

14:150:493

Nanomaterials Lab: Structural, Mechanical, and Chemical Properties

Course Instructor:

Prof. Jun John Xu

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Term:

Fall 2002

Class Time:

T78 (Tuesday 6:10 - 9:00 pm).

Office Hours:

11:15-11:45 W, F

Description:

This Lab consists of five modules (1) Hot Pressing of Nanocrystalline Superplastic Powders (Prof. Roger Cannon); (2) Nanomechanical Testing (Prof. Mina Pelegri); (3) Atomistic Modeling and Simulation of Nanomaterials (Prof. Steve Garofalini); (4) Evaporation-Condensation Synthesis of Nanoparticles (Prof. Steve Tse, Bernard Kear, Greg Elliott); and (5) Nanomaterial Batteries (Prof. Xu). Students get hands-on experience in experiments instructed by the faculty member(s) and/or TA in charge of each module in the faculty member's research laboratory. Each module consists of two 3-hour sections in consecutive weeks.

Objectives:

- 1) Combine scientific understanding from the corresponding lecture course with hands-on experience in experiments in the research laboratory.
- 2) Learn start-of-the-art instrumentation and advanced experimental methods in nanomaterials science and engineering.
- 3) Be exposed to frontier research areas in nanomaterials science and engineering.
- 4) Develop an experimental understanding of structural, mechanical and chemical properties of nanomaterials and their applications.

Prerequisites:

Concurrent taking 14:150:491 Nanomaterials: Structural, Mechanical, and Chemical Properties.

Attendance:

Attendance of every lab section is required.

Projects:

Students will be required to write a lab report on one of the five experiments and give an oral presentation on another experiment.

Grade: Attendance/attitude/performance during lab 40%, lab report 30%, presentation 30%.

Recommended Texts:

“Nanomaterials: Synthesis, Properties and Applications,” A. S. Edelstein (editor), R. C. Cammearata (editor). Institute of Physics.

Supplimental reading: AMPTIAC Quarterly, Vol. 6 [1] Special issue, “A Look Inside Nanotechnology,” AMPTIAC Press, 2002. (Complete text is on Web at URL: <http://www.Amptia.iitri.org/quarterly>)

Academic Integrity:

Students will be expected to adhere to the Policy on Academic Integrity listed within the New Brunswick Undergraduate Catalogue. Students are encouraged to review this policy.

Contribution of Course to Meeting the Professional Component of ABET: Students combine scientific understanding from the corresponding lecture course with hands-on experience in experiments in the research laboratory. They learn experimental approaches in science and engineering, are exposed to frontier research areas, improve lab skills and communications skills, and develop teamwork ability.

Syllabus prepared by: Jun John Xu

Date: August 28, 2002