GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology		Branch/Spec.	Mechatronics Engineering	
Semester	V		Version	2.0.1.0	
Effective from Academic Year	2017-18		Effective for the batch Admitted in		June 2015
Subject code	2MC501	Subject Name	DESIGN OF MACHINE ELEMENTS		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	0	1	0	5	Theory	40	60	100
Hours	4	0	2	0	6	Practical	25	25	50

Pre-requisites:

Learning Outcome:

After learning this course, students should be able to:

- Acquainted with standards, safety, reliability, importance of dimensional parameters and manufacturing aspects in mechanical design.
- Design simple power transmission systems such as belts, chains and ropes.
- Design different types of mechanical clutches and brakes.
- Apply multidimensional fatigue failure criteria in the analysis and design of mechanical components.
- Design and analyze mechanism.
- Design different machine tool structures.
- Communicate the results of a design assignment by means of drawings and a design report.
- Make appropriate use of available computer aided design software.

Theory syllabus

Unit	Content	Hrs
1	**Integrated approach in Design :** Manufacturing consideration in Design, Ergonomic considerations, and cost and weight considerations in Designing machine members, safety and reliability in design, theories of failures.	6
2	**Power transmission by Belts Chain and Rope :** Classification, belt tension ratio, centrifugal tension, power transmitted by belt, selection of flat belt from manufacturer's catalogue, selection of v-belt from manufacturer's catalogue, Construction details of flat and V-belts.	11
3	**clutches and Brakes:** Design of clutch, positive and friction clutches, design of cone, single and multi plates and centrifugal clutches, application in automotive and industrial machinery Classification of clutches. Classification of brakes, design of brakes, band brake, external and internal shoe brakes, disk brakes, applications and construction details	11
4	**Fatigue Loading:** Completely reversed or cyclic stresses; stress v/s cycle (S-N) curves; fatigue and endurance limit; effect of surface finish, size and loading on endurance strength; Finite and infinite life; design for finite and infinite life; stress concentration, notch sensitivity and fatigue stress concentration factor; factor of safety for fatigue loading; Gerber, Goodman and Soderberg criteria for design of parts subjected to variable loading;	13

	Combined variable normal and shear stresses; applications of fatigue loading for design of shafts, axles etc.	
5	**Design of Mechanisms:** Mechanisms for machine building, kinematics and dynamic considerations in analysis of Mechanisms. Design analysis of mechanism.	11
6	**Design of Machine Tool Structure:** Design based on rigidity like Spindle- deflection of spindle, Column, Housing box.	8
Practical content		
The Practical/term work shall be based on the topics mentioned above and will be defended by the candidates.		
Text Books		
1	Haidary, “Machine Design”, Nirali Prakashan Pune. Edition 2nd.	
2	V.B. Bhandari, “Design of machine Elements”, TMH Edition 2nd	
Reference Books		
1	Shigley J.E., “Mechanical Engineering Design”, TMH. Edition 1st.	