



# MECHANICS OF SOLIDS

**PROF. PRIYANKA GHOSH**

Department of Civil Engineering  
IIT Kanpur

**TYPE OF COURSE** : Rerun | Core | UG

**COURSE DURATION** : 12 Weeks (24 Jan' 22 - 15 Apr' 22)

**EXAM DATE** : 23 Apr 2022

**PRE-REQUISITES** : Physics/Mathematics

**INDUSTRIES APPLICABLE TO** : Civil construction companies, PWD, PHE, Irrigation, Mechanical companies, Aerospace engineering companies, Material engineering companies etc.

## **COURSE OUTLINE :**

This course is to serve as an introduction to mechanics of deformable solid bodies. The primary course objective is to equip the students with the tools necessary to solve mechanics problems, which involves (a) static analysis of a component to find the internal actions (forces and moments), (b) determine stresses, strains and deformation due to internal actions, and (c) compare them with known acceptable values. This requires the familiarity with the vocabulary of the subject, skill of drawing free body diagrams and the understanding of the material behavior under loads. It is expected to improve your engineering design skills.

## **ABOUT INSTRUCTOR :**

Prof. Priyanka Ghosh is an Associate Professor in the Department of Civil Engineering, IIT Kanpur. After completion of PhD from IISc, Bangalore in 2005, he served as faculty member at BITS, Pilani, IIT Kharagpur and IIT Kanpur. His primary research focus is in Computational Geomechanics and in particular, analysis of foundations, ground anchors, retaining structures, vibration isolation and geopolymers. He is the recipient of several awards like "IEI Young Engineers Award" by The Institute of Engineers (India), "Outstanding Young Investigator Award" by International Association for Computer Methods and Advances in Geomechanics (IACMAG), USA, "Scholarship for Young Indian Researchers" by the Italian Ministry of Education, University and Research, "Indo-US Research Fellowship" by Indo-US S&T Forum, "Class of 1982 Research Fellowship" by IIT Kanpur etc. He has published several research papers in various international journals and conferences. He has guided several post graduate students for their thesis work and taught different courses in various capacities. He has completed a number of sponsored research projects funded by different government organization such as Dept. of Science and Technology (DST), India; Research Design and Standards Organisation (RDSO), Indian Railway, India etc.

## **COURSE PLAN :**

- Week 1:** Fundamental principles of mechanics
- Week 2:** Introduction to Mechanics of Deformable Bodies
- Week 3:** Concept of Stress
- Week 4:** Concept of Strain
- Week 5:** Stress-strain Temperature Relations
- Week 6:** Forces and Moments Transmitted by Slender Members
- Week 7:** Torsion
- Week 8:** Stresses due to Bending
- Week 9:** Concept of Strain Energy and Yield Criteria
- Week 10:** Deflections due to Bending
- Week 11:** Deflection using Strain Energy Method
- Week 12:** Stability of Equilibrium: Buckling