ECE 413 – Sensors

Catalog Description: Overview of sensor technologies including materials, physics of operation, applications and system integration.

Credits: 3 **Terms Offered:** Spring

Prerequisites: ECE 322 and ECE 323

Courses that require this as a prerequisite:

Structure: Three 50-minute lectures per week

Instructors: P. Dhagat

Course Content:

- Sensors & Signal Conditioning
- Resistive Sensors
- Signal conditioning for resistive sensors
- Inductive and Capacitive (Reactance) Sensor
- Signal conditioning for reactance sensors
- Self-generating sensors
- Additional signal conditioning

Measureable Student Learning Outcomes:

1. **Identify** sources of electrical and mechanical noise; and calculate total system noise.(ABET: b, e)
2. **Identify** sources of interference and calculate effect of interference on output signal. (ABET: b, e)
3. **Determine** the sensitivity and detectivity of sensor systems taking into consideration noise and interference. (ABET: b, c, k)
4. **Design** signal conditioning circuitry demonstrating knowledge of ways to mitigate interference, power supply fluctuations and discriminate signal. (ABET: b, c)
5. **Understand** various sensor designs published in literature -- (i) evaluate choice of sensor material, fabrication techniques, sensor layout (ii) understand the physics of operation (iii) evaluate signal to noise ratio (iv) identify application constraints (power, environmental conditions etc) (ABET: b, c, i, k)

Learning Resources:
Pallàs-Areny & Webster, *Sensors and Signal Conditioning* (2nd Edition)

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the

term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Link to Statement of Expectations for Student Conduct:
http://oregonstate.edu/admin/stucon/achon.htm