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| SESSION PLAN | | | | | | |
| Unit | Sessions | Topics | Input/Std Preparation | Process/ Methodology | Outcome/ Learning of units | Assessment Method |
| I | 1-2 | FORCE SYSTEMS:  Basic concepts: Definitions, Basic assumptions, Scalar & Vector quantities, Free, Forced and fixed vectors | Reference books and hand written notes | Discussion & PPT | Introduction to force system | **MSTs/**  **Quiz/**  **Assignments** |
| 3-5 | Force System: Force, Classification & Representation, Force as a Vector, Composition of forces, Parallelogram Law, Resolution, Principle of Transmissibility of forces | Reference books and hand written notes | Discussion & PPT | Classification of forces |
| 6-7 | Moment of a force, Vector representation, Moment for coplanar force system, Varignon’s theorem | Reference books and hand written notes | Discussion & PPT | Effects of forces, moments |
| 8 | Couple, Vector representation, Resolution of a force into a force and a couple. | Reference books and hand written notes | Discussion & PPT | Effects of forces, couple |
| 9-10 | Force Systems: Coplanar Concurrent Force system and Coplanar Non-Concurrent force systems, Resultant of coplanar force system. | Reference books and hand written notes | Discussion & PPT | Force classification |
| 11-12 | Equilibrium of coplanar force system, Free body diagrams, Determination of reactions, Equilibrium of a body under three forces, Lami’s theorem. | Reference books and hand written notes | Discussion & PPT | Body in equilibrium |
| 13-16 | FRICTION:  Introduction, Wet and Dry friction, Theory of Dry friction, Angle of friction, Angle of Repose, Cone of friction, Coulomb’s laws of friction. | Reference books and hand written notes | Discussion & PPT | Friction and its components |

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| II | 17-19 | BASIC STRUCTURAL ANALYSIS  Plane Truss, Difference between truss and frame, Perfect and imperfect truss, Assumptions and Analysis of Plane Truss, Method of joints, Method of section, Zero force members. | Reference books and hand written notes | Discussion & PPT | Basis of structural analysis | **MSTs/Quiz/**  **Assignments** |
| 20-22 | Beams, Types of beams, Statically Determinate Beams, Shear force and bending moment in beams, Shear force and bending moment diagrams, Relationships between load, shear and ending moment | Reference books and hand written notes | Discussion & PPT | Structural elements such as beams |

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| III | 23-24 | CENTROID AND MOMENT OF INERTIA:  Center of Gravity, Center of Mass and Centroid of curves, areas, volumes, Determination of centroid by integration, Centroid of composite bodies. | Reference books and hand written notes | Discussion & PPT | Centroid for 2D plane and CG for 3D mass system | **MSTs/Quiz/** Assignments |
| 25-26 | Definition of Moment of inertia of area, Perpendicular axis theorem and Polar moment of Inertia, Parallel axis theorem, Moment of inertia of simple areas by integration, Moment of Inertia of Composite Areas. | Reference books and hand written notes | Discussion & PPT | MOI of a section |
| 27-30 | Moment of Inertia of masses, Parallel axis theorem for mass moment of inertia, Mass moment of inertia of simple bodies by integration, Mass moment of inertia of composite bodies. | Reference books and hand written notes | Discussion & PPT | Polar moment of inertia |

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| IV | 31-33 | KINEMATICS OF RIGID BODY:  Introduction, Absolute motion, Plane rectilinear motion of rigid body, Plane curvilinear Motion of rigid body, x-y and n-t components, Rotation of rigid bodies, Relative Motion, Plane Motion of rigid bodies, Instantaneous center of zero velocity | Reference books and hand written notes | Discussion & PPT | Rigid body kinematics | **MSTs/Quiz/**  **Assignments** |
| 34-35 | KINETICS OF RIGID BODY:  Introduction, Force, Mass and Acceleration, Newton’s law of motion, D’Alembert’s Principles and Dynamic Equilibrium, Laws of motion applied to planar translation, rotation and plane motion. | Reference books and hand written notes | Discussion & PPT | Kinetics, velocity analysis of objects |
| 36-37 | Work and Energy, Kinetic energy, Principle of work and energy, Conservative forces, Law of conservation of energy, | Reference books and hand written notes | Discussion & PPT | Work energy system |
| 38-39 | Linear Impulse and Momentum, Conservation of linear momentum. | Reference books and hand written notes | Discussion & PPT | Moment and impulse |

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| V | 40-42 | MECHANICS OF DEFORMABLE SOLIDS:  Simple stress and strain: Normal and shear stresses. One Dimensional Loading; members of varying cross section, bars in series. Tensile Test diagram for ductile and brittle materials, Elastic constants, Strain energy. | Reference books and hand written notes | Discussion & PPT | Solid mechanics | **MSTs/Quiz/** Assignments |
| 43 | Bending of Beams: theory of pure bending, neutral surface and neutral axis, stresses in beams of different cross sections. | Reference books and hand written notes | Discussion & PPT | Bending of beams |
| 44-45 | Theory of Torsion, Torque and twist, Shear stress due to torsion circular sections. | Reference books and hand written notes | Discussion & PPT | Torsion of shafts |