Lesson Plan

Discipline: Mechanical Engineering		Semester:		Faculty: Dr .Niharika Mohanta
Subject: Strength of Materials (TH2)		No of day/week of class allotted: 4 Periods		Semester starts from-15/09/2022 To:21/12/2022
MONTH	WEEK	AVAILAB ILITY OF CLASSES	CLASS DAY	THEORY TOPICS TO BE COVERED
ż	1 st	01	15/09/2022	Briefing about the syllabus Module 1:Simple stress& strain Introduction to the subject and books to be used
		04	19/09/2022	Types of load, stresses & strains,(Axial and tangential)
	2 nd		21/09/2022	Strains, Elastic limit, Hooke's law, Young's modulus
September			21/09/2022	bulk modulus, modulus of rigidity, Poisson's ratio,
			23/09/2022	Derive the relation between three elastic constant(E&K)
			26/09/2022	Derive the relation between three elastic constant(G&E))
	3 rd	04	28/09/2022	Principle of super position. Problems to find out deformation of the bar
			30/09/2022	stresses in composite section. Numericals related to stresses composite section
	4th	NA		
		04 .	10/10/2022	Temperature stress, determine the temperature stress in composite bar (single core)
	5th		12/10/2022	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load. Numerical related to above
			12/10/2022	Problems for practice
			14/10/2022	Revision of module 1
October	6th	. 04	17/10/2022	Module 2:Thin cylinder and spherical shell under internal pressure: Introduction thin cylinder, thick cylinder
			19/10/2022	Definition of hoop and longitudinal stress, Derivation of hoop stress, longitudinal stress
			19/10/2022	Definition and Derivation of hoop strain, longitudinal strain and volumetric strain
			21/10/2022	Computation of the change in length, diameter and volume
	7th	03 ,	26/10/2022	Simple problems on above
			26/10/2022	Revision
			28/10/2022	Module 3: Two dimensional stress systems: Principal planes, principal stress, sign convention
			29/10/2022	Class test 1 (Class test will be conducted on Saturday 2 nd half for module 1 and module 2)
:	8th	03	2/11/2022	Stresses on an oblique section of a body subjected to direct stress in one plane
			2/11/2022	Stresses on an oblique section of a body subjected to direct stress in two mutual perpendicular direction
			4/11/2022	Stresses on an oblique section of a body subjected to simple shear stress

