

ChemE 486

“Educational Lab-on-a-Chip”

Instructors: Professor Daniel Schwartz
 Office: BNS 263
 Office Hours: TBA
 dts@u.washington.edu

TAs:	Ravi Manghani (ravi@u)	Xiyong Chen (chxy76@u)
Office:	Benson Hall	B11 Benson Hall
Office Hours:	TBA	TBA

Web page: http://courses.washington.edu/dtsclass/Chem_E_486.htm

Overview

Microfabricated fluid handling systems (also known as microfluidic system) are widely used in state-of-the-art medical diagnostics and home healthcare systems. An integrated microfluidic system that separates, treats, and analyzes chemical and biochemical species is called a “Lab-on-a-chip”. In this course, small student teams will perform technical and cost designs for the creation of educational “Lab-on-chip” modules that inexpensively illustrate the basic principles of fluid mechanics, heat transfer, mass transfer, and reaction at the microscale. Each group’s design will be built using laser microfabrication facilities funded by an educational grant provided by the Camille and Henry Dreyfus Foundation. The cost design will consider capital and operating costs associated with device manufacture, as well as market characteristics, to establish a price that produces an adequate return on investment.

Grading

Grades will be determined from the scores on written “Specialty Area” Reports (15%), a Preliminary Design concept (25% for Comm Director, 10% for specialists), your team’s written Final Technical and Cost Design Report (40%), an oral presentation of the Final Design (15%), weekly progress update points (10%), and “360 degree” review points (10%). You will be working in small team.

A 2.0 or better grade in this course indicates the student has demonstrated satisfactory ability to:

- Design a system, component, or process to meet desired needs.
- Apply chemical engineering principles in open-ended design problems, while making reasonable assumptions for problems which are complicated, ill-defined, and which have only limited data.
- Use a computer to perform useful work that is validated.
- Integrate oral and written communications into design, manufacturing, and product development.
- Function on a team.
- Engage in self-directed, life-long learning.
- Appreciate professional and ethical responsibility, including safety and environmental aspects.

Course Schedule

MWF	8:30–9:20 am, GUG 317
TTh	Labs, BNS 203 and MEB 237
3/30	Engineering Open House (No class)
5/31	Memorial Day Day (No class)
6/2/04	Senior Exit Interview (tentative)

Due Dates and Times

- Weekly project updates (10%)
- Specialty Area Reports for microfabrication, simulation, and marketing teams (15%), due 4/16.
- Preliminary Design Concept and Options coordinated by the Communications Director (25%), with specialist input (10%), due 4/23.
- Final Written Report (40%), 4:30pm on Friday, 5/28; Oral Report (15%) on Friday, 6/4.