

## **MT-611 Advanced Continuum and non-Linear Mechanics**

Tensors, kinematics of a continuum, basic laws, changes of frame, forces and moments, Euler's laws of mechanics, Euler-Cauchy Stress Principle, Cauchy's Laws of Continuum Mechanics, Reynolds transport theorem and applications, constitutive equations, simple fluids, Newtonian viscous fluid, Navier-Stokes Equations, boundary conditions, some flows of particular nonlinear fluids, universal flows of fluids of grades 1, 2, and 3, Non-Newtonian fluids, linear viscoelastic fluid, Linear Maxwell Fluid, Generalized Linear Maxwell Fluid with a Continuous Relaxation Spectrum, nonlinear viscoelastic fluid, Calculations of the Relative Deformation Tensor, Rivlin-Ericksen Tensors, Magnetohydrodynamics(MHD) basics and principles, some MHD flows, fluid mechanics in porous medium, heat and mass transfer, mixed convection flows, review of fractional calculus, application of fractional calculus in fluid dynamics, applications of Mathematica, Mathcad, Maple, Matlab softwares in symbolic computations for solving complicated mechanical equations.