Pyth					
9th			•		Stresses on an oblique section of a body subjected to
November 10th 04	٤		04	7/11/2022	
9th					shear stress
November 10th					Stresses on an oblique section of a body subjected to
10th		9th		9/11/2022	direct stress in two mutual perpendicular direction
November 10th					accompanied by simple shear stress
November 10th 10				0/11/2022	Graphical method for stresses on a oblique section of
November 10th 04 10th 04 16/11/2022 16/11/2022 16/11/2022 16/11/2022 17/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022 18/11/2022				9/11/2022	a body (Mohrs circle), Sign convention
November 10th 04 16/11/2022 16/11/2022 11th 04 11th 05 11th 05 11th 05 11th 05 11th 05 11th 06 11th 07/11/2022 11th 11th 08 18th 18				•	Mohr's circle method body subjected to direct stress
November 10th 04				10/11/2022	in one plane, Stresses on body subjected to direct
November 10th 04					stress in two mutual perpendicular direction
November 10th			, 04	14/11/2022	Mohr's circle method for body subjected to simple
November 10th 04					shear stress, Stresses on an body subjected to direct
November 10th					stress in one plane accompanied by simple shear
10th 04					stress
10th 04	November	1			Mohr's circle method for body subjected to direct
11th		10th		16/11/2022	stress in two mutual perpendicular direction
11th				50 t 40 (-0.000)	accompanied by simple shear stress
11th				16/11/2022	Simple problems on above
18/11/2022 Internal assessment				17/11/2022	
11th					Internal assessment
11th					Internal assessment
11th 04 23/11/2022 Shear force(SF) and dending moment (BM) definition, Sign convention SFD, BMD — Cantilever beam with different types of loading 23/11/2022 Simple problems on above SFD, BMD — Simply supported beam with different types of loading 30/11/2022 Simple problems on above SFD, BMD — Overhanging beam with different types of loading 02/12/2022 Simple problems on above SFD, BMD — Overhanging beam with different types of loading 02/12/2022 Simple problems on above Class test II(Class test will be conducted on Saturday 2 nd half for module 3 and module 4) 05/12/2022 Module 5:Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending 07/12/2022 Derivation of bending equation, position of neutral axis, moment of resistance. Distribution of bending stress across the section. Modulus of section, Strength of a section 12/12/2022 Simple problems on above Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.	2				Module 4: Bending moment & shear force
11th 04 23/11/2022 Shear force(SF) and Bending moment (BM) definition, Sign convention SFD, BMD – Cantilever beam with different types of loading 25/11/2022 Simple problems on above SFD, BMD – Simply supported beam with different types of loading Simple problems on above SFD, BMD – Overhanging beam with different types of loading SFD, BMD – Overhanging beam with different types of loading O2/12/2022 Simple problems on above Class test II(Class test will be conducted on Saturday 2 ^{md} half for module 3 and module 4) O5/12/2022 Module 5:Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending O7/12/2022 Derivation of bending equation, position of neutral axis, moment of resistance. O9/12/2022 Simple problems on above December 12/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading. Column with Eccentric loading Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.				21/11/2022	Introduction, Types of beams, supports and loads
11th 04 23/11/2022 definition, Sign convention 23/11/2022 SFD, BMD — Cantilever beam with different types of loading 25/11/2022 Simple problems on above 36/11/2022 Simple problems on above 03/12/2022 Simple problems on above 03/12/2022 Simple problems on above 03/12/2022 Class test III(Class test will be conducted on Saturday 2 nd half for module 3 and module 4) 05/12/2022 Module 5:Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending 07/12/2022 Derivation of bending equation, position of neutral axis, moment of resistance. 09/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section Modulus of section, Strength of a section 12/12/2022 Simple problems on above Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.		1			Shear force(SF) and Bending moment (BM)
12th 03 28/11/2022 SFD, BMD - Cantilever beam with different types of loading 28/11/2022 Simple problems on above SFD, BMD - Simply supported beam with different types of loading 30/11/2022 Simple problems on above 30/11/2022 Simple problems on above SFD, BMD - Overhanging beam with different types of loading 02/12/2022 Simple problems on above 03/12/2022 Module 5: Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending 07/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section Simple problems on above 12/12/2022 Simple problems on above 14/12/2022 Introduction, Column and strut, Eccentric loading. Column with Eccentric loading Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/20		1.1+15		23/11/2022	definition Sign convention
12th 03 25/11/2022 Simple problems on above SFD, BMD - Simply supported beam with different types of loading 30/11/2022 Simple problems on above SFD, BMD - Overhanging beam with different types of loading 30/11/2022 Simple problems on above SFD, BMD - Overhanging beam with different types of loading 02/12/2022 Simple problems on above O3/12/2022 Class test II(Class test will be conducted on Saturday 2nd half for module 3 and module 4) 05/12/2022 Module 5: Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending Derivation of bending equation, position of neutral axis, moment of resistance. Distribution of bending stress across the section. Modulus of section, Strength of a section Simple problems on above 14/12/2022 Simple problems on above 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 1				-	SFD. BMD – Cantilever beam with different types of
12th 03 28/11/2022 Simple problems on above 28/11/2022 SFD, BMD – Simply supported beam with different types of loading 30/11/2022 Simple problems on above SFD, BMD – Overhanging beam with different types of loading 02/12/2022 Simple problems on above 03/12/2022 Simple problems on above 03/12/2022 Simple problems on above 03/12/2022 Class test II(Class test will be conducted on Saturday 2nd half for module 3 and module 4) Module 5: Theory of simple bending; Introduction 07/12/2022 Assumptions in the theory of bending, theory of simple bending Derivation of bending equation, position of neutral axis, moment of resistance. Distribution of bending stress across the section. Module of Strength of a section 14/12/2022 Simple problems on above Module of Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading Column with Eccentric loading Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above. Numerical problems on above. 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/12/2022 16/1				23/11/2022	
