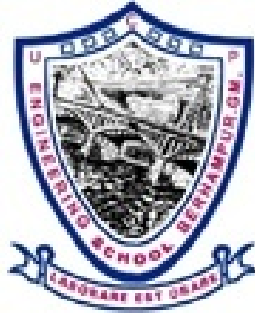


**UMA CHARAN PATNAIK ENGINEERING SCHOOL, BERHAMPUR**



## ***LESSON PLAN***

**SESSION-2024-25**

**SUBJECT: DESIGN OF MACHINE ELEMENTS (THEORY- 02)**

**DEPARTMENT OF MECHANICAL ENGINEERING**

|   |   |   |
|---|---|---|
| <b>Discipline: Mechanical Engineering</b>                 | <b>Semester: 5th</b>                          | <b>Name of the Teaching Faculty:<br/>DEBASHISH BISI</b>   |
| <b>Subject (Th-2):<br/>DESIGN OF MACHINE<br/>ELEMENTS</b> | <b>No of Days/Week<br/>Class Allotted: 04</b> | <b>No of Week: 15</b>   |
| <b>WEEK</b>   | <b>CLASS DAY</b>                              | <b>THEORY TOPICS</b>  |
| <b>1</b>  | 1ST   | <b>CH.1</b> Introduction to Machine Design, course outcomes.                                      |
|   | 2nd   | Classification of machine design, Stresses related to machine design, Stress concentration        |
|   | 3rd   | Engineering materials used in design, properties of material.                                     |
|   | 4th   | Stress-strain curve for ductile and brittle material (Mild steel & Cast iron)                     |
| <b>2</b>  | 1st   | Working stress, yield stress, ultimate stress. Factor of safety for Ductile and brittle material. |
|   | 2nd   | Modes of failure (elastic deflection, yielding & fracture)  |
|   | 3rd   | Factors governing the design of machine elements  |
|   | 4th   | General procedure in machine design   |
| <b>3</b>  | 1ST   | <b>CH.2.</b> Fastening elements and types of fastening  |
|   | 2nd   | Welding and types of welded joints.   |
|   | 3rd   | Advantages and disadvantages of welded joints over other joints                                   |
|   | 4th   | Strength of transverse and parallel fillet welded joint   |
| <b>4</b>  | 1st   | Simple numerical on welding joint   |
|   | 2nd   | Design of welded joints for eccentric loads   |
|   | 3rd   | Different cases of eccentric load and derivations   |
|   | 4th   | Numericals on eccentric loaded welding joint.   |
| <b>5</b>  | 1st   | Riveted joint, types of riveted joint.  |
|   | 2nd   | Failures of riveted joint.  |
|   | 3rd   | Determination of strength and efficiency of riveted joint.  |
|   | 4th   | Design of riveted joint for pressure vessel (boiler)  |
| <b>6</b>  | 1st   | Numericals on design of riveted joints.   |
|   | 2nd   | Numericals on design of riveted joints.   |
|   | 3rd   | Class test.   |
|   | 4TH   | <b>CH.3.</b> Introduction to shaft, functions, materials of shaft                                 |
| <b>7</b>  | 1st   | Design of shaft on basis of strength  |
|   | 2nd   | Design of shaft on basis of strength  |
|   | 3rd   | Design of shaft on basis of rigidity  |
|   | 4th   | Design of shaft on basis of rigidity  |
| <b>8</b>  | 1st   | Numericals on design of shafts  |
|   | 2nd   | Numericals on design of shafts  |
|   | 3rd   | Function of keys, types of keys   |
|   | 4th   | Material of keys, Failures of key, causes, effect of keyway                                       |
| <b>9</b>  | 1st   | Design rectangular sunk key and solving numericals  |
|   | 2nd   | Design rectangular sunk key and solving numericals  |
|   | 3rd   | Numericals on empirical relation of rectangular sunk key  |
|   | 4th   | Specifications of parallel, gib head, taper key   |
|   | 1st   | Class work on key and shaft   |

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|----|-----|---|
| 10 | 2nd | <b>CH.4.</b> Introduction to coupling, design of shaft coupling |
|    | 3rd | Requirements of a good shaft coupling. Types of coupling.       |
|    | 4th | Design of sleeve coupling                                       |
| 11 | 1st | Design of clamp or compression coupling                         |
|    | 2nd | Numerical on design of coupling.                                |
|    | 3rd | Numerical on design of coupling.                                |
|    | 4th | <b>CH.5.</b> Introduction to spring and types (open and closed) |
| 12 | 1st | Materials used and application of spring                        |
|    | 2nd | SWG, specifications of spring.                                  |
|    | 3rd | Spring terms for compression type                               |
|    | 4th | Different stresses in helical spring(circular)                  |
| 13 | 1st | Different stresses in helical spring(circular)                  |
|    | 2nd | Deflection of helical spring of circular wire                   |
|    | 3rd | Numerical on deflection of helical spring                       |
|    | 4th | Surge in spring and how to avoid it                             |
| 14 | 1st | Design of closed coil helical compression spring                |
|    | 2nd | Design of closed coil helical compression spring                |
|    | 3rd | Numerical on design of spring                                   |
|    | 4th | Numerical on design of spring                                   |
| 15 | 1st | Doubt clearing of all topics of subject                         |
|    | 2nd | Model question paper practice                                   |
|    | 3rd | Model question paper practice                                   |
|    | 4th | Closing of subject, course outcomes                             |

**TOTAL PERIODS: 60**  
**NO. OF WEEKS: 15**