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

**Department of Mechanical Engineering**

III Yr. VI Semester (Mechanical Engineering)

### LESSON PLAN

Program : **B. Tech**

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

Course No : **PCC-ME-204 G**

Course Title : **DESIGN OF MACHINE ELEMENT-I**

Max Marks **: 75**

No. of Total Lecture **: 56**

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

Lecturer : **Dr. Parveen Kumar**

**Recommended Books:**

1. Mechanical Engg. Design - First Metric Editions: Joseph Edward Shigley-MGH, New York.
2. Design of Machine Elements – V.B. Bhandari – Tata McGraw Hill, New Delhi.
3. PSG Design Data Book

**Lesson Plan:**

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| Lect. No(s) | Ref. No. | Topics to be covered |
|  |  | Unit I |
| 1 | 1.1 | Introduction |
| 2 | 1.2 | Selection of Materials: Classification of Engg. Materials, Mechanical properties of the commonly used engg.materials |
| 3-4 | 1.3 | Materials, hardness, strength parameters with reference to stress-strain diagram, Factor of safety. |
| 5 | 1.4 | Design Philosophy: Problem identification- problem statement, specifications, constraints, |
| 6-7 | 1.5 | Feasibility study technical feasibility, economic & financial feasibility, societal & environmental feasibility, Generation of solution field (solution variants), |
| 8 | 1.6 | Brain storming, Preliminary design, |
| 9 | 1.7 | Selection of best possible solution, Detailed design, |
| 10 | 1.8 | Selection of Fits and tolerances and analysis of dimensional chains. |
| 11 | 1.9 | Problems |
|  |  | Unit II- 2nd Section |
| 12-13 | 2.1 | Design of various types of riveted joints under different static loading conditions, |
| 14-15 | 2.2 | eccentrically loaded riveted joints |
| 16 | 2.3 | Cotter & Knuckle Joints and numericals |
| 17 | 2.4 | Problems |
|  |  | Unit III |
| 18 | 3.1 | Design of belt drives, Flat & V-belt drives |
| 19-20 | 3.2 | Condition for Transmission of max. Power and numericals |
| 21 | 3.3 | Selection of belt, |
| 22 | 3.4 | Design of rope drives |
| 23 | 3.5 | Design of chain drives with sprockets. |
| 24 | 3.6 | Problems |
|  |  | Unit IV |
| 25 | 4.1 | Various types of clutches in use |
| 26-28 | 4.2 | Design of friction clutches – Disc. Multidisc, Cone & Centrifugal |  |
| 29 | 4.3 | Torque transmitting capacity of clutches. |
| 30-31 | 4.4 | Problems |
| 32 | 4.5 | Various types of Brakes, |
| 33 | 4.6 | Self energizing condition of brakes, |
| 34-35 | 4.7 | Design of shoe brakes –Internal & external expanding, |
| 36 | 4.8 | band brakes |
| 37 | 4.9 | Thermal Considerations in brake designing |
| 38-39 | 4.10 | Problems |
|  |  | **Unit II – 1st Section** |
| 40 | 2.5 | ISO Metric Screw Threads, Bolted joints in tension |
| 41-42 | 2.6 | Eccentrically loaded bolted joints in shear and under combined stresses, |
| 43 | 2.7 | Design of power screws |
| 44-45 | 2.8 | Design of various types of welding joints under different static load conditions. |
| 46 | 2.9 | Problems |
|  |  | **Unit III- 2nd Section** |
| 47 | 3.7 | Design of Keys – Flat |
| 48 | 3.8 | Kennedy Keys |
| 49 | 3.9 | Splines |
| 50-51 | 3.10 | Couplings design –Rigid & Flexible coupling, |
| 52 | 3.11 | turning Moment diagram |
| 53 | 3.12 | coefficient of fluctuation of energy and speed |
| 54-55 | 3.13 | design of flywheel – solid disk & rimmed flywheels |
| 56 | 3.14 | Problems |

**(Dr. Parveen Kumar)**

Guest Faculty

Department of ME

CRSSIET, Jhajjar