289C: Internet of Things: Introduction and Design  
Spring 2019

Lectures room: Location TBD, Date/Time: TBD
Office Hours & Location: TBD, Location TBD
Instructors (Co-teaching): Aykutlu Dana & Saif Islam
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Book(s): “Internet of Things – From Research and Innovation to Market Deployment”
Editors Ovidiu Vermesan, Peter Friess

“Designing for Internet of things”, O'Reilly Publishing

“Internet of Things Principles and Paradigms”, Editors Rajkumar Buyya, Amir Vahid Dastjerdi

Handouts (or class notes published on Web/Moodle), and a number of reference books for each topic.

Supplementary text: Gregory T. Kovacs, Micromachined Transducers Sourcebook

Grading: 

- Homeworks/Reading Assignments 20%
- Midterms 30%
- Laboratory 25%
- Final exam – Project presentation 25%

Prerequisite / Co-requisite: Basic knowledge of C or Python programming languages,
Basic Electronics (analog and digital)

Course Description: This course introduces fundamental concepts in the Internet of Thing, a driving element in the ongoing digital transformation. The course will include introduction to Sensors, Embedded Systems, Networking Protocols for massively connected sensor/actuator networks. The course has a laboratory section with significant hands on work and a final project presentation based on the laboratory work.
Tentative Course Syllabus:

**Week : 1**

**Week : 2**
Lab1: Analog Sensors

**Week : 3**
Microcontrollers for IoT Sensors: Embedded Systems, Resources and Processes, Power, Connectivity, Performance Interfacing Requirements,

**Week : 4**
Case Study: Arduino IDE and Sensor Interfacing
Lab2: Sensor and Actuator Interfacing

**Week : 5**
Networking and IoT: Layers, Protocols, IPV6, Connectivity (wired/wireless, Wi-Fi, cellular, ZigBee, LoRa, Bluetooth), Cloud and Fog computing, Security
Lab3: Bluetooth Connectivity of Sensor Interfaces

**Week : 6**
Programming tools, APIs, Python Programming, REST API

**Week : 7**
Case Study: Network Connected interfacing of Sensors

**Week : 8**
Application Domains and Scenarios
Lab4: Networked Sensing and interfacing

**Week : 9**
Final Project Presentations