Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
Integrated B. Tech. + M. Tech. / M.B.A.	Kinematics of Machines	ME 205	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
III	3	2-1-0	3 Hours

Unit - I

Introduction: Mechanism and machines; Kinematics links; Kinematics pairs; Kinematics chains; Degree of freedom; Grubler's rule; Kinematics inversion; Equivalent linkages; Four link planar mechanisms; Straight line mechanisms; Steering mechanisms; Pantograph; Problems. **(06 Hours)**

Unit - II

Kinematics Analysis of Plane Mechanisms: Displacement analysis; Velocity diagram; Velocity determination; Relative velocity method; Instantaneous center of velocity; Kennedy's theorem; Graphical and analytical methods of velocity and acceleration analysis; Problems. **(06 Hours)**

Unit - III

Cams and Followers: Classification; Types of motion curves and their analytical expressions; Graphical construction of cam profiles for different types of followers; Pressure angle and cam size; Cams with specified contours.

(05 Hours)

Unit - IV

Gears: Fundamental law of gearing; Classification and basic terminology; Spur gears; Other types of gears; Gear trains; Simple; compound and epicyclic gear trains. **(05 Hours)**

Unit - V

Kinematics Synthesis of Mechanisms: Function generation; Path generation; Freudenstein's equation; Two and three position synthesis of four bar and slider crank mechanisms by graphical and analytical methods; Precision positions; Structural error; Chebychev spacing; Transmission angle; Problems.**(04 Hours)**

Unit - VI

Belts and Pulleys: Open and cross belt drive; Velocity ratio; slip; Material for belts; Crowning of pulleys; Law of belting; Types of pulleys; Length of belts; Initial tension; Ratio of tension; Centrifugal tension; Power transmitted by belts and ropes. **(04 Hours)**

Recommended Books:

1. Theory of Mechanisms and Machines: Amitabha Ghosh and Ashok Kumar Malik; Third Edition Affiliated East-West Press.
2. Theory of Machines and Mechanisms: Joseph Edward Shigley and John Joseph Uicker; Jr. Second Edition; McGraw-Hill.
3. Theory of Machines; Thomas Bevan; 3rd Ed.; CBS Publishers.
4. Theory of Machines; Jagdish Lal.
5. Theory and Machines: S.S. Rattan; Tata McGraw Hill.
6. Mechanism and Machine Theory: J.S. Rao and R.V. Dukkipati Second Edition New age International.
7. Kinematics and Dynamics of Machines; Martin; G.H.; 3rd Ed.; McGraw-Hill.
8. Mechanics of Machines: Elementary Theory and Examples; J. Hannah and R. C. Stephens; 4^{th} Ed.; Viva Books.