



***Strategic Plan for Learning and Teaching
Department of Chemical Engineering***

Branch Name:	Chemical Engineering (CHE)	Session :	2018-2019
Subject Name:	Machine Design	Year:	3 rd
Subject Code:	CHE504B	Semester :	5 th

Course Objective:	The primary objective of this course is to demonstrate how engineering design uses the many engineering science principles and to show how these principles are practically applied. The emphasis in this course is on machine design: the design and creation of devices that consist of interrelated components used to modify force and/or motion
Course Outcome:	By the end of the course ,for a particular sub-set of machine elements and a given problem, each student should be able to define failure and decide on an appropriate failure model, and design an appropriate machine element using allowable load (under the given operating conditions),required element life, manufacturing considerations, and manage engineering projects.

Teaching-Learning Plan:

Lecture Class No.	Reference to the WBUT Syllabus	Subject Topics to be discussed/ covered/ delivered	Text book / Referred book SI.No.	
1	Mod I	Introduction to Machine Design, Stress Analysis: Strain, Stress, Elasticity, Modulus of Elasticity	1,2	
2		Simple stress and different types of stresses considered during designing a machine part and related problems		
3		Application of stress-strain diagram in choosing materials property and physical interpretation of ultimate and breaking stress		
4		Torsion, bending, stress analysis in beams and columns		
5		Problems related to Columns and Euler column formula		
6		Combined stresses (Normal and shear stress) and related problems		
7		General notions of dynamic load and impact stresses		
8		Analysis of Struss and related problems		
9		An overview of all possible loads acting on a machine part and induced stresses developed during the design consideration of a machine part		
10				
11	Mod II	Stress-strain diagram, stress concentration (static load applied steadily, static load applied suddenly, variable load), types of failure, prevention of failure,	1,2	
12		Factor of safety, design of combined loading and related problems		
13				
14		Theories of failure: maximum normal stress theory, maximum shear stress theory		
15				
16				
17				Choice of theory of failure, impact loading and fatigue loading
18				Endurance strength, endurance limit, design for fatigue loading; Soderberg criterion, Goodman criterion
19				
20	Mod III		Riveted joints: introduction, rivet heads and methods of riveting, rivet material and rivet test, types of riveted joints	1,2
21		Failure of rivet joints and its design		

22		Rivet design and related problems	
23		Eccentric loading on rivet	
24		Cotter joint and its design	
25		Knuckle joint and its design	
26		Introduction to keys, types of keys and an introduction to coupling, different types of coupling	
27		Shaft-general use, causes of failure in shaft, designing of straight shaft	
28		Design for strength, design for rigidity and stiffness	
29		Introduction to different types of belt drives and related problems	
30		General design of belt drive and related problems	
31	Mod IV	Design of Pressure vessel: thin and thick cylinder design	3,4
32			
33			
34		Design of cylinder head, cover plate	
35			
36			
37			
38		Selection of gasket, design of bolt and flange	
39			
40			

Recommended Text/ Reference Books:

Sl.No.	Name of Text/ Reference Book	Name of Author	Publisher & edition
1	Process Equipment Design	Brownell and Young	John Wiley and sons
2	Machine Design	Norton	Pearson Education
3	Design of Machine Elements	Sharma & Purohit	PHI
4	Design of Process Equipment	Hesse and Rushton	

Course Co-ordinator / Faculty

Sl. No.	Name of the Course Co-ordinator / Faculty	Signature of Course coordinator / Faculty		Signature of HOD	
1	Dr.Debasis Ghosh				