1.	Title of the course	Joining Technologies
2.	Course number	ME503L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME5103/2
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** Aim of this subject is to develop in-depth understanding on joining techniques namely welding, brazing, soldering and adhesive bonding. The course deals in detail with fundamentals of the arc generation, various metal transfer phenomenon, critical reviews of important welding processes and the heat flow involved in the welding processes, and its subsequent effect on the weldment distortion and residual stresses. Furthermore, the principles and various technologies related to brazing, soldering and adhesive bonding will be explained in detail.	
10.	**Course Content:** Welding – welding and allied processes, physics of welding arc, various metal transfer phenomenon; critical review of fusion welding processes – SMAW, TIG, MIG and CO2 welding, plasma arc, SAW, resistance welding; critical review of solid state welding processes – friction welding, friction stir welding, diffusion welding, ultra sonic welding; scope and application of electron beam and laser welding processes; heat and fluid flow in welding, residual stresses and its measurement, welding distortions and its prevention. Brazing and soldering – basic principles, various technologies, brazing filler metals/solders and fluxes, design of brazed/soldered joints. Adhesive bonding – basic principles, functions of adhesives, mechanism of adhesion, failure in adhesive bonded joints, joint design.	
11.	**Textbook(s):** 1. Parmar R S, *Welding engineering and technology*, 1st Edition, Khanna publications (2004). 2. Parmar R S, *Welding engineering and technology*, 3rd Edition, Khanna publications (2003).	
12.	**Reference(s):** 1. Sindo Kou,Welding metallurgy, 2nd Edition, John Wiley & Sons (2003). 2. Kalpakjian S and Schmid S R,Manufacturing Engineering and Technology, 6th Edition, Pearson Education (2009). 3.O'Brien R L,Welding processes, volume 2, 8th Edition, Welding hand book (American Welding Society) (1995). 4. Koichi Masubuchi,Analysis of welded structures, 1st Edition, Pergamon Press Ltd (1980).	