SUBJECT NO-ME60350, SUBJECT NAME- METAL FORMING PROCESSES

LTP- 4-0-0,CRD- 4

SYLLABUS :-

Introduction of metal forming as a manufacturing process, and its relation with other processes, Metal Forming from systems point of view, Advantages of metal forming as a manufacturing process, Classifications of metal forming processes, Forming equipments, Presses (mechanical, hydraulic).

Theoretical analysis (theory of plasticity), Stress-strain relationship, Strain hardening, Material incompressibility, Work of plastic deformation, Work hardening, Yield criteria, Flow rule, Yield criterion and flow rule for Anisotropic material, Initiation and extent of plastic flow (microstructural point of view).

Analysis of forming processes, Slab analysis: Open-die forging, Plate drawing, Flat rolling, Deep drawing of sheet, Other methods of analysis like FEM, upper bound, slip line field.

Overview of various metal forming operations: Forging; open-die forging, closed-die forging, coining, nosing, upsetting, heading, extrusion and tooling, Rod, wire and tube drawing, Rolling; flat rolling, shape rolling and tooling, Sheet forming; blanking, piercing, press bending, deep drawing, stretch forming, spinning, hydroforming, rubber-pad forming, explosive forming, Formability of sheet, Formability tests, Forming limit diagrams, Process simulation for deep drawing and numerical approaches.

Powdered metals and fabrication procedures, Applications, Preparation of powders, Compacting and sintering, Yield criteria and flow rules, Hot and cold pressing (HIP,