



**IN268 JAN 2:1**

## **Microfluidic Devices & Applications**

### **Instructor**

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### **Teaching Assistant**

Email:

**Department: Instrumentation and Applied Physics**

Course Time: Tue., Thu., 10:00 - 11:00 AM; Fri., 3:00-4:00 PM

Lecture venue:

Detailed Course Page:

## **Announcements**

### **Brief description of the course**

This course is offered to Masters and PhD students to introduce them to the field of Microfluidics and Lab-on-a-Chip. The course equips the students with the latest and emerging instrumentation and applied physics aspects of Micro and Nano Technologies and their design, fabrication and applications.

### **Prerequisites**

"none"

### **Syllabus**

Basic principles in microfluidics, design principles for microfluidic devices, device fabrication procedures, (such as optical lithography and soft lithography), components of microfluidic devices (micro-pump, mixers, lenses, valves, heaters, sensors, etc.,) utility of microfluidic devices in various biological, chemical and optical sensing applications, opto-fluidics, Inertial-microfluidics, droplet-microfluidics, microfluidics based-flow cytometry. This course also provides hands on experience in the design, fabrication and characterization of Lab-on-a-chips or point-of care testing devices.

### **Course outcomes**

Exposure to the design and fabrication techniques of Microfluidic Devices, hands-on experience. Familiarity with various applications of Microfluidics and Lab-on-Chip Technologies and doing a term-project in realizing a specific application.

### **Grading policy**

25% Assignments, 25% Project, 50% Final Exam.

### **Assignments**

### **Resources**

Micro- and Nano-scale Fluid Mechanics: Transport in Microfluidic Devices" by Brian J. Kirby.

Introduction to Microfluidics" by Patric Tabeling.

Fundamentals and Applications of Microfluidics" by Nam-Trung Nguyen and Steven T. Wereley.

Biological Applications of Microfluidics edited by Frank A. Gomez.

Theoretical Microfluidics" by Henrik Bruus.