

SPRING 2008 - ECE 8853A (TR 12:05-13:25)

INTERFACE IC DESIGN FOR MEMS AND SENSORS

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- *Do you know how to electronically actuate and readout a MEMS device?*
- *Do you know what sensing functions can be implemented in CMOS?*
- *Do you know how to design a low-noise opamp with μV input offset?*
- *Do you know how an oscillator is designed using a $\mu\text{mechanical}$ resonator?*
- *Do you know the latest commercialization trends in MEMS and Sensors?*

Take this course to learn about all the above, and more!

With invited lectures from experts in MEMS and Sensors industry

This course covers the design of high-performance interface circuits for various MEMS and sensors, and looks at system level issues in integrated microsystems. Although micromechanical devices and sensors have found way into numerous microsystem applications, practicing engineers know little on how to electronically actuate, readout and control these analog-in-nature devices without compromising signal integrity, dynamic range, signal to noise ratio, power consumption, etc. In this course, students will learn about integrated MEMS and CMOS transducers and sensors, their accurate modeling in the electrical domain, and detailed design of mixed-signal integrated interface circuits for such devices, including biochemical sensors (switched-capacitor charge amplifiers/integrators, dynamic noise and offset cancellation techniques, fully-differential, parasitic insensitive designs, transimpedance amplifiers, MEMS oscillators).

Prerequisite: ECE4430 (Analog IC Design I), or permission of the instructor

Homework 10%, Midterm Exam 20%, Design Project 1 25%, Design Project 2 25%, Final Exam: 20%

