

**ChE 891 – Section 2**  
**Experimental Methods in Nanotechnology**  
**Spring Semester 2008**

Prof. Michael E. Mackay  
Department of Chemical Engineering & Materials Science

Monday – Wednesday  
1300 Engineering Building  
3:00 – 4:20 pm

**Introduction.** Nanotechnology refers to development of systems at the atomic, molecular or macromolecular levels, with length scales of order 1 - 100 nanometers. This bottom up synthesis requires careful characterization with a diverse number of experimental techniques. It is the purpose of this course to introduce the students to a variety of nanoscale characterization techniques.

**Course details.** A survey of the available techniques will be undertaken including atomic force microscopy, electron microscopy, etc. Then a comprehensive study of scattering techniques will be performed, including: light scattering, neutron scattering and X-ray scattering. This will be done in an applications manner rather than theoretical derivation of the underlying principles.

**Grading.** There will be a mid-term and final exam for this course which will constitute 50% of the final grade, with equal grading emphasis on each. At the end of the semester a research proposal is to be submitted that follows the *NSF Major Research Instrumentation Program* guidelines accounting for 25% of the final grade

[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5260](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5260)

These will be reviewed by three fellow students using the standard NSF review procedure:

[http://www.nsf.gov/pubs/policydocs/pappguide/nsf08\\_1/gpg\\_3.jsp#IIIA](http://www.nsf.gov/pubs/policydocs/pappguide/nsf08_1/gpg_3.jsp#IIIA)

Part of the grade will include a 10 minute presentation of research proposal at the end of the semester. There will also be homework assignments throughout the semester which will represent the remaining 25% of the course grade.