Written by Administrator Sunday, 01 November 2009 10:08 -

Sub Code

: 06 ME 34

IA Marks

: 25

Hrs/week

: 04

Exam Hours

: 03

Total Lecture Hrs

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: 52

Exam Marks

: 100

PART – A

Simple stress and strain: Introduction, stress, strain, mechanical properties of materials, Linear elasticity, Hooke's Law and Poisson's ratio, Stress-Strain relation – behaviour in Tension for Mild steel and non ferrous metals. Extension / Shortening of a bar, bars with cross sections varying in steps, bars with continuously varying cross sections (circular and rectangular), Elongation due to self weight, Principle of super position.

7 Hours

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Stress in composite section: Volumetric strain, expression for volumetric strain, elastic constants, simple shear stress, shear strain, temperature stresses (including compound bars).

6 Hours

Compound stresses: Introduction, plane stress, stresses on inclined sections, principal stresses and maximum shear stresses, Mohr's circle for plane stress.

Thick and thin cylinders: Stresses in thin cylinders, changes in dimensions of cylinder (diameter, length and volume), Thick cylinders subjected to internal and external pressures (Lame's equation), (compound cylinders not included).

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PART – B

Bending moment and Shear force in beams: Introduction, Types of beams, loads and reactions, shear forces and bending moments, rate of loading, sign conventions, relationship between shear force and bending moments, shear force and bending moment diagrams for different beams subjected to concentrated loads, uniform distributed load (udl) and couple for different types of beams.

7 Hours

Bending and shear stresses in beams: Introduction, theory of simple bending, assumptions in simple bending, relationship between bending stresses and radius of curvature, relationship between bending moment and radius of curvature, moment carrying capacity of a section,

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shearing stresses in beams, shear stress across rectangular, circular, symmetrical I and T sections (composite / fletched beams not included).

7 Hours

UNIT 7:000000000000000

Deflection of beams: Introduction, differential equation for deflection, equations for deflections, slope and moments, double integration method for cantilever and simply supported beams for point load, UDL, UVL and Couple, Macaulay's method.

Torsion of circular shafts and Elastic stability of columns : Introduction, pure torsion, assumptions, derivation of torsional equations, polar modulus, torsional rigidity / stiffness of shafts, power transmitted by solid and hollow circular shafts. Introduction to columns, Euler's theory for axially loaded elastic long columns, derivation of Euler's load for various end conditions, limitations of Euler's theory, Rankine's formula.

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Hours

Text books:

- 1. "Mechanics of Materials" by R.C.Hibbeler, Printice Hall, Pearson Edu., 2005
- 2. "Mechanics of materials", James.M.Gere, Thomson, Fifth edition 2004.

3. **"Mechanics of materials**", S.I. Units, Ferdinand Beer & Russell Johnstan, TATA Mac GrawHill-2003.

Reference books:

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"Strength of Materials", S.S.Bhavikatti, Vikas publications House – Pvt. Ltd., 2nd Ed., 2006.

2. "Mechanics of materials" K.V. Rao, G.C. Raju, First Edition, 2007

3. **"Engineering Mechanics of Solids"** Egor.P. Popov, Pearson Edu. India, 2nd, Edition, 1998.

4. "Mechanics of Solids", Mubeen, Pearson Edu. India, 2002

5. "Strength of Materials", W.A. Nash, Sehaum's Outline Series, Fourth Edition-2007.

Scheme of examination:

One Question to be set from each chapter. Students have to answer any FIVE full questions out of EIGHT questions, choosing at least 2 questions from part A and 2 questions from part B.

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