

MODULE DESCRIPTOR

Module Title

Internet of Things

| | | | |
|-----------|---------------|-------------|--------|
| Reference | CM2110 | Version | 2 |
| Created | December 2020 | SCQF Level | SCQF 8 |
| Approved | June 2018 | SCQF Points | 15 |
| Amended | March 2021 | ECTS Points | 7.5 |

Aims of Module

To enable students to design and implement simple, integrated systems, using low cost embedded hardware and software development tools that implement common interface standards, that can process data acquired from sensors, reacting to this data or transferring the data across the internet.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Explain the key concepts of the Internet of Things and its enabling Technologies.
- 2 Identify the I/O and interface capabilities of a typical, low-cost single board computer systems.
- 3 Describe and discuss recent and evolving developments, protocols and technologies.
- 4 Design and build a simple sensor network based on Internet of Things Technology.

Indicative Module Content

Basic concepts of the Internet of Things and its enabling technologies. Students will be exposed to various techniques and approaches to developing software for embedded, restricted and interconnected systems. Approaches to hardware and software interfacing with sensors, displays and cloud based data collection and visualisation. Developing sensor systems for environmental, system or behaviour monitoring.

Module Delivery

Key concepts are introduced and illustrated through lectures and directed reading. The understanding of students is tested and further enhanced through interactive tutorials. In the laboratories, the student will progress through a sequence of exercises to develop sufficient knowledge and skills in Internet of Things development.

Indicative Student Workload

| | Full Time | Part Time |
|--|-----------|-----------|
| Contact Hours | 30 | N/A |
| Non-Contact Hours | 120 | N/A |
| Placement/Work-Based Learning Experience [Notional] Hours | N/A | N/A |
| TOTAL | 150 | N/A |
| <i>Actual Placement hours for professional, statutory or regulatory body</i> | | |

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

| | | | | | |
|--------------|--|------------|------|--------------------|------------|
| Type: | Coursework | Weighting: | 100% | Outcomes Assessed: | 1, 2, 3, 4 |
| Description: | A coursework including the design and implementation of an IoT system. | | | | |

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

An overall minimum grade D is required to pass the module.

| Module Grade | Minimum Requirements to achieve Module Grade: |
|--------------|--|
| A | The student needs to achieve an A in C1. |
| B | The student needs to achieve a B in C1. |
| C | The student needs to achieve a C in C1. |
| D | The student needs to achieve a D in C1. |
| E | The student needs to achieve an E in C1. |
| F | The student needs to achieve an F in C1. |
| NS | Non-submission of work by published deadline or non-attendance for examination |

Module Requirements

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|--------------------------|-------|
| Prerequisites for Module | None. |
| Corequisites for module | None. |
| Precluded Modules | None. |

INDICATIVE BIBLIOGRAPHY

- 1 Colin Dow. Internet of Things Programming Projects: Build modern IoT solutions with the Raspberry Pi 3 and Python Paperback. Packt Publishing. 2018
- 2 Gary Smart. Practical Python Programming for IoT: Build advanced IoT projects using a Raspberry Pi 4, MQTT, RESTful APIs, WebSockets, and Python 3. Packt Publishing. 2000
- 3 Cox, Tim; Fernandes, Steven Lawrence. Raspberry Pi 3 cookbook for Python programmers : unleash the potential of Raspberry Pi 3 with over 100 recipes. Packt Publishing. 2018
- 4 Batalla, Jordi Mongay; Mastorakis, George; Mavromoustakis, Constandinos X.; Pallis, Evangelos. Beyond the Internet of Things : everything interconnected Springer. 2017
- 5 Buyya, Rajkumar; Dastjerdi, Amir Vahid. Internet of things : principles and paradigms. Cambridge, MA 2016