

Materials & Nanotechnology (MNT)

MNT 729. Materials Characterization. 3 Credits.

This course will cover basic techniques and methods for characterization of materials, x-ray diffraction and electron microscopy will be discussed in detail. Also covered will be spectroscopies, NMR, FTIR and RAMAN.

MNT 730. Nanotechnology and Nanomaterials. 3 Credits.

This course reviews principles of nanotechnology, nanomaterials and develops a framework for their understanding. The basic tools of nanotechnology; nanoscale characterization, physics and materials design will be discussed in the context of current engineering applications.

MNT 732. Physical Properties of Materials. 3 Credits.

Describes the fundamental science and engineering concepts that form the foundation of Materials and Nanotechnology, including statistical mechanics, quantum mechanics, condensed matter physics and chemical engineering.

MNT 735. Optoelectronics Materials and Processing. 3 Credits.

This course covers the basic principles of semiconductor optoelectronic devices and their processing techniques. Students will learn the methods used for their fabrication and also current applications and limits of such technologies in nanotechnology.

MNT 745. Preparing Future Researchers. 1 Credit.

This course will involve presentations given by invited faculty from various academic institutions ranging from research oriented to teaching oriented and also R&D project leaders in companies.

MNT 756. Molecular Modeling. 3 Credits.

This course will cover basic fundamentals of molecular statics, molecular dynamics, Monte Carlo modeling techniques and allow students to be able to model complex lattice structures, structures of lattice defects, crystal surfaces, and interfaces.

MNT 760. Materials Synthesis Processing. 3 Credits.

This course deals with synthesis and processing issues in materials design.

MNT 783. Nanomechanics. 3 Credits.

Covers essential tools (quantum mechanics, molecular dynamics, statistical physics, continuum mechanics) used at the nanoscale. The course will present methods that bridge atomistic and continuum models and discuss these techniques in the context of material design.