DEMAND

PAVIATH INTEGRATED SOLUTION

CIVIL ENGG

CIVIL POLY

ENGINEERING MECHANICS

Paviath ONLINE

◆ CIVIL POLY ◆ II YEAR III SEM ◆ CODE CEM31

OBJECTIVES:
ON COMPLETION OF THE SUBJECT THE STUDENTS WILL BE FAMILIAR WITH:
- DIFFERENT TYPES OF MECHANICAL PROPERTIES OF ENGINEERING MATERIALS.
- STRESS AND STRAINS, THE DEFORMATION OF ELASTIC BODIES UNDER SIMPLE STRESSES
- DIFFERENT TYPES OF SUPPORTS, LOADS AND BEAMS.
- BENDING MOMENT AND SHEAR FORCE DIAGRAMS FOR DETERMINATE BEAMS
- CENTROID FOR DIFFERENT SECTIONS.
- MOMENT OF INERTIA FOR DIFFERENT SECTIONS.
- BENDING STRESSES IN BEAMS AND SHEAR STRESSES IN SHAFTS DUE TO BENDING AND TWISTING MOMENTS RESPECTIVELY.
- TORQUE RESISTING CAPACITY OF THE SHAFT.
- MEMBER FORCES AND THEIR NATURE IN PERFECT FRAMES.

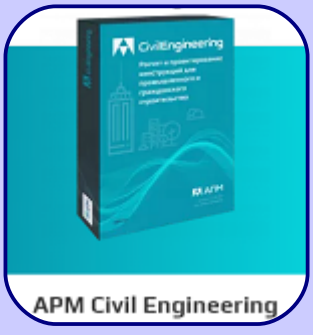
SIMPLE STRESSES & STRAINS AND THEIR APPLICATIONS
1.1 INTRODUCTION TO STRESSES AND STRAINS
DEFINITIONS OF: FORCE, MOMENT OF FORCE, ACTIONS AND REACTIONS, STATICS, STATIC EQUILIBRIUM OF BODIES, MECHANICS, ENGINEERING MECHANICS - CONDITIONS OF STATIC EQUILIBRIUM - TYPES OF FORCES ON STRUCTURAL MEMBERS - STUDY OF STRENGTH OF MATERIAL - MECHANICAL PROPERTIES OF MATERIALS -RIGIDITY, ELASTICITY, PLASTICITY, COMPRESSIBILITY, HARDNESS, TOUGHNESS, STIFFNESS, BRITTLENESS, DUCTILITY, MALLEABILITY, CREEP, FATIGUE, TENACITY, DURABILITY DEFINITIONS OF STRESS AND STRAIN - ---
1.2 APPLICATION OF STRESS AND STRAIN IN ENGINEERING FIELD
BEHAVIOR OF DUCTILE AND BRITTLE MATERIALS UNDER DIRECT LOADS - LOAD EXTENSION CURVE (OR) STRESS STRAIN CURVE OF A DUCTILE MATERIAL - LIMIT OF PROPORTIONALITY, ELASTIC LIMIT, YIELD STRESS, ULTIMATE STRESS, BREAKING STRESS, ACTUAL / NOMINAL STRESSES - WORKING STRESS - FACTOR OF SAFETY - PERCENTAGE ELONGATION - PERCENTAGE REDUCTION IN AREA - SIGNIFICANCE OF PERCENTAGE ELONGATION AND REDUCTION IN AREA OF CROSS SECTION - DEFORMATION OF PRISMATIC AND STEPPED BARS DUE TO UNIAXIAL LOAD - DEFORMATION OF PRISMATIC BARS DUE TO ITS SELF - WEIGHT - NUMERICAL PROBLEMS. COMPOSITE SECTIONS –

SHEAR FORCE AND BENDING MOMENT IN BEAMS
2.1 TYPES OF LOADS AND BEAMS
DEFINITIONS OF: AXIAL LOAD, TRANSVERSE LOAD, CONCENTRATED (OR) POINT LOAD, UNIFORMLY DISTRIBUTED LOAD (UDL), VARYING LOAD – TYPES OF SUPPORTS AND REACTIONS: SIMPLE SUPPORT, ROLLER SUPPORT, HINGED SUPPORT, FIXED SUPPORT; VERTICAL REACTION, HORIZONTAL REACTION, MOMENT REACTION - TYPES OF BEAMS BASED ON SUPPORT CONDITIONS- DIAGRAMMATIC REPRESENTATION OF BEAMS, LOADS AND SUPPORTS – STATIC EQUILIBRIUM EQUATIONS – DETERMINATE AND INDETERMINATE BEAMS.
2.2 SHEAR FORCE AND BENDING MOMENT IN BEAMS
DEFINITIONS OF SHEAR FORCE AND BENDING MOMENT – CONVENTIONAL SIGNS USED
FOR S.F. AND B.M – S.F AND B.M OF GENERAL CASES OF DETERMINATE BEAMS – S.F
AND B.M DIAGRAMS FOR CANTILEVERS, SIMPLY SUPPORTED BEAMS AND OVER HANGING BEAMS – POSITION OF MAXIMUM BM - POINT OF CONTRA FLEXURE – DERIVATION OF RELATION BETWEEN INTENSITY OF LOAD , S.F AND B.M. – NUMERICAL PROBLEMS ON S.F AND B.M (DETERMINATE BEAMS WITH CONCENTRATED LOADS AND UDL ONLY)

