Major Programme:	Master of Science in Microelectronics & Master of Philosophy in Microelectronics				
Course Type:	☐ CM – Compulsory Major ☑ RE – Required Elective	☐ L&S – Languages and Skills ☐ CPE – Community and Peer Education	☐ * GE – General Education	☐ MI – Minor ☐ FE – Free Elective	
Course Title: (in Chinese and English)	Microelectronics for the Internet of Things 用於物聯網中的微電子		Suggested Year of Study:	Year 1	
Duration:	☑ Semester Course	☐ Yearly Course	Credit Units:	3	
Grading System:	☑ Letter Grade	☐ P/NP	Pre-requisite: (if any)	None	
Medium of Instruction:		English			

Course Description:

As enabled by the powerful technology, mircoelectronics have become essential in our daily lives. They are also used in a wide range of fields such as healthcare, environmental monitoring, robotics or entertainment etc. This introductory course in microelectronics is tailored for the Internet of Things (IoTs), which teaches how to use mircoelectronic circuits interacting with the environment through sensors and communicate wirelessly with the other devices. It covers topics from evaluation and implementation of sensor interface, data conversion, signal processing and device communications. This customized course from bottom-up based, which starts from introducing the fundamental building blocks in microelectronics for the IoT. Then, followed by system and architectural interface considerations. Finally, the students have chance to realize a basic IoT system based on available microelectronic module. The course aims to give a basic idea of the key microelectronic building blocks for the IoT application. The students will have a hands-on experience through practical design examples and case studies with available microelectronic module.

Intended Learning Outcomes (ILO):

This course enables students to have:
- To introduce the essential knowledge in basic building blocks and system of IoT system.
- To introduce practical considerations of IoT system, especially emphasized on wireless communction and its essential chipsets.
- To teach students with hands on experience on verifying and designing IoT system with exisiting modula.

Major Assessment Methods:	Case Study	Role Playing	Student Presentation	Individual project / paper	Group project / paper	Group discussions	Writing Assignment	Exercises & problems	Service learning	Internship	Field study	Company visits	Reading & Writing Assessments / tests	Listening & Oral Assessments / tests	Others (please specify)
Class Participation / Discussion _____10___ %								√							
Assignment(s) ____10___ %								√							
Test(s) _____20___ %								√							
Examination ____20___ %								√							
Others: Project _____40___ %			√	√											

Course Content:
(topic outline)

- Introduction: basic IoT concepts, IoT pass-now-and future, application examples.
- IoT system overview: hardware and architectural considerations
- Sensor interface building block evaluation and function: Voltage and current domain interface, sensor non-ideality.
- Data conversion building block and function: Input interface circuit, Nyquist theory, Quantization theory, Aliasing theory.
- Signal processing technique and device communication protocol: synchronous and asynchronous processing. Low energy data transmission protocol introduction.
- Practical labs: sensor, data converter and signal processing module function testing. IoT systems implementation and analysis.