1.	Title of the course	Theory of Plasticity
2.	Course number	ME602L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME6221/10
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	January 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To introduce mechanical behavior of solids undergoing plastic deformation. To review the applications of plastic deformations in engineering design, materials processing, synthesis of new materials, manufacturing processes, and geomechanics. To introduce the theory of rate-independent plasticity and viscoplasticity. To learn the analytical solutions of several problems.	
10.	**Course Content:** Introduction to plasticity and background; Elastic-plastic deformation: kinematics, strain rate, incompatibility; Energy, dissipation, internal variables, Clausius-Duhem inequality; Rate-independent plasticity: yield surface, yield criteria, maximum dissipation postulate, flow rule, work and strain hardening, Il'iushin's postulate; Axisymmetric problems, elastic-plastic bending, metal forming problems; Slip line theory; Viscoplasticity; Uniqueness; Plastic stability; Plastic waves; Introduction to crystal plasticity.	
11.	**Textbook(s):** 1. Kachanov L M, *Fundamentals of the Theory of Plasticity*, Dover publications (2013). 2. Lubliner J, *Plasticity Theory*, Dover publications (2008).	
12.	**Reference(s):** 1. Gurtin M E, Fried E and Anand L, *The Mechanics and Thermodynamics of Continua*, Cambridge University Press (2010). 2. Hill R, *The Mathematical Theory of Plasticity*, Oxford University Press (1998). 3. Lubarda V A, *Elastoplasticity Theory*, CRC Press (2002). 4. Simo J C and Hughes T J R, *Computational Inelasticity*, Springer (2000).	