Syllabus for Mechanical Engineering

MECHANCIAL ENGINEERING (100 Marks)

Unit-I: WORKSHOP TECHNOLOGY

Basic Workshop tools and operations (Carpentry, Fitting, Marking and Measuring tools, Forging and Sheet metal) - Drilling, Mechanical working of Metal, Foundry Equipment, Pattern types, types of moulding sands and their properties, types of cores, casting methods, defects in casting and special casting processes.

Unit-II: MANUFACTURING TECHNOLOGY

Lathe and Lathe Work, Broaching Machines, Shaping, Slotting, and Planing.

Cutting Fluids, Coolants & Lubricants, Welding Milling, Gear Making.

Grinding, Surface Finishing processes. Plastics Processing, Press Tools Jigs and Fixtures, Metrology.

Unit-III: MACHINE DRAWING AND PRODUCTION DRAWING

Machine Drawing: Thread nomenclature, Specification , areas of application and types of the following temporary and permanent fasteners : Bolts and Nuts -Keys and cotters, Rivets and Riveted joints, Piping layouts, Different types of welds and their basic symbols.

Production Drawing: limits, fits & tolerances, surface finish, specifications of standard components like Bolts, Nuts, Bearings.

Unit-IV: CAD/CAM

CAD: Stages of CAD, input and output devices, display devices, types of CAD software, types of computer communication networks. **CAM**: Functions and benefits of CAM, CAPP, necessity of CAD/CAM integration, Basic components of NC, CNC and DNC machines, CNC part programming, Manual and computer assisted part programming, CIMS, FMS, Computer Aided inspection and Robotics.

Unit-V: THERMODYNAMICS

Basic thermodynamics and Laws of Perfect gases, Thermodynamic processes, Fuels and Combustion, Air standard cycles: Carnot, Otto and Diesel cycles, I.C Engines: Two and Four stroke engines, Petrol and Diesel engines, Indicated and brake powers, Indicated and brake thermal efficiencies. Fuel, ignition, lubrication and cooling systems.

Unit-VI: HEAT POWER ENGINEERING

Air Compressors, Gas turbines and Jet propulsion. Properties of Steam, Working and Performance of Boilers, Steam nozzles, Steam Turbines and Steam Condensers.

Unit-VII: SOLID MECHANICS

System of forces, Resolution of Forces, Concept of Equilibrium, Lami's Theorem, Geometrical Properties of Sections, Simple Stresses and Strains, Shear Force and Bending Moment diagrams, Simple Bending, Deflection of Beams and Torsion in shafts.

Unit-VIII: DESIGN OF MACHINE ELEMENTS

Design of Bolts, Screws and Nuts, Shafts, Keys, Couplings, Bearings, Design of Belt and Gear drives and Cams.

Unit-IX: FLUID MECHANICS AND HYDRAULIC MACHINERY

Properties of Fluids, Flow of liquids, Flow through pipes, Impact of Jets, Hydraulic Turbines, Governing, Working principle and operation of Reciprocating and Centrifugal pumps.

Unit-X: ENGINEERING MATERIALS

Mechanical properties of materials, structure of materials, Production of Iron and Steel, Iron Carbon equilibrium Diagram, Heat treatment processes, Plain Carbon and alloy steels, Ferrous and Nonferrous metals and alloys and Powder metallurgy.

Unit-XI: INDUSTRIAL MANAGEMENT

Principles and functions of management, organization structures, Production and materials management, Marketing sales and Feasibility study, Entrepreneurial development, Principles of ISO 9000, Total Quality Management, Industrial legislation and safety.

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