

Department of Electrical and Computer Engineering

EEE 4XXX – Introduction to Nanofabrication

Catalog Description

This course will give the students an introduction to micro/nanofabrication tools and techniques. It includes lab sessions where the students design, fabricate and test selected micro-scale devices.

Catalog Objectives

- To give the students an understanding of the standard micro and nanofabrication techniques and the issues surrounding them.
- To give the students an overview of the major classes, components and applications of nanosystems and the fundamental principles behind the operation of these systems.
- To apply the knowledge of nanofabrication techniques for designing a microsystem.

Prerequisites

EEE 3396 Introduction to solid state devices or with instructor's permission.

Textbooks

- Introduction to Microfabrication, 2010, Sami Franssila

Topics covered

- Introduction to nanofabrication tools, environment and methods
- Thin film materials and processes
- Layout design and pattern generation
- Optical and advanced lithography techniques
- Wafer cleaning and surface preparation
- Etching
- Oxidation
- Diffusion
- Ion implantation
- CMP: Chemical mechanical polishing
- Micrometrology and characterization

Class schedule

Twice a week 75 minutes class and once a week 3 hour lab

Contribution of course to meeting the professional component

Engineering science – 70% (math/science required for creative applications)

Engineering design – 30% (decision making process of devising a system, component or process to meet a desired need).

Relationship of course to program outcomes:

In the course EEE 4XXX – Introduction to Nanofabrication the student will have to show

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) 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
- (g) Ability to communicate effectively
- (i) Recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Person who prepared this description and date of preparation:

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