop and conduct experiments, as well as to analyze and interpret data.	MED	MED
PO3	An ability to design a system component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	MED	MED
PO4	An ability to perform with multidisciplinary teams.	MED	MED
PO5	Use of appropriate modern tool and application software that pertain to Automobile engineering technology systems.	MED	MED
PO6	An ability to identify, formulates, execute and solve engineering problems.	SUB	SUB
PO7	An ability to communicate and present effectively in both verbal and written forms.	SLI	MED
PO8	The broad education necessary to understand the impact of engineering solutions in global, economic, environmental and societal context.	MED	SUB
PO9	Recognition of need for self-improvement, and an ability to engage in life-long learning.	MED	MED
PO10	Ability to aware about the contemporary issues.	MED	MED
PO11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	MED	MED
PO12	Demonstrate to analyse and apply unconventional processes, automation, robotics Nanotechnology, Computer-Aided-Design & Manufacturing and knowledge in Automobile Engineering, Thermodynamics, Refrigeration & Air Conditioning and Jet Propulsion & Rocket Engineering to analyse and solve complex problems and to work professionally in such systems and plants.	SLI	SLI