Orissa School of Mining Engineering
Keonjhar

Department of Mechanical Engineering

Lesson Plan w.e.f 01.10.2021- 18.01.2022

Subject: **Strength of Materials (TH2)**			
Discipline: **Mechanical Engineering**		Name of the Faculty: *Dr .Niharika Mohanta*	
Course Code:	**TH-2**	Semester:	**3RD**
Total Periods:	**60**	Examination:	**2021(Winter)**
Theory Periods:	4P/W	Class Test:	20
Maximum Marks:	**100**	End Semester Examination:	80

WEEK	CLASS DAY	THEORY TOPICS
1st	1st	**Module 1:Simple stress& strain** Introduction to the subject and books to be used
	2nd	Types of load, stresses & strains,(Axial and tangential)
	3rd	Strains, Elastic limit, Hooke's law, Young's modulus
	4th	bulk modulus, modulus of rigidity, Poisson's ratio,
2nd	1st	Derive the relation between three elastic constant(E&K)
	2nd	Derive the relation between three elastic constant(G&E))
	3rd	Principle of super position. Problems to find out deformation of the bar
	4th	stresses in composite section.Numericals related to stresses composite section
3rd	1st	Temperature stress, determine the temperature stress in composite bar (single core)
	2nd	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load. Numerical related to above
	3rd	Problems for practice
	4th	Revision of module 1
4th	1st	**Module 2:Thin cylinder and spherical shell under internal pressure:** Introduction thin cylinder, thick cylinder
	2nd	Definition of hoop and longitudinal stress, Derivation of hoop stress, longitudinal stress
	3rd	Definition and Derivation of hoop strain, longitudinal strain and volumetric strain
	4th	Computation of the change in length, diameter and volume
5th	1st	Simple problems on above
	2nd	Revision
	3rd	**Module 3 : Two dimensional stress systems:** Principal planes, principal stress, sign convention
	4th	Stresses on an oblique section of a body subjected to direct stress in one plane
6th	1st	Stresses on an oblique section of a body subjected to direct stress in two mutual perpendicular direction
	2nd	Stresses on an oblique section of a body subjected to simple shear stress
	3rd	Stresses on an oblique section of a body subjected to direct stress in one plane accompanied by simple shear stress
	4th	Stresses on an oblique section of a body subjected to direct stress in two mutual perpendicular direction accompanied by simple shear stress
7th	1st	Graphical method for stresses on a oblique section of a body (Mohrs

		circle),Sign convention
	2nd	Mohr's circle method body subjected to direct stress in one plane, Stresses on body subjected to direct stress in two mutual perpendicular direction
	3rd	Mohr's circle method for body subjected to simple shear stress, Stresses on an body subjected to direct stress in one plane accompanied by simple shear stress
	4th	Mohr's circle method for body subjected to direct stress in two mutual perpendicular direction accompanied by simple shear stress
8th	1st	Simple problems on above
	2nd	Revision
	3rd	**Module 4 : Bending moment& shear force** Introduction, Types of beams, supports and loads
	4th	Shear force(SF) and Bending moment (BM) definition, Sign convention
9th	1st	SFD, BMD – Cantilever beam with different types of loading
	2nd	Simple problems on above
	3rd	SFD, BMD – Simply supported beam with different types of loading
	4th	Simple problems on above
10th	1st	SFD, BMD – Overhanging beam with different types of loading
	2nd	Simple problems on above
	3rd	REVISION
	4th	**Module 5:Theory of simple bending;** Introduction
11th	1st	Assumptions in the theory of bending, theory of simple bending
	2nd	Derivation of bending equation, position of neutral axis, moment of resistance.
	3rd	Distribution of bending stress across the section. Modulus of section, Strength of a section
	4th	Simple problems on above
12th	1st	REVISION
	2nd	**Module 6: Combined direct & Bending stresses** Introduction, Column and strut, Eccentric loading. Column with Eccentric loading
	3rd	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.
	4th	Numerical problems on above.
13th	1st	Classification of columns, end conditions, sign convention for bending moments
	2nd	Assumptions for Euler's theory,Eulers Formula
	3rd	Buckling load computation using Euler's formula (no derivation) in columns with various end conditions
	4th	Simple problems on above
14th	1st	REVISION
	2nd	**Module 7: Torsion** :Introduction
	3rd	Assumption of pure torsion
	4th	Derivation of The torsion equation for solid and hollow circular shaft
15th	1st	Comparison between solid and hollow shaft subjected to pure torsion
	2nd	Simple problems on above
	3rd	Simple problems on above
	4th	revision