

1.	Title of the course	Introduction to Continuum Mechanics
2.	Course number	ME519L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME5027/12
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	Course Objective(s): To introduce the general theory of deformable continuum which includes the solids, fluids, and other complex materials. To analyze the mathematical relations for the physical laws and the constitutive relations for continuous media. To introduce the analytical solutions of some boundary and initial-boundary value problems.	
10.	Course Content: Introduction to tensor: tensor algebra, tensor calculus; Kinematics: reference and deformed configurations, motion and deformation of body, strains, strain rates; Concept of stress: Cauchy stress, Piola-Kirchhoff stresses, Cauchy theorem; Balance laws: mass balance, linear and angular momentum balance, energy balance, Clausius-Duhem inequality; Frame indifference; Material symmetry; Definition of solids and fluids; Constitutive relations; Elastic materials: nonlinear elasticity, linearized elasticity; Introduction to viscoelasticity and plasticity; Some boundary and initial-boundary value problems from solid mechanics and fluid mechanics.	
11.	Textbook(s): 1. Chadwick P, <i>Continuum Mechanics: Concise Theory and Problems</i> , 2nd Edition, Dover (2012). 2. Gurtin M E, <i>An Introduction to Continuum Mechanics</i> , 1st Edition, Academic Press (1982).	
12.	Reference(s): 1. Gurtin M E, Fried E and Anand L, <i>The Mechanics and Thermodynamics of Continua</i> , 1st Edition, Cambridge University Press (2013). 2. Jog C S, <i>Continuum Mechanics: Foundations and Applications of Mechanics, Volume-I</i> , 3rd Edition, Cambridge University Press (2015). 3. Malvern L E, <i>Introduction to the Mechanics of a Continuous Medium</i> , 1st Edition, Pearson (1977). 4. Silhavy M, <i>The Mechanics and Thermodynamics of Continuous Media</i> , 1st Edition, Springer (2002).	