



# STRUCTURAL GEOLOGY

## **PROF. SANTANU MISRA**

Department of Earth Sciences

IIT Kanpur

**PRE-REQUISITES** : Basic Math/Physics and some knowledge of Geological/Earth Sciences

**INTENDED AUDIENCE** : BE - Civil Engineering

**INDUSTRIES APPLICABLE TO** : Construction Industry / Hydrocarbon Exploration and Mining Industries

### **COURSE OUTLINE :**

The subject STRUCTURAL GEOLOGY deals with the shape (geometry), Displacements (kinematics/strain) and forces (dynamics/stress) in Earth and Planetary bodies. In other words, the subject deals with the deformation of rocks and their architecture and development through geological time scales. Deformed rocks and structures conceal a series of tales, decoding of which is the challenge of a structural geologist in presenting the evolution of our planet earth. The knowledge of structural geology is applied in many practical fields e.g., Hydrocarbon, Mineral and groundwater explorations, Construction industries, natural hazard analysis, landscape evolution etc. This course will primarily focus upon the basics and introductory level understanding of the subject.

### **ABOUT INSTRUCTOR :**

Prof. Santanu Misra is a Professor of Structural Geology in the Department of Earth Sciences of Indian Institute of Technology, Kanpur. He is also a DST Swarnajayanti Fellow, PK Kelkar Research Fellow and INSA Young Scientist. Prof. Santanu teaches Structural Geology and leads the Experimental Rock Deformation Laboratory in IIT Kanpur. His main research focus is to understand the mechanical response of composite rock systems at various deformation conditions.

### **COURSE PLAN :**

**Week 1:** Introduction, Basic Concepts

**Week 2:** Structural Elements, Measurements, Sterographic Projection

**Week 3:** Stereographic Projections of linear and planar features

**Week 4:** Concept of Stress

**Week 5:** Concept of Strain

**Week 6:** Rheology of Rocks

**Week 7:** Deformation Mechanism of Rocks

**Week 8:** Folds and mechanisms

**Week 9:** Superposed folds

**Week 10:** Foliation and Lineation

**Week 11:** Boudinage and related structures

**Week 12:** Faults and Joints, Ductile Shear Zone, Structural Mapping, Summary and Final Discussion