

## Syllabus for B. Tech lateral entry Mechanical Engineering IUST Awantipora

### CORE MECHANICAL

**Theory of Machines:** Four bar linkage and link motion, Flywheels and fluctuation of energy, Power transmission by belts-V-belts and Flat belts. Gears-Type of gears, gear profile and gear ratio calculation. Cams.

**Engineering Mechanics and Strength of Materials:** Laws of forces, Equilibrium of Forces, Moment of Inertia, Laws of motion. Friction. Concept of simple machines, MA, VR, %age. Concepts of stress and strain, Elastic limit and elastic constants. Bending moments and shear force diagram. Torsion in circular shafts. Columns: Euler's and Rankine's theories.

**Thermal Engineering:** Thermodynamics: Heat, work and temperature, First and second laws of thermodynamics. Carnot, Rankine, Otto and Diesel Cycles. P-v & P-T diagrams H<sub>2</sub>O. Saturated, wet & superheated steam. Definition of dryness fraction of steam, degree of superheat of steam.

**Fluid Mechanics & Machinery:** Properties & Classification of Fluids, Newton's law of viscosity, Fluid Statics, Measurement of Fluid Pressure by Manometers, U-tube, Inclined tube. Fluid Kinematics: Stream line, laminar & turbulent flow, external & internal flow, continuity equation. Dynamics of ideal fluids: Bernoulli's equation, Total head; Velocity head; Pressure head. Hydraulic Turbines & Centrifugal Pumps.

**Material Science & Production Engineering:** Classification of Steels: mild steel & alloy steel. Heat treatment of steel. Welding – Arc Welding, Gas Welding, Resistance Welding, Special Welding Techniques i.e. TIG, MIG. Brazing & Soldering, Welding Defects & Testing. Foundry & Casting methods, defects, different casting processes. Forging, Extrusion etc. Metal cutting principles, cutting tools. Basic Principles of machining with Lathe, Milling, Drilling, Shaping, Grinding. Machine tools & manufacturing processes.

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**Metrology and Production Management:** Tools used in Linear Measurements, Angular Measurement, Surface finish. Planning, Organizing, Leading, Controlling. Inventory Control, Inspection & Quality Control.

**PHYSICS**

Vector Analysis, Collision of particles, Vibration and acoustics, Electromagnetic Theory, Maxwell's equations, Quantum mechanics, Solid state physics, Superconductivity, Diffraction, Special Theory of Relativity.

**MATHEMATICS:**

Differential Calculus, ordinary, linear and non-linear differential equations, Partial Differential Equations, Fourier series, Matrices.

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