10 ME 313   KINEMATICS OF MACHINERY
III B.Tech I Semester
(with effect from the academic year 2012-2013)

Lectures/Week: 4 Hrs   *Credits: 4*
University Exam:3 Hrs   *Sessional Marks:40*
                                                                       End Examination Marks: 60

UNIT-I
Kinematics Fundamentals: DOF or mobility; Types of motion; Links, joints and kinematics chains; Inversion; Determining the DOF; Mechanisms and structure; Linkage transformation; intermittent motion; Grashofs conditions; linkages of more than four bars; Quick return motion mechanisms, Straight line Mechanisms.

UNIT-II
Kinematic Synthesis of Mechanisms- Introduction –function generation –path generation –rigid body guidance-chebychev spacing of precision points –two position synthesis – four bar mechanism – three position synthesis - four bar mechanism – overlay method – Frudenstein method for four linkage. Mechanism defects – branch defect, order defect, Greshof defect.

UNIT-III
Analysis of linkages – Analytical: Position Analysis- Coordinate system; position and displacement; Translation, Rotational Motion, Algebraic position Analysis of linkages; Four bar Slider-Crank position solution.

Analytical solutions for velocity analysis, Four bar pin-jointed linkage, Four bar slider crank. Analytical Solution for acceleration analysis - Four bar pin-jointed linkage, Four bar Slider Crank.

UNIT- IV
Analysis of linkages – Graphical: Determination of Velocities in mechanisms. Relative velocity method, Relative velocities of Particles in common links. Velocity diagrams of various four bar mechanisms.
Resultant acceleration of particles in common links and mechanisms - Resultant acceleration of particles on links having angular and linear motion. Coriolis component of accelerations.

UNIT- V
Toothed Gearing and Gear Trains: Rolling Cylinders; Fundamental of Law of Gearing; Gear tooth nomenclature; interference and undercutting; contact ratio;

Gear Trains: Simple gear trains; Compound Gear trains; Epi-cyclic and Planetary gear trains; Efficiency of gear trains.

TEXT BOOKS:

1. Design of Machinery   : Robert Norton
2. Theory of Machines   : R S Khurmi

REFERENCE BOOKS:

1. Theory of Machines   : Thomas Bevan
2. Theory of Machines and Mechanisms : Joseph Edward Shigley
3. Mechanisms and Dynamics of Machinery :
                              Hamilton Mabie H. and   F.W.Ovirk