# ENGINEERING MECHANICS

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Dr. T.J. Prabhu, the former Dean of Mechanical Engineering, Bharath University, Chennai – 73 , has more than 40 years of varied experiences – Industrial, Research and Teaching. He took his B.E(Mech) degree from the erstwhile College of Engineering, Guindy and M.S (Mech) and Ph.D (Appl.Mech) degrees from IIT, Madras. During his stay in industries, he has designed and developed Industrial Process Cameras (Standard Printing M/C Co), Acoustic Enclosures and Silencers and Solar Flat Plate Collectors (Southern Power Systems (P) Ltd), and Low Cost Automatic Machines (W.S. Insulators). Dr. Prabhu has published 18 Research papers of which 10 are in the Interntional Journal WEAR

**Engineering Mechanics** is his fifth book. His other books are *Projects in FEM using MATLAB*, *Design of Transmission Elements*, *Fundamentals of Machine Design*, *Mechanics of Solids* and *Basic Mechanical Engineering*. His areas of interests are Machine Tools, Vibrations, Stress Analysis and Finite Element Method.

# Engineering Mechanics

One of the main functions of a Mechanical engineer is designing of machines and equipments. When the student is introduced to machine design subjects, he is expected to have good grounding in Engineering Materials, Mechanics of Solids (Strength of Materials), Engineering Mechanics, Theory of Machines and Mechanisms and Manufacturing Processes.

**Mechanics** is divided into *Statics* and *Dynamics*. Statics treats the action of forces on bodies which are at rest. Dynamics treats the action of forces on bodies which are in motion.

**Dynamics** can be divided into *Kinematics* and *Kinetics*. Kinematics is the study of displacements, velocities and accelerations without any regard to the forces acting on them, or the masses involved. Kinetics is the study of the relationship between forces acting on a body and the resulting motion.

A good foundation in **Engineering Mechanics** is necessary to study the subject Theory of Machines and Mechanism, which in turn will help ultimately in design work.

What is a Mechanism?

What is a Machine?

A mechanism is an assembly of parts that transforms motion to some required pattern. The mechanism develops low

forces and transmits little power. (E.g., an umbrella, a folding chair)

A machine contains mechanisms that are designed to provide significant force and transmit power. (E.g., an automobile gear box, a machine tool, a robot.)

**This book has the following chapters.**

1. Introduction
2. Statics of Particles
3. Coplanar Non-Concurrent forces
4. Forces in space
5. Friction
6. Centroids and Centres of Gravity
7. Moments of Inertia
8. Rectilinear Motion of Particles
9. Curvilinear Motion of Particles
10. Newton's Second Law
11. Work and Energy
12. Principle of Impulse and Momentum
13. Kinematics of Rigid bodies
14. Dynamics of Rigid bodies