

# **AMTD17 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 (C0) (kg),
- 11.3 Equations for calculating Static equivalent Load (P 0), Dynamic load capacity, Equivalent dynamic load, Basic Dynamic Load Rating C , Spur, Helical.

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

- 12.1 Introduction, Involute Curve, Terminology of gear Teeth, Interference in Gears, Gear Materials, Sources of errors in manufacturing gears,
- 12.2 Design of gears, Design of gears considering hardness, AGMA bending equation, Gear Wheel Design, Internal Gears, Approximate Method of Design of spur gears,
- 12.3 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

