

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E Semester: 4 Mechatronics Engineering

Subject Code 142001

Subject Name KINEMATICS AND DYNAMICS OF MACHINES

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Sr.No	Course content
1.	<b>SIMPLE MECHANISM:</b> Link, Kinematic chains and their classification, mechanism and machine, Inversions - four-bar chain and single slider crank chain, various types of quick return motions. Pantograph, straight line motion mechanisms.
2.	<b>MOTION ANALYSIS:</b> Angular and linear velocities in link mechanism, velocity and acceleration diagram for slider - crank chain and four-bar chain mechanism including coriolis component of acceleration. Analytical methods of Kinematic analysis.
3.	<b>FLEXIBLE POWER TRANSMISSION SYSTEM, GEOMETRICAL CONFIGURATION:</b> Analysis of forces and power transmission. Effects of centrifugal force, creep and initial tension.
4.	<b>GEARS:</b> Classification of gears, types of motion, law of gear tooth action, involute and cycloidal tooth profile - interference of gears - minimum number of teeth to avoid interference, contact ratio. Helical, spiral, worm and bevel gears, Introduction to gear train and types of trains.
5.	<b>GYROSCOPE:</b> Angular Velocity, Angular acceleration, Gyroscopic Torque, gyroscopic effect on naval ships, stability of automobile, stability of two wheel and four wheel automobile
6.	<b>CAMS:</b> Types of cams and followers. Drawing a cam profiles for a given displacement - time diagram, analysis of cam profiles with specified contours.
7.	<b>VIBRATIONS IN MECHANICAL SYSTEMS:</b> Introduction, Basic features of vibration systems - single degree of freedom systems and vibration isolation.
8.	<b>BALANCING:</b> Forces due to revolving masses. Balancing of revolving masses in one plane and in different planes.

### Reference Books:

1. S.S.Rattan Theory of Machines Tata Mc Graw Hill
2. Jagdish Lal Theory of Machines Metropolitan Book Co.
3. Amitabha Ghosh & Mallik A. K. Theory of Mechanisms and Machines East West Press
4. Rao J. S. and Duggipati R. V. Mechanism & Machine Theory New Age International Pub.
5. Charles E. Wilson & J.Peter Sadler Kinematics and Dynamics of Machinery Pearson Education publications