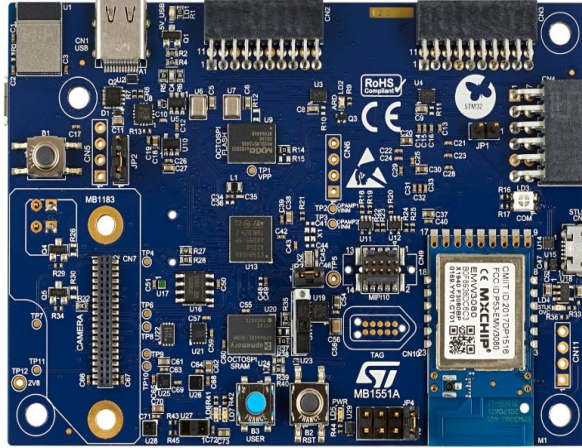# Engineering Design Summer Institute
E1IT: Internet of Things
Schedule and Course Details

STMicroelectronics Sensor Tile Internet of Things System

Course Logistics:

Time: M-F 9AM-4PM
Location: Engineering IV building, room 44-110
Instructor: Hooman Darabi (hooman@g.ucla.edu)
Teaching Assistant: TBA
Group Tutor: TBA
Course UCLA Bruin Learn

Course Description:

Welcome to UCLA! We very much look forward to the opportunity to present and work with you in the 2025 Engineering Design Summer Institute. Our mission is to provide you with an outstanding introduction to the most important new engineering opportunities with an emphasis on enabling your innovation. The development of our curriculum has been recognized internationally by many universities and professional engineers using our resources in all fields.

The new IoT (Internet of Things) thrust is one of the most important trends in technology today. IoT systems provide sensors and actuators in our global environment, on the scale of nations and cities, to individual buildings, homes, vehicles, and the rapidly expanding world of wearable

devices. Machine learning is one of the most important new innovations for engineering system design and development. It enables development of the first computational systems that autonomously learn and recognize specific events, conditions, and the characteristics of complex systems. The class will provide a rapid introduction to machine learning suitable for IoT systems that is inherently accessible and meaningful to precollege students. This is hosted *directly* on our IoT platform. Completion of hands-on engineering design projects, preparation of short report describing projects, and presentation of results are expected.

This is a Laboratory course emphasizing design and innovation, providing hands-on experience with IoT devices and enhancing your understanding of computing. We will be working with you in a laboratory on each class day. Our mission is to provide a rapid and in depth experience in the new fields of Internet of Things and Machine Learning. This also includes state of the art sensing as well as an introduction to digital signal processing. Our student graduates of this curriculum have been very successful and have found rewarding new directions for their early career. The course will culminate with the students submitting a final project accompanied with a report and a brief video presentation. The project is open-ended, where the students can innovate and implement their own version of the IoT system, for any relevant application. Each student will give a short live presentation of her/his work on the last day of the session.

Schedule:

The class meets every day, M-F from 9AM to 4PM, and consists of lectures, and lab activities. The lectures provided by the instructor cover various important topics pertaining IoT systems, such as introduction to microsensors, machine learning, and digital signal processing. The labs are supervised by the TA and mentors, where students get to perform hands-on activities on our IoT platform, and learn about the practical aspects of aforementioned topics in a real IoT system. The students are required to finish through 8 tutorials, followed by a final project accompanied with a report and a brief video presentation.

Week	Lecture/Lab
1	● Lecture: Introduction to Internet of Things ● Lecture: Introduction to Microsensors for IoT ● Lecture: Tutorials 1, 2, and 3 ● Lab: Tutorials 1, 2, and 3
2	● Lecture: Introduction to Machine Learning and Neural Networks for IoT ● Lecture: Tutorials 4, 5, and 6 ● Lab: Tutorials 4, 5, and 6
3	● Lecture: Introduction to Digital Signal Processing for IoT ● Lecture: Introduction to microprocessors for IoT ● Lecture: Tutorials 7, 8, and the final project ● Lab: Tutorials 7, 8, and the final project ● Video file demonstrating Final Submission ● Final Project Submissions

Required material:

A notebook computer (Apple Mac or Windows) is required for each class session. The IoT kit and the required accessories to connect to the notebook computers will be provided to the students at the beginning of the class, for them to keep. This is a laboratory course, and no textbook is required.

Grading:

This is a 2-unit course with letter grading, equivalent to UCLA's Engineering 1IT course. The breakdown of the final grade is as follows:

- 40% Completion of Tutorials
- 30% Final Project
- 15% Assignments
- 15% Attendance

Grades for the project will reflect not only the success of the project as a whole but also faculty/TA assessment of the contributions of the individual members

No midterm or final required.