

Chemistry 449: MICROFABRICATED CHEMICAL MEASUREMENT  
SYSTEMS  
Spring 2007

DESCRIPTION: Chemistry 449 is a 3-credit survey course designed for chemistry graduate students and advanced undergraduate chemistry majors.

PREREQUISITE: Chemistry 481

OBJECTIVE: The purpose of this course is to introduce the use of micro- and nanosystems for acquiring chemical and biochemical information. Micro and nanofabrication techniques used to build such systems will be described, as will be basic fluid and molecular transport phenomena applicable to micro- and nanoscale fluidics. A selected overview of the literature concerning chemical and biological microsystems will be provided.

TEXT: Fundamentals of Microfabrication: The Science of Miniaturization, Second Edition, M. J. Madou (ISBN:0849308267) is recommended. Additional selected texts will be suggested as references and readings collected from journal literature on specific topics will be assigned.

GRADING: Grades will be determined on the basis of a midterm and a final exam (35% each) and in-class assignments which may include a term paper and short oral presentations (30%).

TOPICS:

- Photolithography
- Ebeam lithography
- Wet chemical etching
- Dry etching techniques
- Focused ion beam milling
- Other fabrication techniques
- Microscale fluid transport
- Electrokinetic transport
- Continuous fluidic systems
- Discrete fluidic systems
- Nanofluidics
- Scaling of miniature chemical measurement systems
- Microfabricated chemical separation systems
- Integrated fluidic microsystems
- Gas phase microsystems
- Other chemical microsystems