MSE-463 Nano-Materials

Credit Hours: 2-0

Pre-requisites: PHY-213 Physics of Materials

Course Objectives

- To provide students with the general concepts of nanomaterials.
- To introduce various forms of nanomaterials.
- To provide students with basic principles of nanomaterial preparation.
- To introduce on basic level some of the tools used to characterize nanomaterials.
- To introduce various examples of engineering applications of nanomaterials.

Course Contents

- Introduction to Nanoscience,
- Surface Science for Nanomaterials,
- Nanomaterials' Characterization, safety concerns
- Synthesis of Nanoparticles and Their Self-Assembly.
- Thin-Film Deposition.
- Nanolithography.
- Nanomaterials Properties and Applications

Course Outcome

- The course is designed to introduce important concepts of nanomaterials.
- Students will be able to comprehend the potential impact, in all classes of materials, of the control of nanostructure
- Outline the nanotechnology production routes currently available
- Identify possible opportunities for nanomaterials in product development and enhancement.
- **Suggested Books**
- Wing Kam Liu, Eduard G. Karpov, and Harold S. Park, *Nano Mechanics and Materials: Theory, Multiscale Methods and Applications, John Wiley and Sons 2006.*

- John Vacca, *Nanotechnology: Materials, Systems, and Processes at the Nano-Scale, Butterworth Heinmann 2009.*