

Microelectromechanical Systems

Scheduled meeting time: Mondays and Wednesdays 1:10 – 2:30pm; Room: 233 Mudd

Instructor: Prof. Chee Wei Wong
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 Office hours: Mondays and Wednesdays 2:30 – 3:30pm

Course Materials:

(Required) Microsystems Design, Stephen D. Senturia, Kluwer, Boston, 2001.

(Recommended) J. A. Pelesko and D. H. Bernstein, Modeling MEMS and NEMS, CRC Press, 2002.

Course Objective: To explore the exciting phenomena at small – order of microns or less – lengthscales. This covers an appreciation of micro- and nanofabrication technologies, continuum dynamics and structural mechanics, optics and photonics, heat transfer and fluids at these lengthscales. The structure of this course will combine lectures, case studies, laboratory demonstrations, and a team-level design project.

Course Description and Bulletin: This is a broad interdisciplinary course covering design of microsystems, ranging from micro- and nanofabrication, mechanics, heat transfer, fluid dynamics, and electromagnetism with special emphasis on small lengthscale devices. This subject presents an introduction to micro and nano-scale devices, using examples from micro- and nanoelectromechanical real-world applications. Emphasis of the class will be on modeling and simulation in the design of such devices. Lectures during the first half of the term will cover physics and engineering on these lengthscales: such as continuum dynamics and energy methods, elastic structures, optics and photonics, heat transfer and fluids, sensors and actuators, and device fabrication. During the second half, we will explore specific micro- and nanoscale device case studies and design, with a section where students will get a hands-on experience with sample microdevices.

