GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2

Mechanical Engineering (CAD/CAM)

Subject Name Manufacturing Processes and Analysis

Sr.No	Course content
1.	FORMING: Fundamental theories of plasticity and mechanics of plastic deformation. Stress-strain relationships, deformation equations, methods for solution of problems in metal forming such as slab analysis, upper bound analysis etc., deformation zone, geometry, Hydrostatic pressure, workability, residual stresses, classification of metal forming processes and analysis of any one forming process. Design of Press Tools.
2.	CASTING: Basic concepts of engineering analysis of casting, factors influencing the production of engineering casting to customer's specifications, Design for casting, functional design, dimensional features, metallurgical factors, strength/weight considerations, sources of fluctuation in properties, influence of form and environment, permanent mould casting, centrifugal casting, continuous casting, vacuum casting, flaskless moulding, shell, investment, polystyrene (full mould casting), Co_2 moulding and analysis of any one of the above processes.
3	WELDING: General concepts of weld design, analysis of stresses in welded structures, permissible stresses, standards, calculation of the size of welds for static and dynamic loading, location and orientation of welds in an assembly, residual stresses, distortion and their control, weldability.
4	MACHINING: Hot machining, deep hole drilling, metal spinning, cryogenic machining, micro-Machining.
5	NON CONVENTIONAL MACHINING: Mechanism, transfer medium, immediate source of energy and application of all non conventional processes, identification of variables and analysis of EDM chemical machining, Laser machining, AJM and USM.
6	RAPID PROTOTYPING AND TOOLING: Geometrical modeling, Reverse engineering, Virtual / Augmented reality, DFX, RP Methods, Stereo lithography, Fused-deposition modeling, Selective laser sintering, Laminated-object manufacturing, Ballistic particle Manufacturing, Solid-base curing and Direct manufacturing and rapid tooling

REFERENCE BOOKS:-

1. Mechanical metallurgy- George E Dieter – McGraw Hill.
2. Principles of industrial metal working process – Rowe G. W.
3. Principles of metal casting- Heine & Rosenthal.
4. Welding and its application- Rossi B. E.
5. Modern machining processes- P. C. Pandey, H. S. Shan.
6. Rapid Product Development- Synergic integration of time-compression technologies by K. P. Karunakaran, V. P. Bapat, Sreenath Babu Akula, P. D. Solanki, Gaurav Gupta, V.R. Prasanth, Saket Anand, Arnab Sarkar and S. Venkatkrishnan.
7. Manufacturing Processes for Engineering Materials by Serope Kalpakjion and Steven R. Schmid- Pearson Education.