Year & Sem: E1S1	Course Code: ME1202	Course Name: **Kinematics of Machines**	No. of Credits: 4	L	T&PS	P
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UNIT-I: Beginnings of Theory of Machines, Planar Mechanisms, Basic Kinematic Concepts, Elementary Mechanisms, Grübler's Criterion Four Link Chains, Kinematic Inversion;

UNIT-II: Kinematic Analysis of Mechanisms, Velocities by Centro Method, Relative Velocity Equation, Relative Acceleration Equation, Acceleration Analysis of Reciprocating Engine Mechanism, Analytical Determination of Velocity and Acceleration of the Piston;

UNIT-III: Straight Line Motion and Universal Coupling, Condition for Exact Straight Line Motion, Exact Straight Line Motion Mechanisms, Approximate Straight Line Motion Mechanisms, Steering Gear Mechanism, Hooke's (Cardan, Universal) Joint;

UNIT-IV: Cams, Types of Cams and Followers, Displacement Diagrams, Disk Cam with Knife-Edge Follower, Translating Roller Follower, Translating Flat Follower, Oscillating Flat Follower, Cams of Specified Contour;

UNIT-V: Gears, Classification of Gears, Types of Motion, Gear Nomenclature, Law of Gear Tooth Action, Involute as a Gear Tooth Profile, Layout of an Involute Gear Set, Producing Gear Teeth, Meshing Gears and Line of Contact, Interference of Involute Gears, Minimum Number of Teeth to Avoid Interference, Contact Ratio, Cycloidal Tooth Profiles, Cycloidal and Involute Tooth Forms; Helical, Spiral, Worm and Bevel Gears, Involute Helicoid, Helical Gear Tooth Relations, Contact of Helical Gear Teeth, Helical Gear Calculations, Spiral [Crossed Helical] Gears, Worm Gearing, Bevel Gears, Formation of Bevel Gears;

UNIT-VI: Gear Trains, Classification of Gear Trains, Simple Gear Trains, Compound Gear Trains, Synthesis of Gear Trains, Gear Train Applications to Machine Tools, Epicyclic Trains, Inversions of Epicyclic Trains, Differential Trains, Torque Distribution in Epicyclic Trains, Example of an Epicyclic Train, Coupled Epicyclic Trains, Wilson Four Speed Automobile Gear Box. Computer aided kinematic analysis with cases dealt in the class and visualize the Mechanisms and kinematic solutions.

References/Text Books:

1.
2.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.