

Department of Materials Science and Engineering
**New Senior Elective and Graduate
Course Offering**

Spring Semester 2008
MY4970

“Nanomaterials & Nanofabrication”

*Register for 3 credits of
MY4970 Special Topics – Materials*

Offered M-W-F, 11:05 – 11:55 am

Minerals & Materials Engineering Building, Room 610

Course Description

This course is an interdisciplinary introduction to processing, structure, and properties of materials at the nanometer length scale. The course will cover recent breakthroughs and assess the impact of this burgeoning field. Specific nanofabrication topics include epitaxy, beam lithographies, self-assembly, biocatalytic synthesis, atom optics, and scanning probe lithography. The unique size-dependent properties (mechanical, thermal, chemical, optical, electronic, and magnetic) that result from nanoscale structure will be explored in the context of technological applications including computation, magnetic storage, sensors, and actuators. An overview of the physics and device application of nanoelectronic devices will be presented. Topics will range from nanoscale silicon devices and their theoretical limits, to nanostructured, low dimensional and single electron devices, to molecular scale electronic transport physics.

PROJECTS: The final project will consist of a literature review and proposal of a relevant topic in nanomaterials. The project will comprehensively describe current progress and assess future prospects. A written report and oral presentation will be required.

PREREQUISITES: Senior undergraduate or graduate students in materials science, engineering, chemistry, physics, or biology.

TEACHING METHOD: Three classes per week with lectures, group assignments, and student presentations.

EVALUATION METHOD: Course grades will be determined from group assignments (60%) and the final project (40%).

**For more information regarding this course, please contact
Prof. Gajendra Shekhawat, g-shekhawat@northwestern.edu**