1.	Title of the course	Continuum Mechanics
2.	Course number	MA618L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To MA6025/12
6.	To be offered by	Department of Mathematics and Statistics
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To introduce the basic properties of tensors. To relate the laws of physics to the conservation equations of transport phenomena. To solve boundary value problems for fluid, hyper and viscoelastic materials.	
10.	**Course Content:** Algebra of Cartesian tensors, index notation, isotropic tensors, invariants of a tensor; Continuum hypothesis, Lagrange strain, Eulerian strain, Cauchy Green strain, polar decomposition theorem, rotation tensor, Reynolds transport theorem, vorticity; Kinematics of deformation, compatibility conditions, balance principles; Cauchy stress, stress invariants, Piola-Kirchhoff stresses; Euler's laws of motion, field equation, conservation laws, first and second laws of thermodynamics, stress-laws of thermodynamics, energy balance; Constitutive equations of fluids, viscoelastic and hyperelastic materials, principles of material objectivity; Solutions to simple boundary value problems, linearized field equations, examples of linear elastic solutions.	
11.	**Textbook(s):** 1. Rudnicki J W, *Fundamentals of Continuum Mechanics*, 1st Edition, Wiley (2014).	
12.	**Reference(s):** 1. Gurtin M E, *An Introduction to Continuum Mechanics*, 1st Edition, Academic Press (1981). 3. Marsden J E and Hughes T J R, *Mathematical Foundations of Elasticity*, 1st Edition, Dover Publications (1994). 4. Segel L A, *Mathematics Applied to Continuum Mechanics*, 1st Edition, Dover Publications (1987).	