Subject : Mathematics

Teacher name : Rashminder Semester 3rd

Name of the Paper : Paper 3

Class: MSc(Mathematics)

November 2020

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| Tensor Algebra: Coordinate-transformation, Cartesian Tensor of different order. Properties of tensors, Isotropic tensors of different orders and relation between them, Symmetric and skew symmetric tensors. Tensor invariants, Deviatoric tensors, Eigenvalues and eigen-vectors of a tensor. Tensor Analysis: Scalar, vector, tensor functions, Comma notation, Gradient, divergence and curl of a vector / tensor field .  |

December 2020

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| Analysis of Strain : Affine transformation, Infinitesimal affine deformation, Geometrical Interpretation of the components of strain. Strain quadric of Cauchy. Principal strains and invariance, General infinitesimal deformation. Saint-Venant's equations of compatibility. Finite deformations Analysis of Stress : Stress Vector, Stress tensor, Equations of equilibrium, Transformation of coordinates.  |

January2021

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| Stress quadric of Cauchy, Principal stress and invariants. Maximum normal and shear stresses. Mohr’s circles, examples of stress. Equations of Elasticity : Generalised Hooks Law, Anisotropic symmetries, Homogeneous isotropic medium  |

February 2021

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| Elasticity moduli for Isotropic media. Equilibrium and dynamic equations for an isotropic elastic solid. Strain energy function and its connection with Hooke’s Law, Uniqueness of solution. Beltrami-Michell compatibility equations. Clapeyrom’s theorem. Saint-Venant's principle |