IoT Fundamentals: Networking Technologies, Protocols, Analytics and Use Cases

ECE 697TR

(Fall 2019)

Class Hours: Tuesday, Thursday 8.30AM-9.45AM

Lecture Room: Marston Hall 15

Instructor: Prof. Aura Ganz (ganz@ecs.umass.edu)

Office: Knowles Engineering Building 309F

Office Hours: Tuesday and Thursday, 2.30pm-3.30pm

Teaching Assistants: TBD

URL: Moodle

Prerequisites: Graduate student, networking course and good programming skills.

Textbook: IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things 1st Edition, by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry. ISBN-13: 978-1587144561 Cisco Press; (June 23, 2017).

Course Contents and Objectives

In recent years, impressive developments of hardware, software and networking technologies enable their use in complex systems such as smart and connected cities, transportation, cars, manufacturing plants, utilities, etc. Such systems will be comprehensively monitored and controlled down to every component. These components (i.e., IoT devices) will collectively generate massive amounts of data supporting business decisions, increasing the systems reliability and safety as well as contributing to the population health.

Due to the very large number of IoT devices (billions), their limited computation, communication and power capabilities, and the vast amount of data they generate, new tools are required which are different from the ones used to build

the current Internet.

The main objectives of the course are:

1. To introduce a coherent framework for understanding IoT
2. To introduce IoT essential concepts and techniques
3. To introduce case studies of IoT systems that incorporate these concepts and techniques
4. To expose the students to new state-of-the-art research topics in IoT

Topics Covered

In this course we will introduce IoT fundamentals which include:

1) IoT architecture and design
2) Sensors and actuators
3) Networking technologies that interconnect IoT objects (topologies, standards, protocols)
4) Application protocols
5) Case studies.

Grading

- **Homeworks (20%)**
- **Paper presentations (20%)**
- **Final Project (60%)**

Accommodation Policy Statement

The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), Learning Disabilities Support Services (LDSS), or Psychological Disabilities Services (PDS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we may make appropriate arrangements.

Statement on Academic Honesty

It is expected that all students will abide by the Graduate Student Honor Code and the Academic Honesty Policy (available at the Graduate Dean's Office, the Academic Honesty Office (Ombud's Office). Sanctions for acts of dishonesty range from receiving a grade of F on the paper/exam/assignment or in the course, loss of funding, being placed on probation or suspension for a period of time, or being dismissed from the University. All students have the right of appeal through the Academic Honesty Board.