GEOMETRICAL PROPERTIES OF SECTIONS
3.1 CENTROID
GEOMETRICAL PROPERTIES – DEFINITIONS AND EXAMPLES OF SYMMETRICAL, ANTI SYMMETRICAL, ASYMMETRICAL SHAPES - DEFINITIONS OF CENTRE OF GRAVITY AND CENTROID - CENTROID OF SYMMETRICAL SHAPE (SOLID/HOLLOW SQUARE, RECTANGULAR, CIRCULAR, I SECTIONS) - CENTROID OF ASYMMETRICAL SHAPES (TRIANGULAR, SEMI-CIRCULAR, QUADRANT, TRAPEZOIDAL, PARABOLIC SECTIONS) - CENTROID OF ANTI SYMMETRIC SHAPES (S , Z SECTIONS) – BUILT UP STRUCTURAL SECTIONS - PROBLEMS
3.2 MOMENT OF INERTIA
DEFINITIONS OF: INERTIA, MOMENT OF INERTIA, POLAR MOMENT OF INERTIA, RADIUS OF GYRATION, SECTION MODULUS, POLAR MODULUS - PARALLEL AND PERPENDICULAR AXES THEOREMS - DERIVATION OF EXPRESSIONS FOR M.I / POLAR M.I, SECTION MODULUS AND RADIUS OF GYRATION OF REGULAR GEOMETRICAL PLANE SECTIONS (RECTANGLE, CIRCLE, TRIANGLE) – M.I ABOUT CENTROIDAL AXIS / BASE, SECTION MODULUS, RADIUS OF GYRATION OF SYMMETRIC, ASYMMETRIC, ANTI-SYMMETRIC AND BUILT UP SECTIONS – NUMERICAL PROBLEMS

STRESSES IN BEAMS AND SHAFTS
4.1 STRESSES IN BEAMS DUE TO BENDING
TYPES OF BENDING STRESSES – NEUTRAL AXIS – THEORY OF SIMPLE BENDING – ASSUMPTIONS – MOMENT OF RESISTANCE – DERIVATION OF FLEXURE/BENDING EQUATION M / I = E / R = Σ/Y – BENDING STRESS DISTRIBUTION – CURVATURE OF BEAM – POSITION OF N.A AND CENTRODIAL AXIS – STIFFNESS EQUATION – FLEXURAL RIGIDITY – STRENGTH EQUATION – SIGNIFICANCE OF SECTION MODULUS – NUMERICAL PROBLEMS.
4.2 STRESS IN SHAFTS DUE TO TORSION
DEFINITIONS OF: SHAFT, COUPLE, TORQUE (OR) TWISTING MOMENT - TYPES OF SHAFTS (ONE END FIXED AND THE OTHER ROTATING, BOTH ENDS ROTATING AT DIFFERENT SPEEDS) - THEORY OF PURE TORSION – ASSUMPTIONS -DERIVATION OF TORSION EQUATION, T / IP = ΛMAX/ R = GΘ / ℓ - SHEAR STRESS DISTRIBUTION IN CIRCULAR SECTION DUE TO TORSION - STRENGTH AND STIFFNESS OF SHAFTS – TORSIONAL RIGIDITY - TORSIONAL MODULUS - COMPARATIVE ANALYSIS OF HOLLOW AND SOLID SHAFTS - POWER TRANSMITTED BY A SHAFT - NUMERICAL PROBLEMS.
PIN JOINTED FRAMES BY METHOD OF JOINTS AND GRAPHICAL METHODS

TEXT BOOKS:
1. R.S.KHURMI "STRENGTH OF MATERIALS", S.CHAND & COMPANY LTD, NEW DELHI
2. S.RAMAMIRTHAM, "STRENGTH OF MATERIALS", DHANPAT RAI (2003)
REFERENCE BOOKS:
1. VAZIRANI & RATWANI, "ANALYSIS OF STRUCTURES-VOL I",KHANNA PUBLISHERS(2003)
2. S.B.JUNNARKAR, "MECHANICS OF STRUCTURES- VOL I".
3. SANCHAYAN MUKHERJEE, "ELEMENTS OF ENGINEERING MECHANICS"
4. RK BANSAL, "ENGINEERING MECHANICS", LAXMI PUBLICATIONS PVT.LTD.,



STC APM

SYLLABUS COACHING
TRAINING - 2/UNIT TRAINING
SELF - 4/UNIT ASSIGNMENT
PRESENTATION – 2/UNIT
SHOWTIME - 2/UNIT

MATHS ILLUSTRATION - GEOMETRY EXPRESSIONS

Renga®

ASCON RENGA

SYLLABUS PERIOD
TRAINING – 2/2 HRS/UNIT
REMOTE - 2/2 HRS/UNIT
DURATION - SEMESTER
ONLINE/REMOTE ACCESS

MECHANICAL EXPRESSIONS – ANALYTIX CAMS

ArCADia SOFT
ArCADia BIM | ArCADia-RAMA | INTERsoft-INTELLICAD | EuroConnections

ARCADIA BIM

FEATURES
TRAINING BY IND. PROFESSIONAL
INDUSTRY APPLICATION
TRAINER OPPORTUNITY
CERTIFICATION

info@paviathintegratedsolution.com -www.paviathintegratedsolution.com www.paviathjobportal.com