# LESSON PLAN

Name of faculty : Ms. Kiran Bala
Discipline : Mechanical Engineering
Semester : 4th Semester
Subject : Machine Design
Lesson Plan Duration : 15 weeks
Work load (Lecture/ Practical) per week (in hours) 3 Hrs Lect./ Week

| WEEK | THEORY | |
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| | **Day Lecture** | **Topic(Including Assignment/Test)** |
| 1 | 1 | Design – Definition, Type of design, necessity of design |
| | 2 | Comparison of designed and undersigned work |
| | 3 | Design procedure, Characteristics of a good designer |
| 2 | 1 | Design terminology: stress, strain, factor of safety, |
| | 2 | factors affecting factor of safety |
| | 3 | Stress concentration, methods to reduce stress concentration, fatigue, endurance limit. General design consideration |
| 3 | 1 | Codes and Standards (BIS standards) |
| | 2 | SN Curve and its significance |
| | 3 | Selection of materials, criteria of material selection |
| 4 | 1 | Design Failure ,Various design failures-maximum normal stress theory |
| | 2 | Various design failures-maximum stress theory |
| | 3 | Various design failures-maximum strain theory |
| 5 | 1 | Revision & Assignment 1 |
| | 2 | Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available Shaft subjected to torsion only- Rigidity criterion |
| | 3 | Determination of shaft diameter (hollow and solid shaft) on the basis of Strength criterion, Rigidity criterion. Simple Numericals |
| 6 | 1 | Determination of shaft diameter (hollow and solid shaft) subjected bending . Numericals |
| | 2 | Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending . Numerical |
| | 3 | **1st Sessional test** |
| **7** | 1 | Design of Key Types of key, materials of key, functions of key |
| | 2 | Failure of key (by Shearing and Crushing). |
| | 3 | Design of key (Determination of key dimension) Effect of keyway on shaft strength |
| 8 | 1 | Numericals |
| | 2 | Necessity of a coupling, advantages of a coupling, types of couplings |
| | 3 | Design of muff coupling protected type |
| 9 | 1 | Numericals |

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| | 2 | Design of muff coupling unprotected type |
| | 3 | Design of Flange Coupling, protected type |
| 10 | 1 | Numericals |
| | 2 | Design of flange coupling.unprotected type |
| | 3 | Numericals, Design of Joints Types of joints - Temporary and permanent joints, utility of various joints |
| 11 | 1 | **2nd Sessional test** |
| | 2 | Temporary Joint: Knuckle Joints – Type of knuckle Joint, design of the knuckle joint Numericals |
| | 3 | Cotter Joint – Different parts of the spigot and socket joints on Knuckle joint |
| 12 | 1 | Design of spigot and socket joint. Numericals |
| | 2 | Riveted Joints. : Rivet materials, Rivet heads, leak proofing of riveted joint – caulking and fullering, |
| | 3 | Different modes of rivet joint failure., |
| 13 | 1 | Design of riveted joint – Lap and butt, single and multi riveted joint. |
| | 2 | Different parts of the joint Welded Joint - Welding symbols. Type of welded joint, Strength of combined parallel and transverse weld. |
| | 3 | Strength of parallel and transverse welds Design of Screwed Joints ,Introduction, Advantages and Disadvantages of screw joints, location of screw joints |
| 14 | 1 | Important terms used in screw threads, designation of screw threads |
| | 2 | Initial stresses due to screw up forces, stresses due to combined forces |
| | 3 | Design of Screw jack Numericals |
| 15 | 1 | Design of Spring: Classification and applications of sprigs, spring terminology, Stresses in springs, Wahl's correction factor |
| | 2 | Design of open coil helical spring subjected to uniform applied load under tension and compression |
| | 3 | **3rd Sessional test** |