



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE  
(AUTONOMOUS)  
DEPARTMENT OF CIVIL ENGINEERING**

<b>Regulation</b>	BR23				
<b>II B.TECH I SEMESTER</b>	<b>Course Code: 23CE3T02</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Course Title:</b>	<b>STRENGTH OF MATERIALS</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Learning Objectives:**

1. To impart Fundamental concepts of Strength of Material and Principles of Elasticity and Plasticity Stress
2. To impart concepts of shear force and bending moment on various types of beams and loading conditions
3. To impart concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
4. To the concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
5. To classify cylinders and columns based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure

**Course Outcomes:**

At the end of completion of the course, the student will be able

CO	Statement	Blooms level
CO 1	To understand the basic materials behavior under the influence of different external loading conditions and the support conditions.	L2
CO 2	To draw the diagrams indicating the variation of the key performance features like axial forces, bending moment and shear forces in structural members.	L3
CO 3	To acquire knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams	L2
CO 4	To analyze the deflections due to various loading conditions.	L3
CO 5	To assess stresses across section of the thin, thick cylinders and columns to arrive at optimum sections to withstand the internal pressure using Lamé's equation	L4

**UNIT – I:**

**Simple Stresses and Strains:** Elasticity and plasticity – Types of stresses and strains – Hooke's law – Factor of safety, Poisson's ratio - Relationship between Elastic constants – Bars of varying section – stresses in composite bars.

**UNIT – II:**

**Shear Force and Bending Moment:** Definition of beam – Types of beams – Concept of shear force and bending moment – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.

**UNIT – III:**

**Flexural and Shear Stresses:**

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation, Neutral axis – Determination of bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beams

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