MSE 6193.02 - Sensor Materials and Devices

COURSE INFORMATION

INSTRUCTOR

Professor P. I. Gouma

CLASS HOURS

TBD

COURSE REQUIREMENTS

• Attendance at lectures and lab sessions
• Timely completion of homework
• Mid-Term Exams
• Final Report and Oral Presentation
• Background reading
• Classroom discussion and questions are encouraged

COURSE DESCRIPTION

Catalog Entry

Sensors are introduced as the physical, chemical, and biological detectors necessary for monitoring human health, the environment, and numerous industrial processes. The basic principles of operation of sensing devices are covered in this course. Reference to the different classes of materials that are used for sensing is made. Furthermore, the course covers the topic of novel sensor device fabrication using nanomaterials. The principles of nanoscale fabrication and several examples of key nanoscale processes such as sol-gel routes, templating, nanotube and nanowire processing are discussed.

Pre-requisites: TBD
Pre- or Co-requisites: TBD

Background Knowledge Assumed

Basics of:
• Physics
• Basic Chemistry

Recommended Texts:


**COURSE OUTLINE**

**Introduction**
Introduction to Sensors
Solid State background
Solid/Gas Interfaces
Solid/Liquid Interfaces
Measuring techniques for sensor evaluation

**Chemical Sensing**
Gas sensors
Resistive, Electrochemical, optical and Chem FET sensors
Fuel composition sensors
Biosensors

**Smart Sensors and Devices**
Electronic Nose
Microfabricated sensors
Nanostructured materials and devices

**Hybrid Nanomaterials**
Nanomanufacturing of hybrid fibers

**Nanomedicine Applications of Nanomaterials**
Breath Analyzers
Tissue Engineering
Patch-type biosensors
GRADING

3 Credits (Undergraduate) / 1-3 Credits (Graduate)

Course Grade

Letter grades based on homework and exam scores, weighted as follows:

- Homework Assignments and Class Participation: 30%
- Mid-Term Exams: 30%
- Final Report and Oral Presentation: 40%

There will be no “extra credit” assignments. All students will be graded on the same basis.
Any cheating on requirements will result in a grade of F.

ACADEMIC INTEGRITY

You are encouraged to work and study with your classmates. However, any work you submit for homework or exams must be your own work. Those found cheating on any assignment or test will automatically fail this course and will be brought up on charges of academic dishonesty.