



ME228 Aug 3:0

Materials and Structure Property Correlations

Instructor

Satish V. Kailas and Namrata Gundiah
Email: satvk@iisc.ac.in and namrata@iisc.ac.in

Teaching Assistant

NA
Email: NA

Department: Mechanical

Course Time: Tue, Thu, 2-3.30PM

Lecture venue: ME Lecture hall

Detailed Course Page: NA

Announcements

No attendance will be taken. At the end of each class (last 10 minutes) the student is given a sheet of paper on which the student has to write (after closing the notes) what they have learnt in the class. This ensures that the student has to concentrate in the class, this sheet becomes the attendance and no proxy is possible.

Brief description of the course

To teach students the relation between the processing and properties of materials.

Prerequisites

None

Syllabus

Atomic structure of materials, atomic bonding, crystal structure point, line and areal defects in crystal structure, dislocation concepts of plastic deformation, critical resolved shear stress, interactions between dislocations and work hardening, fracture-microscopic descriptions, strengthening. Mechanisms of metals, Processing maps, concepts of bio-materials; natural and synthetics, fracture and fatigue of bio-materials.

Course outcomes

The students understand how to control the properties of materials and the genesis of the property of materials including metals, ceramics and polymers.

Grading policy

Assignments 10%, Mid term 40% and finals 50%

Assignments

Assignments are based on current literature. Students are asked to get papers of topics related to materials and write about them.

Questions based on materials covered in the class.

Resources

Reed-Hill, R.E. and Abbaschian, R., Physical Metallurgy Principles, PWS-Kent Publishing Company, 1992.

George E. Dieter, Mechanical Metallurgy, McGraw Hill Book Company, 1986

Linear Viscoelastic Behaviour, I M Ward and J Sweeney, Wiley and Sons, 2013