

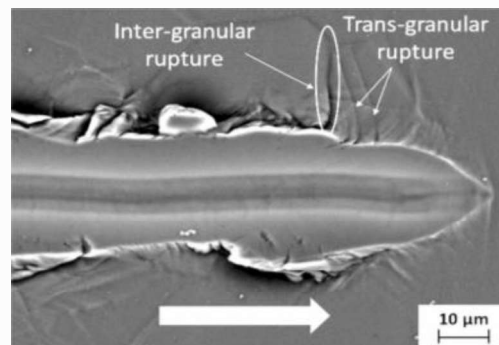
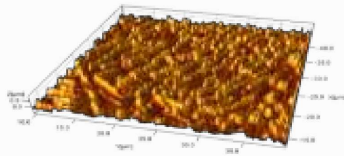


MATERIAL ENGINEERING

Material Engineering is an intrinsic part of Applied Mechanics. It focusses on research, analysis and development of computational and experimental tools for solving problems in industrial application. The major areas of expertise involve Linear and Nonlinear elasticity, Composite materials, fracture mechanics, 3D modelling of crystals, tribological behaviour analysis, Modern engineering materials like shape memory alloys and high entropy alloys, etc. Students of this stream are equipped to deal with a wide range of modern testing techniques and on- field challenges through the experience that they gain from the research as well as our industrially-oriented projects.

Material Science

- Nano Materials
- Metal Foams
- Crystal Plasticity
- Alloy Design
- Smart Materials
- Composites



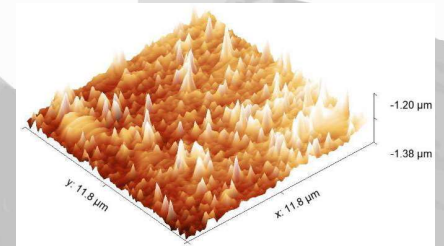
Scanning Electron Microscope (SEM) image of Nano scratch

IMPORTANT COURSES

- Fracture mechanics
- Modern engineering materials
- Failure analysis and its prevention
- Micro and Nano scale mechanical behaviour of engineering materials
- Property and selection of engineering materials
- Continuum Mechanics
- Microstructural characterization of materials
- Phase transformation
- Design methods

SOME OF THE ON-GOING PROJECTS BY M. TECH. STUDENTS

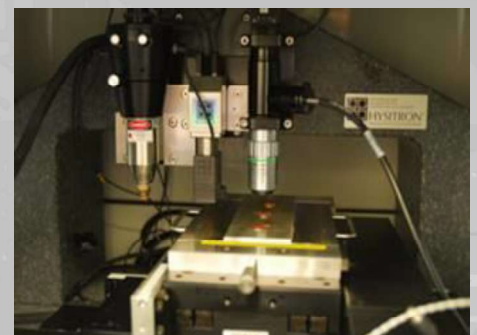
- Mechanical and tribological behaviour of high entropy alloys using Atomic Force Microscopy (AFM).
- Design and characterization of Auxetic materials.
- 3D printing of models of crystals, their defects and anisotropic property.
- Wear analysis of Magnesium composite using Nano Indentation and AFM.
- Corrosion behaviour of Magnesium alloy
- Effect of microstructural parameters on transformation behaviour in Titanium alloys.
- Nano scale tribology of lubricant additives for automobile application.
- Experimental analysis of deformation mechanism of Cobalt.
- Preparation and Calibration of Micro-Spherical Probe Integrated with AFM Cantilever for Friction and Wear of Study of Materials.
- Design and characterization of Shape Memory Alloy (SMA) based porous structures.



Atomic Force Microscopy

MATERIAL CHARACTERIZATION LAB ARE EQUIPED WITH

- Atomic force microscopy (AFM)
- Nano indentation
- Scanning electron microscope (SEM)
- Transmission electron microscope (TEM)
- Micro hardness tester
- X-ray Diffraction (XRD)
- Induction welding equipment
- Creep testing equipment
- Universal testing machine (UTM)



Nano indentation