Chemistry 764 Nano Electronic Materials

Call Number: 06590
Place: Morton 313 Time: Tue. Th. 5:10 - 6:30 pm

This 4-credit hour course is designed to serve as an introduction to nano-electronic materials from a chemical perspective. The goal of the course is to introduce solid-state theory, familiarize you with modern topic in electronic materials research, and to develop skills for literature search and critical reading.

The course consists of two parts. In the first half of the quarter, basic background on electronic processes in solids is covered. With the language and understanding of solid state theory, the second half of the quarter introduces forefront research fields in nano-materials chemistry. The topics treated in the course include, but are not limited to, the following:

Structure and structural determination of crystalline solids
Electronic structure of metals, semiconductors and insulators
Phenomenology of 0D, 1D and 2D nanostructures
Synthesis and properties of nanoparticles, nanowires, and nanotubes
Assembly and properties of functional nanostructured materials
Characterization of nanomaterials using scanning probe microscopy
Organic and molecular electronics.

A mid-term exam will be given to cover the background knowledge in solid-state materials studied in the first half quarter. There is **no final exam**; instead, each student is required to prepare a 5-10 page term paper on a topic determined in consultation with the instructor.

Office hours: Office hours are by appointment only. Appointments can be arranged in class or via email.

Textbook:
No textbook is required, but the following books are recommended as reading materials.
Charles Kittel, *Introduction to Solid State Physics*, 7th ed., John Wiley and Sons, 1996.
Walter A. Harrison, *Electronic Structure and the properties of Solids*, Dover, 1989
Jeremy K. Burdett, *Chemical bonding in solids*, Oxford University Press, 1995
Supriyo Datta,*Electronic Transport in Mesoscopic Systems*, Cambridge Univ. Press,1995
Bharat Bhushan, *Handbook of Nanotechnology*, Springer, 2004

Grading: Final grades will be determined from homework, midterm exam and the term paper. The Midterm exam and the term paper contribute 30% each and the homework contributes 40%.

Contact Information:

Prof. Liwei Chen
Department of Chemistry and Biochemistry
Email: `lwchen@helios.phy.ohiou.edu`
Tel: `(740) 517-2852`