# Ch. Ranbir Singh State Institute of Engineering & Technology, Jhajjar

**Department of Mechanical Engineering**

III Yr. V Semester (Mechanical Engineering)

### LESSON PLAN

Program : **B. Tech**

Year & Sem. :  **III / V**

Course No : **PCC-ME-307 G**

Course Title : **KOM**

Max Marks **: 75**

No. of Total Lecture **: 42**

Schedule : **3L+0T=3**

Lecturer : **Dr. Parveen Kumar**

**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, MGH, New York.

**Lesson Plan:**

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| **Theory** | | **Practical** | |
| **Lecture Day** | Topics to be covered | **Practical day** | Topics to be covered |
|  | Introduction: mechanism and machines, kinematics links, kinematics pairs, kinematics  chains. | 1. | To study various types of Kinematic links, pairs, chains and Mechanisms. |
|  | Degree of freedom, rubler’s rule. |
|  | Kinematics inversion, equivalent linkages, |
|  | four link planar mechanisms. | 2. | To study inversions of 4 Bar Mechanisms, Single and double slider crank mechanisms. |
|  | Straight line mechanisms, |
|  | steering mechanisms, pantograph. |
|  | Kinematics Analysis of Plane Mechanisms: | 3. | To plot slider displacement, velocity and acceleration against |
|  | displacement analysis. |  |  |
|  | Velocity diagram, velocity determination, relative velocity method. |  | crank rotation for single slider crank mechanism. |
|  | Instantaneous centre of velocity, Kennedy’s theorem, | 4. | To find coefficient of friction between belt and pulley. |
|  | graphical and analytical methods of velocity and acceleration analysis. |
|  | Cams: Classification of cams and followers, disc cam nomenclature. |
|  | Construction of displacement, velocity and | 5. | To study various type of cam and follower arrangements. |
|  | acceleration diagrams for different types of follower motions. |
|  | Analysis of follower motions, determination of basic dimension. |
|  | Synthesis of cam profile by graphical methods, | 6. | To plot follower displacement vs cam rotation for various Cam Follower systems. |
|  | cams with specified contours. |
|  | Gears: fundamental law of gearing, involute spur gears. |
|  | Characteristics of involute and cycloidal action, | 7. | To study various types of gears – Helical, cross helical worm, bevel gear. |
|  | Interference and undercutting, centre distance variation. |
|  | Path of contact, arc of contact, non standard gear teeth, helical, spiral bevel and worm gears. |
|  | Gear Trains: synthesis of simple, | 8. | To study various types of gear trains – simple, compound, reverted, |
|  | compound and reverted gear trains. |  |  |
|  | Analysis of epicyclic gear trains,  problems. |  | epicyclic and differential. |
|  | Kinematics synthesis of Mechanisms: function generation, path generation. | 9. | To find co-efficient of friction between belt and pulley |
|  | Freudenstein’s equation,  two and three position synthesis of four bar |
|  | slider crank mechanisms by graphical and analytical  methods. |
|  | Precision positions, structural error; | 10. | To study the working of Screw Jack and determine its efficiency. |
|  | Chebychev spacing. |
|  | Transmission angle, problems. |
|  | Friction in journal bearing, friction circle and friction axis, |  |  |
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|  | pivots and collar friction |  |  |
|  | Uniform pressure and uniform wear. |  |  |
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|  | 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, ratio of tension, centrifugal tension, power transmitted by belts and ropes. |  |  |
|  | Initial tension, creep, chain drives, chain length, classification of chains. |  |  |
|  | Revision |  |  |
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