DEMAND

PAVIATH INTEGRATED SOLUTION

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STRENGTH OF MATERIALS – II

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◆ CIVIL UNIVERSITY ◆ SECOND YEAR II SEMESTER ◆ CODE A40114

UNIT – I
TORSION OF CIRCULAR SHAFTS : THEORY OF PURE TORSION – DERIVATION OF TORSION EQUATIONS : T/J = Q/R = NΘ/L – ASSUMPTIONS MADE IN THE THEORY OF PURE TORSION – TORSIONAL MOMENT OF RESISTANCE – POLAR SECTION MODULUS – POWER TRANSMITTED BY SHAFTS – COMBINED BENDING AND TORSION AND END THRUST – DESIGN OF SHAFTS ACCORDING TO THEORIES OF FAILURE.
SPRINGS: INTRODUCTION – TYPES OF SPRINGS – DEFLECTION OF CLOSE AND OPEN COILED HELICAL SPRINGS UNDER AXIAL PULL AND AXIAL COUPLE – SPRINGS IN SERIES AND PARALLEL – CARRIAGE OR LEAF SPRINGS.

UNIT – II
COLUMNS AND STRUTS : INTRODUCTION – TYPES OF COLUMNS – SHORT, MEDIUM AND LONG COLUMNS – AXIALLY LOADED COMPRESSION MEMBERS – CRUSHING LOAD – EULER'S THEOREM FOR LONG COLUMNS- ASSUMPTIONS- DERIVATION OF EULER'S CRITICAL LOAD FORMULAE FOR VARIOUS END CONDITIONS – EQUIVALENT LENGTH OF A COLUMN – SLENDERNESS RATIO – EULER'S CRITICAL STRESS – LIMITATIONS OF EULER'S THEORY – RANKINE – GORDON FORMULA – LONG COLUMNS SUBJECTED TO ECCENTRIC LOADING – SECANT FORMULA – EMPIRICAL FORMULAE – STRAIGHT LINE FORMULA – PROF. PERRY'S FORMULA.
BEAMS CURVED IN PLAN: INTRODUCTION – CIRCULAR BEAMS LOADED UNIFORMLY AND SUPPORTED ON SYMMETRICALLY PLACED COLUMNS – SEMI-CIRCULAR BEAM SIMPLYSUPPORTED ON THREE EQUALLY SPACED SUPPORTS.

UNIT - III
BEAM COLUMNS: LATERALLY LOADED STRUTS – SUBJECTED TO UNIFORMLY DISTRIBUTED AND CONCENTRATED LOADS – MAXIMUM B.M. AND STRESS DUE TO TRANSVERSE AND LATERAL LOADING.DIRECT AND BENDING STRESSES: STRESSES UNDER THE COMBINED ACTION OF DIRECT LOADING AND BENDING MOMENT. CORE OF A SECTION – DETERMINATION OF STRESSES IN THE CASE OF CHIMNEYS, RETAINING WALLS AND DAMS – CONDITIONS FOR STABILITY – STRESSES DUE TO DIRECT LOADING AND BENDING MOMENT ABOUT BOTH AXIS.

UNIT – IV
UNSYMETRICAL BENDING: INTRODUCTION – CENTROIDAL PRINCIPAL AXES OF SECTION – GRAPHICAL METHOD FOR LOCATING PRINCIPAL AXES – MOMENTS OF INERTIA REFERRED TO ANY SET OF RECTANGULAR AXES – STRESSES IN BEAMS SUBJECTED TO UNSYMMETRICAL BENDING – PRINCIPAL AXES – RESOLUTION OF BENDING MOMENT INTO TWO RECTANGULAR AXES THROUGH THE CENTROID – LOCATION OF NEUTRAL AXIS - DEFLECTION OF BEAMS UNDER UNSYMMETRICAL BENDING.
SHEAR CENTRE: INTRODUCTION - SHEAR CENTRE FOR SYMMETRICAL AND UNSYMMETRICAL (CHANNEL, I, T AND L) SECTIONS

UNIT – V
THIN CYLINDERS: THIN SEAMLESS CYLINDRICAL SHELLS – DERIVATION OF FORMULA FOR LONGITUDINAL AND CIRCUMFERENTIAL STRESSES – HOOP, LONGITUDINAL AND VOLUMETRIC STRAINS – CHANGES IN DIA, AND VOLUME OF THIN CYLINDERS – THIN SPHERICAL SHELLS.
THICK CYLINDERS: INTRODUCTION LAME'S THEORY FOR THICK CYLINDERS – DERIVATION OF LAME'S FORMULAE – DISTRIBUTION OF HOOP AND RADIAL STRESSES ACROSS THICKNESS – DESIGN OF THICK CYLINDERS – COMPOUND CYLINDERS – NECESSARY DIFFERENCE OF RADII FOR SHRINKAGE – THICK SPHERICAL SHELLS.

TEXT BOOKS:
1) STRENGTH OF MATERIALS BY R.K.BANSAL, LAKSHMI PUBLICATIONS HOUSE PVT. LTD.
2) STRENGTH OF MATERIALS BY R.K RAJPUT, S.CHAND & COMPANY LTD.
3) MECHANICS OF MATERIALS BY GERE, CENGAGE LEARNING PVT. LTD.
REFERENCES:
1) FUNDAMENTALS OF SOLID MECHANCIS BY M.L.GAMBHIR, PHI LEARNING PVT. LTD
2) INTRODUCTION TO STRENGTH OF MATERIALS BY U.C.JINDAL, GALGOTIA PUBLICATIONS PVT. LTD.
3) STRENGTH OF MATERIALS BY BHATTACHARYA, CENGAGE LEARNING
3) STRENGTH OF MATERIALS BY D.S PRAKASH RAO, UNIVERSITIES PRESS PVT. LTD.
4) STRENGTH OF MATERIALS BY S.S.RATTAN, TATA MCGRAW HILL EDUCATION PVT. LTD.
5) STRENGTH OF MATERIALS BY R.SUBRAMANIAN, OXFORD UNIVERSITY PRESS.
6) MECHANICS OF MATERIALS BY FERDINAND P. BEER *ET.AL.*, TATA MCGRAW HILL EDUCATION PVT. LTD.

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PRESENTATION – 2/UNIT
SHOWTIME - 2/UNIT

SYLLABUS PERIOD
TRAINING – 2/2 HRS/UNIT
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