

DEMAND PAVIATH INTEGRATED SOLUTION

STRENGTH OF MATERIALS - I

Pav<u>iath ONLINE</u>

CIVIL ENGG

◆ CIVIL UNIVERSITY ◆ SECOND YEAR ◆ CODE A30107

UNIT – I

SIMPLE STRESSES AND STRAINS : ELASTICITY AND PLASTICITY – TYPES OF STRESSES AND STRAINS – HODKE'S LAW – STRESS – STRAIN DIAGRAM FOR MILD STEEL – WORKING STRESS – FACTOR OF SAFETY – LATERAL STRAIN, POISSON'S RATIO AND VOLUMETRIC STRAIN – ELASTIC MODULII AND THE RELATIONSHIP BETWEEN THEM – BARS OF VARYING SECTION – COMPOSITE BARS – TEMPERATURE STRESSES. ELASTIC CONSTANTS. STRAIN ENERGY – RESILIENCE – GRADUAL, SUDDEN, IMPACT AND SHOCK LOADINGS – SIMPLE APPLICATIONS.

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UNIT – IV

PRINCIPAL STRESSES AND STRAINS : INTRODUCTION – STRESSES ON AN INCLINED SECTION OF A BAR UNDER AXIAL LOADING – COMPOUND STRESSES – NORMAL AND TANGENTIAL STRESSES ON AN INCLINED PLANE FOR BIAXIAL STRESSES – TWO PERPENDICULAR NORMAL STRESSES ACCOMPANIED BY A STATE OF SIMPLE SHEAR – MOHR'S CIRCLE OF STRESSES – PRINCIPAL STRESSES AND STRAINS – ANALYTICAL AND GRAPHICAL SOLUTIONS. THEORIES OF FAILURE: INTRODUCTION – VARIOUS THEORIES OF FAILURE: MAXIMUM PRINCIPAL STRESS THEORY, MAXIMUM PRINCIPAL STRESS THEORY, STRAIN ENERGY AND SHEAR STRAIN ENERGY THEORY (VON MISES THEORY).

APM Civil Engineering

STC APM

SYLLABUS COACHING

TRAINING - 2/UNIT TRAINING

UNIT – II

SHEAR FORCE AND BENDING MOMENT : DEFINITION OF BEAM – TYPES OF BEAMS – CONCEPT OF SHEAR FORCE AND BENDING MOMENT – S.F AND B.M DIAGRAMS FOR CANTILVER, SIMPLY SUPPORTED AND DVERHANGING BEAMS SUBJECTED TO POINT LOADS,

UNIFORMLY DISTRIBUTED LOAD, UNIFORMLY Varying Loads and combination of These

LOADS - POINT OF CONTRAFLEXURE -Relation between S.F., B.M and rate of Loading at a section of a beam.

UNIT – V

DEFLECTION OF BEAMS : BENDING INTO A CIRCULAR ARC - SLOPE, DEFLECTION AND

RADIUS OF CURVATURE – DIFFERENTIAL EDUATION FOR The Elastic line of A Beam – double integration and Macaulay's methods – determination of Slope and

DEFLECTION FOR CANTILEVER AND SIMPLY SUPPORTED Beams subjected to point Loads, U.D.L, Uniformly Varying Load-Mohr's Theorems - Moment Area Method

- APPLICATION TO SIMPLE CASES INCLUDING DVERHANGING BEAMS.CONJUGATE BEAM METHOD: INTRODUCTION – CONCEPT OF CONJUGATE BEAM METHOD. DIFFERENCE BETWEEN A REAL BEAM AND A CONJUGATE BEAM. DEFLECTIONS OF DETERMINATE BEAMS WITH CONSTANT AND DIFFERENT MOMENTS OF INFRITA.



FLEXURAL STRESSES: THEORY OF SIMPLE BENDING – ASSUMPTIONS – DERIVATION OF BENDING EQUATION: M/I = F/Y = E/R – 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 BEAM SECTIONS.

SHEAR STRESSES : DERIVATION OF Formula – Shear Stress Distribution ACROSS VARIOUS BEAM SECTIONS LIKE Rectangular, Circular, Triangular, I, T Angle Sections.

TEXT BOOKS:

 STRENGTH OF MATERIALS BY R.K.BANSAL, LAKSHMI PUBLICATIONS HOUSE PVT. LTD.
STRENGTH OF MATERIALS BY R.K.RAJPUT, S.CHAND & COMPANY

LID. 3) MECHANICS OF MATERIALS BY PYTEL, CENGAGE LEARNING PVT. LTD.

REFERENCES: I) Strength of Materials by S.S.Bhavikatti, vikas publishing House Day 1 to

HOUSE PVT. LTD. 2) Mechanics of Structures Vol –I by H.J.Shah and

S.B.JUNNARKAR, CHAROTAR PUBLISHING HOUSE PVT. LTD. 3) Strength of Materials by D.S prakash Rad, Universities

3) STRENGTH OF MATERIALS BY U.S. PRAKASH RAD, UNIVERSITIE PRESS PVT. LTD. 4) STRENGTH OF MATERIALS BY S.S. RATTAN TATA MCGRAW HILL

4) STRENDTH OF MATERIALS BY S.S.RATTAN, TATA MUGRAW HILL EDUCATION PVT. LTD.

LOGGANDARY I. EIG. 5 Fundamentals of Solid Mechancis by M.L.Gambhir, Phi Learning PVT. Ltd <u>6) Strength of Materials</u> and Structures by John Case *et Al*.

D) STRENGTH OF MATERIALS AND STRUCTURES BY JUNN GASE ET AL. BUTTERWORTH- HEINEMANN.

7) STRENGTH OF MATERIALS BY R.SUBRAMANIAN, DXFORD UNIVERSITY PRESS.



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