

## Module: Internet of Things 251

<b>Module name:</b>	Internet of Things 251
<b>Code:</b>	IOT251
<b>NQF level:</b>	6
<b>Type:</b>	Elective – Diploma in Information Technology (all stream)
<b>Contact Time:</b>	34 hours
<b>Structured Time:</b>	6 hours
<b>Self-directed Time:</b>	40 hours
<b>Notional hours:</b>	80 hours
<b>Credits:</b>	8
<b>Prerequisites:</b>	WPR251, PRG151

### Purpose

This course is an introduction to developing and deploying solutions for the Internet of Things (IoT). It will focus on capturing data from a trusted device and sending the data to a cloud platform where it can be exploited by the many services available. It will explore all the steps required to create a basic IoT solution using popular embedded devices like the Raspberry Pi, and cloud-based IoT Platforms like the IBM Watson, Bluemix. It assumes basic programming skills and scripting language proficiency.

### Outcomes

Upon successful completion of this module, the student will be able to:

- Demonstrate detailed knowledge of an application development environment that engages IoT, on both the device and the cloud.
- Identify and analyse IoT security and privacy risks, and concept design secure hardware and software.
- Create a basic IoT solution by leveraging pre-built blocks of code that abstracts and speeds the development process.
- Create applications that leverage connectivity and analytics as part of an integrated IoT platform.
- Use APIs to access the platform and explore the different connectivity options for various devices, gateways and applications.
- Explore options to ensure solutions makes best use of the captured data and interfacing with peripherals, using knowledge of interfacing standards.
- Produce a viable IoT concept design that solves a problem, is ready to prototype and test, and has an identified route to market.
- Work effectively in a team or group, and to take responsibility for his or her decisions and actions and the decisions and actions of others within well-defined contexts, including the responsibility for the use of resources where appropriate.

### Assessment

Assessment is performed using a variety of instruments:

- Continuous evaluation of theoretical work through a formative and a summative test.

- Continuous evaluation of project work, whereby the student must design a viable IoT concept that solves a problem and is ready to prototype and test
- Final assessment through a written examination.

## Teaching and Learning

### Learning materials

- Lecturer hand-outs and samples.
- Internet of Things (2019)- IT without Frontiers Series

### Additional Reference Material:

McManus S, Cook M, (2014). *Raspberry Pi for Dummies 2<sup>nd</sup> Edition*, For Dummies Series. [ISBN-9781118904916]

Heath S. (2012). *Embedded systems design 2<sup>nd</sup> Edition*, [ISBN-9780080477565]

### Learning activities

The teaching is a combination between presentation of theoretical concepts and exercises and discussions. It is dialogue-oriented with a practical approach, with a mandatory project which must be completed during the course.

### Notional learning hours

Activity	Units	Contact Time	Structured Time	Self-Directed Time
Lecture		27.0		13.0
Formative feedback		3.0		
Project	1	4.0		9.0
Assignment	1			3.0
Test	2		4.0	8.0
Exam	1		2.0	7.0
		<b>34.0</b>	<b>6.0</b>	<b>40.0</b>

### Syllabus

- Introduction to the internet of Things
- Trends and characteristics in the IoT field
- Rapid application development in the cloud
- Rapid application development on the device e.g. Raspberry Pi
- Lower level programming of IOT