ChBE 4803B/8803B: Chemical Engineering in Nanoscale Systems: Syllabus

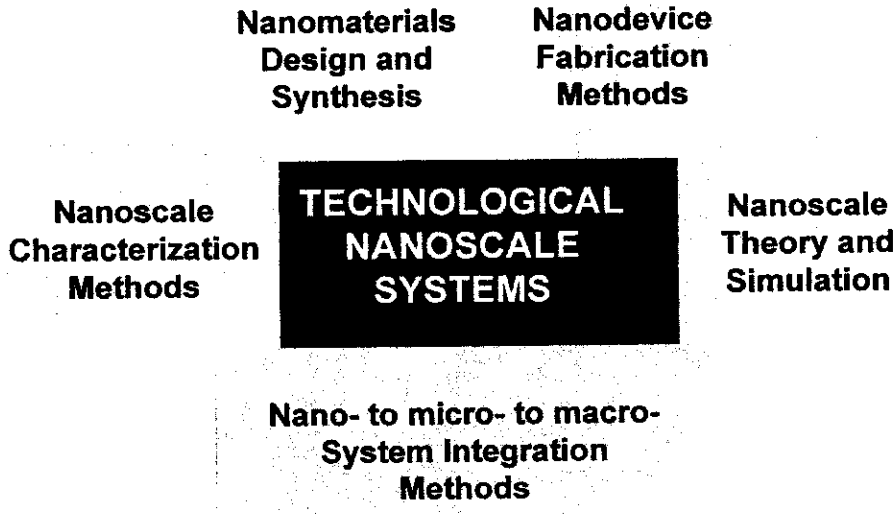
Date	Topic
Aug 22, Aug 24	Overview and introduction
Aug 29, Aug 31, Sep 5	Nano "Building Blocks": Biological Nanotubes and Nanopores
Sep 7, Sep 12, Sep 14	Nano "Building Blocks": Synthetic Nanotubes
Sep 19, Sep 21	Nanoparticles for heat transport applications: Nanofluids
Sep 26, Sep 28, Oct 3 *HW #1 due Oct 3*	Nanoparticles and nanostructured materials for catalysis
Oct 5, Oct 10, Oct 12	Directed assembly of nanostructured materials in solutions
Oct 19	Guest Lecture : Dr. Ravi Doraiswami, School of ME Topic: Nano/Micro Integration
Oct 24, Oct 26, Oct 31	Nanostructured and Nanocomposite Thin Films
Nov 2 *HW #2 due Nov 2*	Building organic nanostructures from polymers
Nov 7	Building and operating nanomachines
Nov 9	Nanosystem Design Project: Preliminary review discussions
Nov 21	Nanomanufacturing for our energy future
Nov 28, Nov 30, Dec 5, Dec 7	Nanosystem Design Project Presentations and Discussion

ChBE 4803/8803: Special Topics, Fall 2006
CHEMICAL ENGINEERING IN NANOSCALE SYSTEMS
Georgia Institute of Technology

Instructor: Prof. Sankar Nair **3 Credits**

Nanotechnology is a cross-cutting discipline that is enabling revolutionary advances in areas as diverse as energy, electronics, petrochemicals, and biotechnology. It is concerned with the design and analysis of ***nanoscale systems***, which present novel challenges from those encountered in macroscopic systems.

This course focuses on applying core chemical engineering fundamentals along with synthesis, fabrication and characterization methods to design and analyze technologically important nanoscale systems. Both nanoscale engineering and the underlying nanoscale science will be emphasized in an integrated approach to nanosystems.



Some specific topics: Mass, heat, momentum and charge transport in nanoscale systems. Applications in separations nanotechnology and single-molecule analysis. Thermodynamics of nanoscale systems. Nanoscale phase behavior, stability, and applications in thin film engineering. Reactive and non-reactive self assembly processes and applications. Catalytic and reactive behavior in nanoscale environments. Construction of nanomachines.

Course format and grading:

- 3 lecture hours a week. Lectures by Prof. Nair and several 'guest lectures' by other GT faculty.
- No prerequisites, but prior courses in thermodynamics, transport phenomena and/or reaction engineering are desirable
- Grades are based on 4 HWs and a Term Project (in groups of 3-4 students). There will be no Exams.

Questions ? Contact Dr. Nair (sankar.nair@chbe.gatech.edu, 404-894-4826).