

Module Synopses

Semester One

Smart City System Design

Students will gain understanding of the pervasive connectivity and architecture needed in smart nation and smart city ecosystems. Topics covered include networking technologies and protocols, smart city architecture and infrastructure, network and systems security, case studies and examples of smart city ecosystems worldwide. Emphasis will be on IDA's Smart Nation Platform, including the AG Box, wireless sensor network, and the Smart Nation OS. Part of this module will consist of a mini-project where students will make use of Design Thinking methodology to scope out a smart city project. This project will be developed over the modules of the entire course.

Cloud Computing & Analytics

Students will gain practical knowledge on setting up Cloud Computing-related infrastructure, with emphasis on big data collection and storing from smart sensors. Students will also be introduced to various data mining tools, data processing techniques and algorithms used for the analysis and visualization of the collected data stored on both local and public cloud servers. As part of a mini-project, students will apply the knowledge gained to build a functional prototype system that is able to store and analyse data. This system will be used in subsequent modules to realise their smart city project.

Semester Two

Sensors & Communication Technologies

Students will gain an understanding of the microcontroller, sensor and actuator technologies, as well as various communication (especially wireless communication) protocols. Topics include basic microcontroller concepts, interfacing microcontroller with various sensors, actuators and communication devices (both hardware connection and microcontroller programming will be covered), fundamentals of wireless communications, and common communication protocols such as Bluetooth, Zigbee, WLAN, GPS, LTE 4G and HetNet. Applying what they have learned, students will integrate sensors and smart devices to the cloud and analytics system for data storage, analysis and control in order to realise their smart city project.

Mobile Application Development

Students will learn the architecture of smart mobile platform and gain a hands-on experience on how to develop a mobile application. Topics include mobile application development, using application program interfaces (APIs) to retrieve data from local database and public data stores and send data to the cloud, controlling devices remotely over the Internet using web services, and mobile UX design. Students will apply what they have learned to further develop their smart city project by storing and viewing data from the cloud and analytics system, and controlling the smart devices developed other modules.