

# **AMSF-12 PRINCIPLES OF ENGINEERING DESIGN**

## **UNIT-1 INTRODUCTION TO DESIGN**

- 1.1 Steps in design
- 1.2 Design factors-
- 1.3 Practical considerations in design
- 1.4 Theories of failure- stress concentration
- 1.5 Consideration of creep and thermal stress in design.
- 1.6 Detachable joints
- 1.7 Design of screws- thread standards- thread stress
- 1.8 Pre-loading of bolts- external load with pre-load-fatigue and shock loading
- 1.9 Types of keys-types of pins-design of cotter and pin joint.

## **UNIT-2 RIVETED JOINTS-STRESSES IN RIVETED JOINTS**

- 2.1 Design of riveted joints subjected to central & eccentric loads-
- 2.2 Boiler and tank joints
- 2.3 Structural joints.
- 2.4 Welded joints-types of welded joints
- 2.5 Design of welded joints subjected to axial, torsion and bending loads.

## **UNIT-3 SPRINGS- STRESSES IN HELICAL SPRING**

- 3.1 Deflection of helical compression and extension Spring
- 3.2 Springs subjected to fatigue loading
- 3.3 Concentric and helical torsion spring
- 3.4 Critical frequency of spring's leaf springs
- 3.5 Design of automotive leaf springs.
- 3.6 Power Shafting
- 3.7 Design for static loads- combined stresses
- 3.8 Design of shaft for strength and deflection- axial load on shaft.

## **UNIT-4 DESIGN OF CYLINDRICAL AND SPHERICAL VESSELS FOR INTERNAL AND EXTERNAL PRESSURES**

- 3.1 Design of heads and enclosures- tall vessels
- 3.2 Supports for vessels- non-standard flanges pipe line design.
- 3.3 Design of storage tanks.

### **References Books:**

1. Joseph Edward Shingley, Mechanical Engineering Design
2. V.I. Doughite, Design of Machine elements
3. J. Myatt , Machine Design
4. L.E. Brownell and B.H. Young, Process Equipment Design
5. M.V. Joshi, Process Equipment Design,