Unit Title	Internet of Things (Iot) and Cloud Computing (blended)
FHEQ Level	Level 5
Unit Code	CLC20206
Credit Value	30
Unit Type	Subject

Learning Hours (Blended)			
Staff – Student Contact Hours		**Independent Study Hours**	
Classes	45	Independent study	175
Supervised access to Ravensbourne resources	30	Preparation for assessment	50
Total		300	

Unit Description

It is becoming common for someone to turn their lights on or off from a remote location with the help of internet enabled Bulbs and a mobile device.

Low cost networked devices work as ears and eyes with the help of sensors and the internet. These devices are connected to cloud based servers capable of processing large amounts of data generated by hundreds and thousands of these devices.

This module covers the context and history of the (Internet of Things) IoT, hardware, communication protocols and security systems it relies on, and the cloud-side analytics that make sense of the data produced. It gives practical hands-on experience of common IoT devices (sensors, actuators, microcontrollers), and look at a range of commercial platforms. Students will have access to sensors and programable microcontrollers that can be converted to IoT devices.

Internet of Things is gaining popularity amongst normal consumers and also the Industry. IoT devices are able to communicate and transfer data with a Unique Identifier (UID) with very low power consumption and minimal digital processing powers.

There is no single definition of IoT as its uses are so wide ranging that it is difficult to encapsulate it to one application or technology.

Students will be working on some exciting projects during this unit which may involve sensor data acquisition and storage in a cloud server. Students will also look at the ethical perspective on smart devices such as smart watches, sharing of data with the cloud service provider and their potentials uses/misuses.

The Five Principles underpin the Mindsets and Skillsets Manifesto and are the foundation

upon which all course curriculum frameworks and unit specifications are based. The relevant Principles as stated below have been mapped against the Learning Outcomes relevant to each course unit and at each level (see Programme Specifications for full description of the Five Principles):

1. Cultivate / Where the individual thrives.
2. Collaborate / Where disciplines evolve.
3. Integrate / Where education engages industry.
4. Advocate / Where purpose meets practice.
5. Originate / creativity meets technology.

Unit Indicative Content

IoT and the Cloud

Industry-wide Knowledge

- IoT introduction
- Arduino and Raspberry Pi
- Iot Sensors
- Data acquisition and storage on local device
- Data storage on cloud server
- Security implication of local and cloud storage
- Uses of IoT in the industry
- Edge Computing
- Cloud Analytics
- Computer Networks and Wi-Fi
- Wired and wireless sensors
- Using Python for automation

AWS knowledge areas

- AWS Industrial IoT Solutions
- AWS Connected Home Solutions
- AWS Miovision
- Analytics
- Connectivity and Control Services
- Device Software
- Intelligent solutions

Unit Aims
1. To evaluate how IoT devices work and what could be the associated security implications
2. To design and Develop a cloud based or independent IoT solution to solve a problem
3. To critically evaluate available IoT technologies and their uses in consumer products
4. To critically evaluate the uses of IoT in the industry and what benefits they bring

Unit Learning Outcomes
LO 1 Research/Inspiration Analyse and interpret information gathering techniques using a wide range of sources, providing visual, contextual and industry case-study research as appropriate. Related Principle: ORIGINATE
LO 4 (Pre) Production Employ relevant knowledge of production skills alongside a grasp of the creative potential of a selection of processes, materials and methods that inform creative and academic practice. Related Principle: COLLABORATE
LO 6 Critical and creative mindsets Analyse conceptions of diverse practice and use this to inform a course of action Related Principle: ORIGINATE
LO 7 Employability Demonstrate professional transferrable and employability skills, including the ability to manage time and work to clear briefs and deadlines, respond to set goals, and communicate effectively. Related Principle: CULTIVATE

Learning and Teaching Methods
This unit will be delivered using a combination of: ● Lectures / Seminars ● Online activities ● Self-directed independent study ● Peer learning, group discussion, guest speakers

Assessment methods and tasks	
Assessment tasks	**Weighting (%)** *(one grade or multi-grade unit)*
Portfolio	40%
Individual or (Group of 2) Presentation of the artefact.	60%

Indicative Assessment Criteria

Develop an IoT solution based on your interest, given case study or a real world problem and answer the following:

Evaluate the operation of your selected IoT devices and what could be the associated security implications (LO1)

Evaluate specific forms of IoT architecture and justify their use when designing software applications. (LO1)

Select an appropriate IoT framework, tools, hardware and API techniques to include in your application to solve a problem. (LO4)

Evaluate the success of your solution and any risk factors associated with it (LO7)

Critically evaluate available IoT technologies and their uses in consumer products (LO6)

Critically evaluate the uses of IoT in the industry and what benefits they bring (LO7)

Essential Reading list

"Overview of Internet of Things Solutions Google Cloud." Google, Google, https://cloud.google.com/solutions/iot-overview.

Cox, Tim, et al. Getting Started with Python for the Internet of Things: Leverage the Full Potential of Python to Prototype and Build IoT Projects Using the Raspberry Pi. Packt Publishing, 2019.

Recommended Reading List

Gupta, Aditya. The IoT Hacker's Handbook: a Practical Guide to Hacking the Internet of Things. Apress., 2019.

Kurniawan, Agus. Internet of Things Projects with ESP32: Build Exciting and Powerful IoT Projects Using the All-New Espressif ESP32. Packt Publishing Ltd, 2019.

Kurniawan, Agus. Raspbian OS Programming with the Raspberry Pi: IoT Projects with Wolfram, Mathematica, and Scratch. Apress, 2019.

Seneviratne, Pradeeka. Beginning LoRa Radio Networks with Arduino: Build Long Range, Low Power Wireless IoT Networks. Apress, 2019.

Further reading and resources may be identified in your Project Brief.