

L1. Introduction of Mechanics of Solids

Engineering science is usually subdivided into number of topics such as

1. Solid Mechanics
2. Fluid Mechanics
3. Heat Transfer
4. Properties of materials and so on

Although there are close links between them in terms of the physical principles involved and methods of analysis employed. The solid mechanics as a subject may be defined as a branch of applied mechanics that deals with behaviours of solid bodies subjected to various types of loadings. This is usually subdivided into further two streams i.e Mechanics of rigid bodies or simply Mechanics and Mechanics of deformable solids.

The mechanics of deformable solids which is branch of applied mechanics is known by several names i.e. strength of materials, mechanics of materials etc.

Mechanics of rigid bodies: The mechanics of rigid bodies is primarily concerned with the static and dynamic behaviour under external forces of engineering components and systems which are treated as infinitely strong and undeformable. Primarily we deal here with the forces and motions associated with particles and rigid bodies.

Mechanics of deformable solids: Mechanics of solids: The mechanics of deformable solids is more concerned with the internal forces and associated changes in the geometry of the components involved. Of particular importance are the properties of the materials used, the strength of which will determine whether the components fail by breaking in service, and the stiffness of which will determine whether the amount of deformation they suffer is acceptable. Therefore, the subject of mechanics of materials or strength of materials is central to the whole activity of engineering design. Usually the objectives in analysis here will be the determination of the stresses, strains, and deflections produced by loads. Theoretical analyses and experimental results have an equal role in this field.

Reference Bookes and Important Link:

1. Mechanics of Materials 1, E.J. HEARN
2. Mechanics of Materials , GERE J.M. & GOODNO
3. Engineering Mechanics of Solids, POPOV
4. Strength of materials by G. H. Ryder, Mc Millan India Ltd.,
5. Elements of Strength of Materials by Timoshenko and Young, East West Press Pvt. Ltd.