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CE8301 STRENGTH OF MATERIALS I

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UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Simple Stresses and strains – Elastic constants - Relationship between elastic constants – Stress Strain Diagram – Ultimate Stress – Yield Stress – Deformation of axially loaded member - Composite Bars - Thermal Stresses – State of Stress in two dimensions – Stresses on inclined planes – Principal Stresses and Principal Planes – Maximum shear stress - Mohr's circle method.

UNIT II TRANSFER OF LOADS AND STRESSES IN BEAMS 9

Types of loads, supports, beams – concept of shearing force and bending moment – Relationship between intensity of load, Shear Force and Bending moment - Shear Force and Bending Moment Diagrams for Cantilever, simply supported and overhanging beams with concentrated load, uniformly distributed load, uniformly varying load and concentrated moment. Theory of Simple Bending – Stress Distribution due to bending moment and shearing force - Flitched Beams – Leaf Springs.

UNIT III DEFLECTION OF BEAMS 9

Elastic curve – Governing differential equation - Double integration method - Macaulay's method - Area moment method - conjugate beam method for computation of slope and deflection of determinant beams.

UNIT IV TORSION 9

Theory of Torsion – Stresses and Deformations in Solid and Hollow Circular Shafts – combined bending moment and torsion of shafts - Power transmitted to shaft – Shaft in series and parallel – Closed and Open Coiled helical springs – springs in series and parallel – Design of buffer springs.

UNIT V ANALYSIS OF TRUSSES 9

Determinate and indeterminate trusses - Analysis of pin jointed plane determinate trusses by method of joints, method of sections and tension coefficient – Analysis of Space trusses by tension coefficient method.

TEXTBOOKS:

1. Rajput.R.K. “Strength of Materials”, S.Chand and Co, New Delhi, 2015.
2. Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, SMTS –I Strength of materials, Laxmi publications. New Delhi, 2015
3. Rattan. S. S, “Strength of Materials”, Tata McGraw Hill Education Private Limited, New Delhi, 2012
4. Bansal. R.K. “Strength of Materials”, Laxmi Publications Pvt. Ltd., New Delhi, 2010

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1. Timoshenko.S.B. and Gere.J.M, “Mechanics of Materials”, Van Nos Reinhold, New Delhi 1999.

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2. Vazirani.V.N and Ratwani.M.M, "Analysis of Structures", Vol I Khanna Publishers, New Delhi,1995.
3. Junnarkar.S.B. and Shah.H.J, "Mechanics of Structures", Vol I, Charotar Publishing House, New Delhi 2016.
4. Singh. D.K., "Strength of Materials", Ane Books Pvt. Ltd., New Delhi, 2016
5. Basavarajaiah, B.S. and Mahadevappa, P., Strength of Materials, Universities Press, Hyderabad, 2010.
6. Gambhir. M.L., "Fundamentals of Solid Mechanics", PHI Learning Private Limited., New Delhi, 2009.