

Department of Electrical and Computer Engineering

EEL 4XXX – MEMS II

Catalog Description

This course will give students an in depth knowledge and experience of emerging and developed technologies in the areas of micro-electro-mechanical-systems through a combination of lecture and project work. The class will be devoted to lecture, presentation and lab works. (3 credits)

Catalog Objectives

- Students will develop expertise through in depth study of advanced micro/nano fabrication technologies.
- Hands on experience on MEMS design through case studies which will be closely tied with the ongoing research at FIU.
- Students will also gain experience on proposal writing as well as reviewing other proposals.
- Experience on MEMS CAD tools – Coventorware.

Prerequisites

- EEE 3396 Introduction to solid state devices
- EEE 4XXX – MEMS 1

Textbooks

- Marc Madou, “Fundamentals of microfabrication”, CRC Press NY
- Stephen D.Senturia, “Microsystem Design”

Topics covered

- Advanced micro/nano fabrication techniques – plasma physics, ICP etch, surface/bulk micromachining
- Thin film – fabrication and applications
- DRIE – deep Si etch
- Fabrication of Optical MEMS – fundamentals of light, micromirrors, microgratings, corner cube reflectors
- Fabrication of MEMS in biomedical applications – interaction of light with tissue, MEMS based fibre optic OCT/OCM
- Fabrication of RF MEMS – switches, micro relays, varactors, inductors, phase shifers, filters, micromachined antenna

- MEMS packaging – packaging design, materials, packaging techniques – bonding, sealing, dicing, wafer-level packaging

Class schedule

Twice a week, 75 minutes each session

Contribution of course to meeting the professional component

Engineering science – 30% (math/science required for creative applications)

Engineering design – 70% (decision making process of devising a system, component or process to meet a desired need).

Relationship of course to program outcomes:

In the course EEL 4XXX – MEMS II the student will have to show

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (j) a knowledge of contemporary issues
- (l) an ability to apply probability and statistics

Person who prepared this description and date of preparation:

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R110915 – HW