

Department of Mechanical Engineering

OUTLINE OF SYLLABUS FOR M. TECH ENTRANCE TEST – 2011

MECHANICAL SYSTEM DESIGN

(A)

Design of Mechanical Systems: System design, life cycle design, concurrent design, Design through materials, design specifications of gears, bearings, cams, piston – cylinder and chains, fasteners, CAD of machine elements, solid modeling, optimization.

Industrial Engineering: Work study, motion study, method study, PMTS, rating, work measurement, ergonomics, factory organization, Plant layout and location, materials management, quality control, PPC, project management PERT/CPM, decision making, Leadership, motivation, line balancing.

(B)

Thermal Engineering: Thermodynamics system, zeroth, first law, second law, opens closed, isolated system, Internal energy enthalpy and entropy concepts Carnot Cycle, Carnot theorem, Clausius theorem, Gibbs and Helmholtz function. State postulate, Specific heat, Maxwell's relations and thermodynamics of non reactive mixtures. Combustion of fuels, Orsat apparatus, vapor power cycle, boilers, steam nozzles steam turbines, condensers, reciprocating and rotary compressors, air standard cycle IC engines its various components, refrigeration and psychrometry, concepts of gas dynamics.

Heat Transfer: Conduction, convection and radiation concepts, Fins and heat exchangers.

(C)

Mechanics of Solids: Analysis of stress and strain. Two dimensional stresses in thin and thick cylinders. Elastic curve. Various relations between bending, slope and deflection. Theories of failure, design procedure, selection of material and manufacturing, stress concentration factor, endurance limit Goodman's and Soderbergs analysis, design of various machine elements. Rivets, Welds etc., belts chains etc.

Production Engineering: Conventional machining processes, Lathe, milling machine, shapers etc., non conventional machining; EDM, ECM, NC, CNC machines.

Theory of machines: mechanism, various definitions friction devices, governors, cams, gears, vibrations (free damped and forced) and balancing.