

SYLLABUS :-

Basic concepts of the standard discrete system. Finite difference (FDM), finite element (FEM) and boundary element methods (BEM) for modeling and analysis of manufacturing processes. Generalization of FE concepts – weighted residual and variational approaches. Element types – plane triangular, quadrilateral, curved isoparametric elements, 3-dimensional elements, axisymmetric, plate and shell elements. Automatic mesh generation and data visualization schemes. Mixed and hybrid finite element analysis: thermal modeling of manufacturing processes like induction hardening, arc welding, cooling of castings, forgings, cutting tools and consequent deduction of cooling rate and metallurgical transformations. Thermo-plastic modeling of forming processes like forging, extrusion and rolling. FE modeling of dynamic and non-linear problems.