

# **AMIE15 DESIGN OF MACHINE ELEMENTS**

## **UNIT-1 INTRODUCTION & PROCEDURE IN MACHINE DESIGN**

- 1.1 Design Process, Relation of designer with other disciplines,
- 1.2 Classification of design work, Qualities required in a designer, Design procedure, Standardization,

## **UNIT-2 MATERIALS**

- 2.1 Introduction, Factors determining the choice of materials, Properties and testing of materials, Cast Iron

## **UNIT-3 MANUFACTURING CONSIDERATIONS IN MACHINE DESIGN**

- 3.1 Important points to be observed while designing for casting,
- 3.2 Important points to be observed while designing for heat for easier machining.

## **UNIT-4 IMPORTANT POINTS TO BE OBSERVED WHILE DESIGNING FOR HEAT TREATMENT, LIMITS, FITS, AND SURFACE FINISH**

- 4.1 Introduction, Indian Standard (IS 919-1963), Definitions, Types of tolerances, Geometrical tolerances,
- 4.2 Interchangeable manufacture and selective assembly, Types of fits, Surface Finish, Surface roughness, Information to be given in the statement of surface roughness.

## **UNIT-5 FASTENERS**

- 5.1 Threaded fasteners, non-threaded fasteners.

## **UNIT-6 SHAFTS**

- 6.1 Introduction, Materials, Design consideration, Determination of shaft sizes on the basis of strength, Shaft sizes based on shaftings, effect of keyways, Critical speeds on shafts,

## **UNIT-7 FLYWHEELS**

- 7.1 Introduction, Turning Moment diagram, Maximum fluctuation of energy, Design of flywheels,

## **UNIT-8 COUPLINGS**

- 8.1 Introduction, Rigid couplings, Flexible Couplings, Slip Couplings,

## **UNIT-9 CLUTCHES**

- 9.1 Introduction, Rigid body clutches , Friction clutches, Centrifugal clutches, Friction clutches,
- 9.2 Centrifugal clutches, Electromagnetic Friction clutches, Eddy current clutches, Slip Clutches, Magnetic Particles Clutches,

## **UNIT-10 BRAKES**

10.1 Introduction, Friction Materials, Band brakes, Differential band brakes, Band and block Brakes, Block brakes, Self-Energizing and self-locking brakes, Automotive shoe brakes,

### **UNIT-11 BALL AND ROLLER BEARINGS**

11.1 Introduction, Construction and classification of ball bearings, Types of roller bearings, Bearing life, Bearing Series, Static Load Capacity,

11.2 Methods of evaluation Static load rating of rolling (ball and roller (bearing) , Equations for calculating basic load rating (C<sub>0</sub>) (kg),

11.3 Equations for calculating Static equivalent Load (P<sub>0</sub>), Dynamic load capacity, Equivalent dynamic load, Basic Dynamic Load Rating C , Spur, Helical.

### **UNIT-12 BEVEL AND WORM GEARS**

10.1 Introduction, Involute Curve, Terminology of gear Teeth, Interference in Gears, Gear Materials, Sources of errors in manufacturing gears,

10.2 Design of gears, Design of gears considering hardness, AGMA bending equation, Gear Wheel Design, Internal Gears, Approximate Method of Design of spur gears,

10.3 Method of calculating the rating of machine cut spur and helical gears, Gear Boxes , Helical Gears, Bevel Gears, Worm Gears

#### **Reference Books:**

1. Mechanical Engineering Design by Joseph Edward Shigley
2. Machine Design Data Handbook by H A Patil
3. Machine Design by Robert L and Norton.

