

Introduction to Internet of Things

Course Overview

With more than 30 Billion connected devices expected by the end of 2020, the Internet of Things (IoT) is radically changing the technological landscapes. Applications opportunities are endless: home automation, healthcare, predictive maintenance, agriculture, energy management, or transportation are only some of those use cases. However, the Internet of Things is more than just sensors, it's a process ranging from remote data collection to data analytics in order to grasp the full potential of your data. This course offers an introduction to the IoT covering not only the theoretical background and current usages, but also providing practical knowledge through hands-on tutorials and workshops. Students will gain expertise on the whole IoT process.

Course Outline

This 5-day (21 hours, 6 sessions) course will be delivered face-to-face.

Session 1 (1:00pm-4.30pm, Thursday, 5 May 2022) — What is the Internet of Things and why should we care?

- Introduction
- Defining the Internet of Things: history, technologies, trends, impacts, and business opportunities
- IoT networks, protocols, and interoperability

Session 2 (1:00pm-4.30pm, Friday, 6 May 2022) — Workshop

- Introduction to sensors
- Introduction to IoT development kits: Arduino, LoPy, Raspberry Pi
- A first experiment: Building your first sensor and visualize data

Session 3 (1:00pm-4.30pm, Thursday, 12 May 2022) — LoRaWAN and The Things Network

- Real-world applications (SMART Pedestrians, SMART Storm waterways management)
- Achieving Long Range and Low Power data transmission
- LoRaWAN Architecture
- The Things Network – A free to use and open LoRaWAN network

Session 4 (1:00pm-4.30pm, Friday, 13 May 2022) — Workshop

- Tutorial/Workshop: Connecting your sensors to The Things Network
- Managing payloads: Encoding and decoding messages
- Tutorial: Connecting your sensor to the cloud and building your first dashboard with Cayenne

Session 5 (9:00pm-12:30pm, Thursday, 19 May 2022) — Dashboards and building advanced applications

- Publishing data: MQTT
- Introduction to Node-Red
- Interfacing Arduino with Node-RED
- LoPy4 MQTT – Publish & Subscribe

Session 6 (1:00pm-4.30pm, Thursday, 19 May 2022) — Small project / Assignment

- Graphically build your IoT Application with Node-Red

Course Benefits

By the end of this course, you will be able to:

- Understand the Internet of Things and its applications
- Discover hardware for the Internet of Things
- Know the different network protocols for the Internet of things
- Have extended knowledge on LoRaWAN
- Deploy and connect sensors to the Things Network
- Build IoT applications

Course Type

Introductory course: introducing concepts, methods or tools to relevant students or professionals.

Course Pre-Requisite

Basic knowledge of Computer Science and programming is preferred but not required.

Assessment

A small IoT project will be given, and individual report needs to be submitted upon completion of this course. The goal of this assignment is to detail at a high-level an original IoT solution to solve a real-world problem.

Course Conveners



Dr. Yan Li

Dr Yan Li is a research fellow at SMART. She completed her PhD in the Department of Electrical and Electronic Engineering, University of Melbourne. Her research interests include wireless sensor networks, mobile computing, indoor localization, Internet of Things (IoT) applications.



Dr. Adrian Xiao

Dr. Adrian Xiao received his PhD degree in Electronic Engineering from The University of Queensland. Dr. Xiao joined SMART as a research fellow since 2022. Prior to that, he was a FPGA hardware engineer working for industry for 4 years. He has broad experience in nano-satellite design and communication, interface/protocol architecture design, video algorithm implementation, hardware acceleration and FPGA based architecture optimization.

Location

Computer Lab, Ray Cleary building, the University of Wollongong Shoalhaven Campus.

Fee and Discount

The standard registration fee for this course is \$1,800. However, discount codes are available for the following:

- 10% discount for UOW staff, students and alumni
- 10% discount for 2 or more course enrolments from the same person
- 10%, 15%, 20% discount for group booking with 5-9, 10-15 and 15+ enrolments, respectively, from the same organisation.

Contact

For any inquiry please contact:

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