NE222 Aug. 3:0

MEMS: Modeling, Design, and Implementation

Instructor

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Department: CeNSE

Course Time: Tue., Thu., 9:00-10:30 AM

Lecture venue: CeNSE MMCR

Detailed Course Page: N/A

Announcements

Brief description of the course

This course discusses all aspects of MEMS technology â€“ from modeling, design, fabrication, process integration, and final implementation. Modeling and design will cover blockset models of MEMS transducers, generally implemented in SIMULINK or MATLAB. Detailed multiphysics modeling may require COMSOL simulations. The course also covers MEMS specific micromachining concepts such as bulk micromachining, surface micromachining and related technologies, micromachining for high aspect ratio microstructures, glass and polymer micromachining, and wafer bonding technologies. Specific case studies covered include Pressure Sensors, Microphone, Accelerometers, Comb-drives for electrostatic actuation and sensing, and RF MEMS. Integration of micromachined mechanical devices with microelectronics circuits for complete implementation is also discussed.

Prerequisites

None

Syllabus

As listed in the "Brief description of the course"

Course outcomes

Understanding of MEMS technology

Multiphysics modelling of MEMS devices

Design of MEMS devices and simulation of response

Understanding of issues in MEMS implementation

Grading policy

50% assignments and 50% term project

Assignments

Resources

1) Microsystem Design by Stephen D. Senturia

2) Micro and Smart Systems

by G.K. Ananthasuresh, K.J. Vinoy, S. Gopalakrishnan, K.N. Bhat, V.K. Aatre