

Discipline :MECHANICAL ENGG.	Semester :3 <sup>rd</sup>	Name of the Teaching Faculty: PRAVAT KUMAR SWAIN
SUBJECT: STRENGTH OF MATERIAL (TH-2)	No. of days/per week class allotted: 04	Semester From Date:15.09.2022 To Date:22.12.2022 No. of Weeks:15
Week	Class Day	Theory / Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	<b>1.Simple stress &amp; strain</b> • Types of load, stresses & strains, (axial and tangential),
	2 <sup>nd</sup>	• Hooke's law, young's modulus, bulk modulus, modulus of rigidity,
	3 <sup>rd</sup>	• Poisson's ratio, derive the relation between three elastic constants
	4 <sup>th</sup>	• Principle of super position, stresses in composite section
2 <sup>nd</sup>	1 <sup>st</sup>	• Temperature stress, determine the temperature stress in composite bar (single core)
	2 <sup>nd</sup>	• Strain energy and resilience, stress due to gradually applied, suddenly applied and impact load
	3 <sup>rd</sup>	• Strain energy and resilience, stress due to gradually applied, suddenly applied and impact load
	4 <sup>th</sup>	• Simple problems on above
3 <sup>rd</sup>	1 <sup>st</sup>	• Simple problems on above
	2 <sup>nd</sup>	• Simple problems on above
	3 <sup>rd</sup>	<b>2.Thin cylindrical and spherical shell under internal pressure</b> • Definition of hoop and longitudinal stress, Strain
	4 <sup>th</sup>	• Definition of hoop and longitudinal stress, strain
4 <sup>th</sup>	1 <sup>st</sup>	• Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain
	2 <sup>nd</sup>	• Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain
	3 <sup>rd</sup>	• Computation of the change in length, diameter and volume
	4 <sup>th</sup>	• Simple problems on above
5 <sup>th</sup>	1 <sup>st</sup>	• Simple problems on above
	2 <sup>nd</sup>	• CLASS TEST
	3 <sup>rd</sup>	<b>3. Two dimensional stress systems</b> • Determination of normal stress, shear stress and resultant stress on oblique plane
	4 <sup>th</sup>	• Determination of normal stress, shear stress and resultant stress on oblique plane
6 <sup>th</sup>	1 <sup>st</sup>	• Determination of normal stress, shear stress and resultant stress on oblique plane
	2 <sup>nd</sup>	• Location of principal plane and computation of principal stress
	3 <sup>rd</sup>	• Location of principal plane and computation of principal stress
	4 <sup>th</sup>	• Location of principal plane and computation of principal stress
7 <sup>th</sup>	1 <sup>st</sup>	• Location of principal plane and computation of principal stress and maximum shear stress using Mohr's circle
	2 <sup>nd</sup>	• Location of principal plane and computation of principal stress and maximum shear stress using Mohr's circle

	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Location of principal plane and computation of principal stress and maximum Shear stress using Mohr's circle</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>Location of principal plane and computation of principal stress and maximum Shear stress using Mohr's circle</li> </ul>
8 <sup>th</sup>	1 <sup>st</sup>	<b>4.Bending moment &amp; shear force</b> <ul style="list-style-type: none"> <li>Types of beam and load</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Types of beam and load</li> </ul>
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Types of beam and load</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>Concepts of shear force and bending moment</li> </ul>
9 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>Concepts of shear force and bending moment</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Concepts of shear force and bending moment</li> </ul>
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Shear force and bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and overhanging beam under point load and uniformly distributed load</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>Shear force and bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and overhanging beam under point load and uniformly distributed load</li> </ul>
10 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>Shear force and bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and overhanging beam under point load and uniformly distributed load</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Shear force and bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and overhanging beam under point load and uniformly distributed load</li> </ul>
	3 <sup>rd</sup>	<b>5.Theory of simple bending</b> <ul style="list-style-type: none"> <li>Assumptions in the theory of bending,</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>Assumptions in the theory of bending,</li> </ul>
11 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>Bending equation, moment of resistance, section modulus &amp; neutral axis.</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Bending equation, moment of resistance, section modulus &amp; neutral axis.</li> </ul>
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Bending equation, moment of resistance, section modulus &amp; neutral axis.</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>Solve simple problems</li> </ul>
12 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>Solve simple problems</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Solve simple problems</li> </ul>
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Solve simple problems</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>CLASS TEST</li> </ul>
13 <sup>th</sup>	1 <sup>st</sup>	<b>6.Combined direct &amp; bending stresses</b> <ul style="list-style-type: none"> <li>Define column</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Axial load, eccentric load on column</li> </ul>
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Direct stresses, bending stresses, maximum &amp; minimum stresses. numerical Problems on above.</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>Direct stresses, bending stresses, maximum &amp; minimum stresses. numerical problems on above.</li> </ul>
	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>Buckling load computation using Euler's formula (no derivation) in columns with various end conditions</li> </ul>

<b>14<sup>th</sup></b>	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>Buckling load computation using Euler's formula (no derivation in columns with various end conditions)</li> </ul>
	3 <sup>rd</sup>	<b>7.Torsion</b> <ul style="list-style-type: none"> <li>Assumption of pure torsion</li> </ul>
	4 <sup>th</sup>	<ul style="list-style-type: none"> <li>The torsion equation for solid and hollow circular shaft</li> </ul>
<b>15<sup>th</sup></b>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>The torsion equation for solid and hollow circular shaft</li> </ul>
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>The torsion equation for solid and hollow circular shaft</li> </ul>
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>Comparison between solid and hollow shaft subjected to pure torsion</li> </ul>
	4 <sup>TH</sup>	<ul style="list-style-type: none"> <li>CLASS TEST</li> </ul>

#### RECOMMENDED BOOKS

Sl. No.	Author	Title of the book	Publisher
01	S Ramamrutham	Strength of Materials	Dhanpat Rai
02	R K Rajput	Strength of Materials	S.Chand
03	R.S khurmi	Strength of Materials	S.Chand
04	G H Ryder	Strength of Materials	Mc millon and co.lmtd
05	S Timoshenko and D H Young	Strength of Materials	TMH

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