12th 03 28/11/2022 SFD, BMD – Simply supported beam with different types of loading 30/11/2022 Simple problems on above SFD, BMD – Overhanging beam with different types of loading 5SFD, BMD – Overhanging beam with different types of loading 02/12/2022 SFD, BMD – Overhanging beam with different types of loading 02/12/2022 Simple problems on above Class test II(Class test will be conducted on Saturday 2nd half for module 3 and module 4) 05/12/2022 Module 5: Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending 07/12/2022 Derivation of bending equation, position of neutral axis, moment of resistance. Distribution of bending stress across the section. Modulus of section, Strength of a section Simple problems on above 12/12/2022 Simple problems on above Column with Eccentric loading. Column with Eccentric loading. Column with Eccentric loading stresses, Maximum& Minimum stresses. Numerical problems on above.				25/11/2022	Simple problems on above
types of loading 30/11/2022 Simple problems on above 30/11/2022 Simple problems on above SFD, BMD — Overhanging beam with different types of loading 02/12/2022 Simple problems on above Class test II(Class test will be conducted on Saturday 2nd half for module 3 and module 4) 05/12/2022 Module 5:Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending 07/12/2022 Derivation of bending equation, position of neutral axis, moment of resistance. 09/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section 12/12/2022 Simple problems on above Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading. 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.					SFD, BMD – Simply supported beam with different
12th 03 30/11/2022 Simple problems on above SFD, BMD – Overhanging beam with different types of loading Simple problems on above Osimple problems on above Class test III(Class test will be conducted on Saturday 2nd half for module 3 and module 4) 05/12/2022 Module 5:Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending Derivation of bending equation, position of neutral axis, moment of resistance. O9/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section Simple problems on above Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading. Column with Eccentric loading University Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.		12th		28/11/2022	types of loading
13th 05 SFD, BMD – Overhanging beam with different types of loading				30/11/2022	
13th 05 02/12/2022 Simple problems on above 03/12/2022 Class test II(Class test will be conducted on Saturday 2nd half for module 3 and module 4) 05/12/2022 Module 5: Theory of simple bending; Introduction Assumptions in the theory of bending, theory of simple bending Derivation of bending equation, position of neutral axis, moment of resistance. O9/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section Modulus of section, Strength of a section Simple problems on above I4/12/2022 Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. I6/12/2022 Numerical problems on above.		12			SFD, BMD – Overhanging beam with different types
13th 05 13t				30/11/2022	
13th 05 13t				02/12/2022	Simple problems on above
13th 05 13t		13th	05		Class test II(Class test will be conducted on
December 13th				03/12/2022	Saturday 2 nd half for module 3 and module 4)
December 13th				05/12/2022	Module 5: Theory of simple bending; Introduction
December 13th				07/10/0000	Assumptions in the theory of bending, theory of
December Derivation of bending equation, position of neutral axis, moment of resistance. O9/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section Simple problems on above				07/12/2022	simple bending
December December 12/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section 12/12/2022 Simple problems on above Module 6: Combined direct & Bending stresses 14/12/2022 Introduction, Column and strut, Eccentric loading. Column with Eccentric loading 14th O4 . Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.				07/12/2022	Derivation of bending equation, position of neutral
December 12/12/2022 Distribution of bending stress across the section. Modulus of section, Strength of a section. 12/12/2022 Simple problems on above.					axis, moment of resistance.
December 12/12/2022 Simple problems on above	:			00/10/2000	
December 12/12/2022 Simple problems on above 14/12/2022 Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.				09/12/2022	
14/12/2022 Module 6: Combined direct & Bending stresses Introduction, Column and strut, Eccentric loading. Column with Eccentric loading 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.	December			12/12/2022	
14/12/2022 Introduction, Column and strut, Eccentric loading. Column with Eccentric loading Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.		. 14th		12/12/2022	Simple problems on above
14/12/2022 Introduction, Column and strut, Eccentric loading. Column with Eccentric loading Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.					Module 6: Combined direct & Bending stresses
14th O4. Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.				14/12/2022	Introduction, Column and strut, Eccentric loading.
14th 14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.					
14/12/2022 Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.					
Minimum stresses. Numerical problems on above. 16/12/2022 Numerical problems on above.	D	14111	U -1 •	14/10/2022	
				14/12/2022	Minimum stresses. Numerical problems on above.
				16/12/2022	Numerical problems on above
				10/12/2022	Numerical problems on above.

			19/12/2022	Classification of columns, end conditions, sign convention for bending moments
=	15th	03	21/12/2022	Assumptions for Euler's theory, Eulers Formula
			21/12/2022	Buckling load computation using Euler's formula (no derivation) in columns with various end conditions
-			Extra class	Simple problems on aboveand REVISION
			Extra class	Module 7: Torsion : Introduction, Assumption of pure torsion
	16th		Extra class	Derivation of The torsion equation for solid and hollow circular shaft
*			Extra class	Comparison between solid and hollow shaft subjected to pure torsion. Simple problems
			Extra class	Revision

Dr. Niharika Mahanta · Lecturer in Mechanical Engg.

HOD, Mechanical Engg. OSME, Kebnjhar

Principal OSME, Kepnihar