Gautam Buddha University, Greater Noida

School of Engineering (Mechanical Engineering)

Degree	Course Name	Course Code	Marks:100
M. Tech. in Design Engg.	Analysis and Synthesis of Mechanisms	MED 601	SM+MT+ET 25+25+50
Semester	**Credits**	**L-T-P**	**Exam.**
III	3	3-0-0	3 Hours

Unit – I

Kinematics: Kinematics in elements; Mechanism with lower and higher pairs; Geometry of motion; Dimensional synthesis of mechanisms; Chebyshov Polynomials; Spacing of accuracy points. **(08 Hours)**

Unit – II

Four Bar Coupler Points Curves: Equation of coupler curves; Robort Chebyshov theorem; Double points and symmetry; Euler Savary equation and cube of stationery curvature. **(07 Hours)**

Unit – III

Geometric Methods of Synthesis of Planner Mechanisms: Two finitely separated link positions; Three finitely separate link positions; Poles and relative poles; Synthesis with three accuracy points; Four finitely separated link positions poles triangle; Image poles-opposite poles; Quadrilateral circle points and center points curves; Synthesis with four accuracy points. **(08 Hours)**

Unit – IV

Synthesis of Planer Mechanisms: Displacement equations of the four bar linkage; Synthesis with three accuracy points; Velocity and acceleration synthesis with four accuracy points; Compatibility synthesis with five accuracy points; Structural error; Analysis of mechanical error in linkages. **(08 Hours)**

Unit – V

Spatial Mechanisms: Synthesis of spatial linkages; Displacement analysis; Matrix method of analysis; Function generators for symmetric function; Application of spatial mechanisms to Robotics; Kinematics analysis of as industrial robots manipulators; Gripper theory; Computer aided design of mechanisms and introduction to dynamic of analysis of mechanism.

(08 Hours)

Unit – VI

Dynamic of Mechanisms: Static force analysis with friction; Inertia force analysis; Combined static and inertia force analysis; Shaking force; Kinetostactic analysis; Balancing of linkages. **(06 Hours)**

Recommended Books:

1. Mechanisms Design Analysis and Synthesis Vol. I & II, Arthur G. Erdman and George. N. Sander. Prentice Hall of India.
2. Kinematic and Dynamics of Machinery; Charles E. Wilson and J. Peter Sadler; Pearson.
3. Design of Machinery; Robort L. Norton; Tata McGraw Hill.
4. Kinematic and Dynamics of Machinery; Robort L. Norton. McGraw Hill.
5. Theory of Machines and Mechanisms; International Students Edition, J.E. Shigley and J.J. Vicker; Oxford University Press.
6. Kinematics, Dynamics and Design of Machinery; Kenneth J. Waldran and Gary L. Kinzel; Wiley
7. Theory of Machine; S. S. Rattan; Tata Mc Graw Hill.
8. Kinematic Synthesis of Linkages; Richard Scheunemann; Hartenberg, Jacques Denavit; McGraw Hill.