Class Schedule: Tuesdays and Thursdays 9:30am-10:45am

Instructor: Prof. John Cumings


Review Articles
4. Review materials in Blackboard

Suggested References
5. Any good textbook on quantum mechanics, such as “Introduction to Quantum Mechanics”, D. J. Griffiths, (Prentice-Hall, New York, 1994).

Journals to Follow (among others)
Nano Letters
http://pubs.acs.org/journals/nalefd/
http://www.nature.com/
Virtual Journal of Nanoscience and Technology
http://www.vjnano.org/nano/

Catalog/Course Description: This course is an exploration of materials whose structure places them at the boundary between small objects and large molecules. Having characteristic dimensions in the range of 1-100 nanometers, these materials are difficult to synthesize and characterize but are nevertheless at the forefront of science and technology in many fields. This course will cover the methods for creating, manipulating and measuring these materials with an emphasis on the current scientific literature. The novel properties and potential applications will also be addressed.

Prerequisites: Permission of the Department
**Course Goals:**
1. Student learns about confinement effects at the nanometer scale, and how these relate to quantum mechanics, i.e. the wave nature of the electron.
   2. Student learns about interatomic and surface forces.
   3. Student learns the basics of scanned probe microscopies, electron microscopies and scattering techniques for characterization of materials at the nm scale.
   4. Student learns to read and analyze journal articles from the scientific literature and to write and present a critique.

**Student Outcomes covered by the Course:**

ABET A: Ability to apply mathematics, science and engineering principles;
ABET E: Ability to identify, formulate and solve engineering problems
ABET G: Ability to communicate effectively;

**Topics Covered:**

Carbon Nanotubes: Synthesis, structure, and electronic properties
Mesoscopy: Nanoscale electronics
Focus Areas (by class poll)
Final paper topic due (1/2 page)
Nanomaterial PIs (by class poll)
Lab Visits & Guest Lectures