Module: Internet of Things 281

Module name:	Internet of Things 281
Code:	IOT281
NQF level:	6
Type:	Elective – Bachelor of Computing (all streams)
Contact Time:	34 hours
Structured Time:	6 hours
Self-directed Time:	40 hours
Notional hours:	80 hours
Credits:	8
Prerequisites:	WPR281, PRG181

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.
- The assignments or projects collectively will count 30% of your class mark.
- All tests will collectively account for 70% of your class mark.
- Your class mark contributes 30% towards your final mark for the subject, while the final assessment accounts for 70% of your final mark.

Teaching and Learning

Prescribed books

- 🕮 Arduino Projects Book (2012) under Creative commons license

Additional material

- 🕮 McManus S, Cook M, (2014). Raspberry Pi for Dummies 2nd Edition, For Dummies Series. [ISBN-9781118904916]
- 🕮 Heath S. (2012). Embedded systems design 2nd Edition, [ISBN-9780080477565]
- 🕮 Stewart Becky, Adventures in Arduino [ISBN-9781118948477]

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 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		3.5		
Project	1	3.5		9.0
Assignment	1			3.0
Test	2		4.0	8.0
Exam	1		2.0	7.0
		34.0	**6.0**	**40.0**

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