

Structure and Properties of Amorphous Materials

MATSCEN 5541

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level) Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Provide basic knowledge about the structure and properties of oxide, metallic, semiconducting and polymeric glasses emphasizing viscosity, glass transition, structural relaxation and microstructure.

Prerequisites and Co-requisites:

Prereg: 2241, 2251, 3151, and 3261; or permission of instructor.

Course Goals / Objectives:

- Learn basics of atomic level structure and defects of amorphous materials including oxide, metallic, semiconducting, and polymeric glasses
- Learn about important theories of the temperature dependence of the viscosity of melts and of super-cooled liquids
- Learn about the factors that promote glass formation in systems
- Learn about microstructure that is present in many (but not all) glass forming systems
- Learn about the factors that influence the properties of amorphous materials

Course Topics:

- Introduction to amorphous materials
- Glass formation from liquid state
- Formation of amorphous solids from vapor and solid states
- Viscosity and visco-elastic properties of glass forming melts
- Glass transition
- Structural relaxation
- Phase Separation
- Atomic level structure of noncrystalline solids
- Atomic motions in glassy state
- Thermal properties of amorphous solids
- Optical properties of amorphous solids

Designation:

Elective