SUBJECT NO-MF40604, SUBJECT NAME- LASER APPLICATIONS IN MANUFACTURING

LTP- 3-0-0,CRD- 3

SYLLABUS :-

Laser Applications in Manufacturing Prerequisite ;Non-traditional ManufacturingLaser Processing of Materials:Main industrial lasers: He,Ne, CO2, Excimer, Nd:YAG, Diode, Fiber and Ultra,short pulse lasers and their output beam characteristics; laser beam delivery systems. Overview of Laser Industrial and Scientific Applications: Metrological applications, Holography, Laser Isotope Separation, Laser fusion.Laser processing fundamentals: Laser beam interaction with metal, semiconductor and insulator, Ultra,short laser pulse interaction, heat flow theory and metallurgical considerations. Laser Material Processing Applications: Laser Cutting and drilling: Process characteristics, material removal modes, practical performancesLaser Welding: Process mechanisms like keyhole and plasma effect, operating characteristics and process variationLaser Surface modifications: Heat treatment, surface remelting, surface alloying and cladding, surface texturing, LCVD and LPVD Laser rapid manufacturingLaser metal forming: Mechanisms involved including thermal temperature gradient, buckling, upsetting.Laser peening: Fundamentals of Laser Shock Processing, Effects of various laser and process parameters, Mechanical effects and microstructure modification during laser shock processing.Theoretical modeling of laser material processingOn-line Process monitoring and control: Laser and process parameters, and workpiece characteristicsEconomics of Laser Applications in ManufacturingLaser Safety: Laser safety standards and safety procedures .