



# NANOMATERIALS AND THEIR PROPERTIES

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Engineering IIT Kanpur

**PRE-REQUISITES** : Knowledge of thermodynamics and atomic structure

**INTENDED AUDIENCE** : Materials, Chemical, Mechanical, Physics, Chemistry

### **COURSE OUTLINE :**

The present course will deal with the nanomaterials and their unique properties. The nanomaterials are ubiquitous in various fields of science and engineering. Almost, every field uses nanomaterials in research as well as applications. Hence, it is important to know the basic concepts related to properties of nanomaterials. The course will also deliberate on the structure, surface energy of nanomaterials and their correlation with properties. The unique properties of nanomaterials will be connected with structure (atomic, microstructure at nanoscale) and connected to basic concepts.

### **ABOUT INSTRUCTOR :**

Prof Krishanu Biswas, is currently working at the Department of Materials Science and Engineering of IIT Kanpur. His research area comprises of nanomaterials, phase transformation, multicomponent materials, materials for energy applications etc. He extensively teaches in the institute. He has developed several courses in NPTEL forum. Two courses have been developed as MOOC and others as VIDEO courses.

### **COURSE PLAN :**

**Week 1:** Introduction, Overview of nanostructures nanomaterials

**Week 2:** Multiscale hierarchical nanostructures

**Week 3:** Thermodynamics of Nanomaterials

**Week 4:** Thermodynamics of Nanomaterials

**Week 5:** Surfaces and interfaces in nanostructures

**Week 6:** Surfaces and interfaces in nanostructures

**Week 7:** Properties of nanomaterials

**Week 8:** Properties of nanomaterials

**Week 9:** Properties of nanomaterials

**Week 10:** Properties of nanomaterials

**Week 11:** Properties of nanomaterials

**Week 12:** Properties of nanomaterials