

MEC 575: Introduction to MEMS

Fall, 2015

Ming Lu
631-344-4773
mlu@bnl.gov

Meets: 7:00-9:50 PM, Wednesday, SBS Bldg. Room N102
Office hours: by appointment

Textbook and

1. Chang Liu, *Foundations of MEMS*, 2nd edition, Prentice Hall 2011, ISBN 0132497360.
2. Franck Chollet & Haobing Liu, *A (not so) short introduction to MEMS*, Version 5.2, <http://memscyclopedia.org/introMEMS.html>, ISBN: 978-2-9542015-0-4

Note: C. Liu's textbook will mainly be used after midterm exam and Chollet & Liu's free book can be treated as a quick reference.

Course Description

The goal of this course is to introduce the subject of micro-electro-mechanical devices and systems (MEMS). Lectures will cover micro/nanofabrication technologies and process flow development, material properties, structural behavior, as well as the working principles and the applications of micro actuators, sensors, and transducers.

Grading

Final grades will be based on the following distribution:

Attendance: 10%

Homework: 20%

Midterm (open book): 25%

Project: 20%

Final: 25%

Homework Policy

1. Homework are not weighted equally.
2. Homework must be submitted before 7:15 PM of the next lecture.
3. Homework which is one-week overdue will only be counted by 50%.
4. **Homework submitted after two weeks will not be graded.**

Lecture schedule

Week	Date	Lecture Topics
1	8/26	Introduction to MEMS
2	9/2	Material for MEMS, Microfabrication overview
3	9/9	Thin film deposition
4	9/16	Thin film deposition, Lithography
5	9/23	Lithography
6	9/30	Etching
7	10/7	Wafer bonding, CMP, Doping & Bulky Si micromachining
8	10/14	<i>Midterm exam</i>
9	10/21	Electrostatics Sensing and Actuation
10	10/28	Thermal Sensing and Actuation Piezoresistive Sensors
11	11/4	Piezoresistive Sensors, Piezoelectric Sensors
12	11/11	Piezoelectric Sensors Sensors and Actuators Summary
13	11/18	Microfluidics, Lab-on-a-Chip
14	11/25	<i>No Class - Happy Thanksgiving</i>
15	12/2	<i>Project presentation</i>
16	12/15 (5:30-8:00 pm)	<i>Final</i>

Academic Integrity Statement:

Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, *but are not limited to*, copying or plagiarizing class assignments including homework, reports, designs, computer programs, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn.