1.	Title of the course	Martensitic Phase Transformations
2.	Course number	ME604L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME6023/11
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To study martensitic transformations (MTs) which play the central role in exhibiting shape memory effect in shape memory alloys. To know about crystallographic theory of MTs, kinematics, nucleation, and kinetics of MTs using sharp interface and phase-field approaches. To study evolution of microstructures in solids including shape memory alloys and steel.	
10.	**Course Content:** Fundamentals of martensitic transformations (MTs); Crystallographic theory of MTs: Cauchy-Born hypothesis, lattice symmetries, transformation strains, compatibility relations; Non-convex free energy; Material instability; Nucleation of phases; Kinetics of phase boundaries and shock wave; Athermal resistance; Eshelby tensor and driving forces; Twinning and multivariant MTs; Microstructures in solids; Shape memory alloys; Phase field approaches to MTs.	
11.	**Textbook(s):** 1. Abeyaratne R and Knowles J K, *Evolution of Phase Transitions: A Continuum Theory*, 1st Edition, Cambridge University Press (2006). 2. Bhattacharya K, *Microstructure of Martensite*, 1st Edition, Oxford University Press (2004).	
12.	**Reference(s):** 1. Khachaturyan A G, *Theory of Structural Transformation in Solids*, 1st Edition, Dover (2008). 2. Pitteri M and Zanzotto G, *Continuum Models for Phase Transitions and Twinning in Crystals*, 1st Edition, Chapman & Hall/CRC (2002). 3. Porter D A, Easterling K E and Sherif M Y, *Phase Transformations in Metals and Alloys*, 3rd Edition, Routledge (2009).	