

## **ECE 4385: Introduction to Microsystems I**

**Credit / Contact hours:** 3 / 3

**Course coordinator:** Tim Dallas

**Textbook(s) and/or other required material:** Micro Electro Mechanical System Design, J. Allen

**Catalog description:** Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project based course introduces microsystem design, analysis, simulation, and manufacturing through several case studies using representative devices.

**Pre-requisite(s) or co-requisites:** ECE 3311, ECE 3303 and 2.25 GPA. For majors only or departmental consent.

**Designation:** Elective

**Course learning outcomes:** Upon completion of this course, students should be able to do the following:

1. Gain an interdisciplinary overview of the current state of MEMS
2. Use numerical tools to predict the behavior of MEMS
3. Operate and analyze the behavior of MEMS
4. Utilize computer layout and simulation tools to design MEMS devices for fabrication

**Student outcomes addressed:** a, c, e, and k.

**Topics covered:**

Introduction to MEMS – 4 hours

Modeling using ANSYS – 4 hours

MEMS Design using AutoCAD and Sandia's SUMMiT V tools – 6 hours

Microfabrication – 2 hours

MEMS devices (Digital micromirrors, accelerometers, etc.) – 4 hours

Microsensors (chemical, biological, mechanical, etc.) – 4 hours

MEMS Actuators – 2 hours

Testing and Packaging – 2 hours

Laboratory experiments/tours – 10 hours

Student Project Presentations – 6 hours