



SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by
NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956.
Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.D.T., Narsapur-534280. (Andhra Pradesh)

DEPARTMENT OF CIVIL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
23CE3T02	STRENGTH OF MATERIALS	III	CIVIL	05	2025-26	14-07-2025

COURSE OUTCOMES

1	Explain the basic materials behavior under the influence of different external loading Conditions and the support conditions. (K2)
2	Draw the diagrams indicating the variation of the key performance features like axial Forces, bending moment and shear forces in structural members. (K3)
3	Acquire knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams. (K3)
4	Calculate deflections in the beams due to various loading and support conditions. (K3)
5	Compute stresses across section of the thin, thick cylinders and columns to arrive at optimum sections to withstand the internal pressure using Lamé's Equation. (K3)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	Explain the basic materials behavior under the influence of different external loading Conditions and the support conditions. (K2)	1.1	Simple Stresses and Strains: Elasticity and plasticity	T1,R1	1	Chalk & Talk, PPT, Tutorial
		1.2	Types of stresses and strains	T1,R1	1	
		1.3	Hooke's law — Factor of safety, Poisson's ratio	T1,R1	1	
		1.4	problems	T1,R1	1	
		1.5	problems	T1,R2	1	
		1.6	Relationship between Elastic constants	T1,R2	1	
		1.7	problems	T1,R1	1	
		1.8	problems	T1,R1	1	
		1.9	Bars of varying section — stresses in composite bars.	T2,R1	1	
		1.10	problems	T2,R1	1	
		1.11	problems	T2,R1	1	
		1.12	problems	T2,R1	1	



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				Total	12	
II	Draw the diagrams indicating the variation of the key performance features like axial Forces, bending moment and shear forces in structural members. (K3)	2.1	Shear Force and Bending Moment: Definition of beam Types of beams	T2,R1	1	Chalk & Talk, PPT, Tutorial
		2.2	Concept of shear force and bending moment	T2,R1	1	
		2.3	Point of contra flexure	T2,R2	1	
		2.4	Relation between S.F., B.M, and rate of loading at a section of a beam;	T2,R1	1	
		2.5	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads,	T2,R2	1	
		2.6	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to uniformly distributed loads,	T2,R1	1	
		2.7	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.	T1,R1	1	
		2.8	Problems	T1,R1	1	
		2.9	Problems	T1,R1	1	
		2.10	Problems	T1,R1	1	
		2.11	Problems	T1,R1	1	
		2.12	Problems	T1,R1	1	
				Total	12	
III	Acquire knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the	3.1	Flexural and Shear Stresses: Flexural Stresses: Theory of simple bending, Assumptions	T2,R1	1	Chalk & Talk, PPT, Tutorial
		3.2	Derivation of bending equation,	T2,R1	1	
		3.3	Neutral axis, Determination of bending stresses, section modulus of rectangular and circular sections (Solid and	T1,R2	1	



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	beams. (K3)		Hollow),			
		3.4	I, T, Angle and Channel sections, Design of simple beams	T2,R2	1	
		3.5	Problems	T1,R2	1	
		3.6	Shear Stresses: Derivation of formula — Shear stress distribution across various beam sections like rectangular	T2,R1	1	
		3.7	Problems	T1,R2	1	
		3.8	Shear Stresses: Derivation of formula — Shear stress distribution across various beam sections like circular, I, T Angle sections.	T1,R1	1	
		3.9	Problems	T1,R1	1	
		3.10	Problems	T1,R1	1	
		3.11	Torsion – circular shafts only.	T1,R1	1	
		3.12	Problems	T1,R1	1	
				Total	12	
IV	Calculate deflections in the beams due to various loading and support conditions. (K3)	4.1	Deflection of Beams: Double integration and Macaulay's methods	T2,R1	1	Chalk & Talk, PPT, Tutorial
		4.2	Determination of slope and deflection for cantilever subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.	T2,R1	1	
		4.3	Problems	T1,R2	1	
		4.4	Problems	T2,R1	1	
		4.5	Determination of slope and deflection for simply supported subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.	T1,R2	1	
		4.6	Problems	T2,R1	1	
		4.7	Problems	T1,R1	1	
		4.8	Determination of slope and deflection for overhanging	T1,R1	1	



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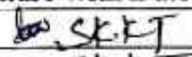
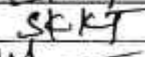
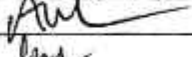
			beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.			
		4.9	Problems	T1,R1	1	
		4.10	Problems	T1,R1	1	
		4.11	Mohr's theorems — Moment area method — application to simple cases of cantilever.	T1,R1	1	
		4.12	Problems	T1,R1	1	
		Total				12
V	Compute stresses across section of the thin, thick cylinders and columns to arrive at optimum sections to withstand the internal pressure using Lame's Equation. (K3)	5.1	Introduction – Classification of columns – Axially loaded compression members	T2,R1	1	Chalk & Talk, PPT, Tutorial
		5.2	Euler's crippling load theory – Derivation of Euler's critical load formulae for various end conditions	T2,R1	1	
		5.3	Problems	T2,R1	1	
		5.4	Problems	T1,R2	1	
		5.5	Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory	T1,R1	1	
		5.6	Rankine – Gordon formula – Eccentric loading and Secant formula – Prof. Perry's formula.	T2,R1	1	
		5.7	Problems	T2,R1	1	
		5.8	Thin and Thick cylindrical shells — Derivation of formula for longitudinal and circumferential stresses — hoop, longitudinal and volumetric strains	T1,R2	1	
		5.9	Problems	T1,R2	1	
		5.10	changes in diameter, and volume of thin cylinders. Lames theory for thick cylinders, Derivation of Lames formulae,	T1,R2	1	

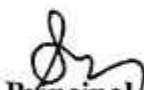


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		5.11	distribution of hoop and radial stresses across the thickness, compound cylinders- distribution of stresses	T1,R2	1	
		5.12	Problems	T1,R2	1	
					Total	12
					CUMULATIVE PROPOSED PERIODS	60
Text Books:						
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION					
1	Strength of Materials by R. K. Bansal, Lakshmi Publications, 16th Edition, 2022.					
2	Strength of Materials by J.K. Gupta and S.K. Gupta, Cengage publications 2nd edition, 2024					
3	Strength of Materials by B. S. Basavarajaiah and P. Mahadevappa, Universities Press 3rd Edition, 2010.					
Reference Books:						
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION					
1	Advanced Mechanics of Solids, L.S Srinath, McGraw Hill Education, 2017, 3rd Edition					
2	Strength of Materials - Fundamentals and Applications, T.D.Gunneswara Rao and MudimbyAndal, Cambridge University Press, 2018, 1st Edition					
Web Details						
1	https://www.youtube.com/watch?v=IpMZNpWjsk4					

	Name	Signature with Date
i. Faculty	SK KHADAR JILANI	
ii. Course Coordinator	SK KHADAR JILANI	
iii. Module Coordinator	A.VENKATA KRISHNA	
iv. Programme Coordinator	G V L N MURTHY	


Principal