Unit Title	Boxes, Code and Networks
FHEQ Level	Level 5
Unit Code	EUSE182
Credit Value	15
Unit Type	Elective

Learning Hours

Staff – Student Contact Hours		Independent Study Hours	
Classes	37.5	Independent Study	60
Supervised access to resources		Preparation for Assessment	15
		Unsupervised Access to Resources	22.5
Total			**150**

Unit Description

This unit examines the role and impact of connected devices, digital products and data networks in society and for industry. You will create your own networked machines, deployable computers, remote sensors that make use of web and cloud services and application programming interfaces (API's). Project outcomes will provide services in new contexts, developing new combinations of services to create new opportunities or solve existing problems, and fundamentally complete tasks for personal or industry use cases. (Originate Principle)

This unit introduces basics on communication protocols and information architecture as well as developing data-driven products. Identifying opportunities and problems, users and their needs through user, stakeholder and technological research and analysis is a key activity in focusing the unit outcome. This is a hands-on unit which requires equal parts engagement on contextual issues, technical skill acquisition, and design consideration, to develop a successful outcome. You will deliver functioning outcomes which may be market-focused prototypes with users and scalability in mind or outcomes that serve to highlight and speculate on the implications of connected devices. (Integrate Principle)

The wider context of the Internet of Things (IoT) will be analysed and critiqued from a technological, business and societal point of view, balancing the potential positive and damaging impacts concerning privacy, safety, mental wellbeing, physical health. (Collaborate Principle)

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

- Context of IoT devices in terms of personal, societal and business impact
- Physical computing
- Communication protocols
- How to use APIs and cloud services
- Design of objects, shrouds, housings
- Design for user experience through screen graphics and tactile interfaces

Develop innovative concepts for IoT

Develop innovative concepts for IoT

Create functioning prototypes for connected devices

Gain knowledge on code and software needed to connect physical computing hardware to networked data systems

Gain skills in designing for user interface and physical objects using appropriate software, tools and materials

Increase awareness of impacts and implications of creating connected devices

Understand entrepreneurial and business opportunities of these skills and thinking

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 3 Development/Prototyping

Analyse a range of potential pathways that result in appropriate solutions, informed by an understanding of the principles of the creative process.

Related Principle: INTEGRATE

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

Learning and Teaching Methods

Briefings
Lectures
Project work

| Seminars |
| Workshops |
| Group work |
| Online activity |
| Individual Presentations and critiques |
| Self-directed independent study |

Assessment methods and tasks

More detailed assessment tasks will be specified in the brief.

Assessment tasks	Weighting (%) *(one grade or multi-grade unit)*
Portfolio of work with supporting physical and digital material detailing project research, process and development.	Unit assessed holistically (100% of unit) **(pass/fail)**

Indicative Assessment Criteria

Assessment criteria are the basis on which the judgment of the adequacy of the work is made. A more detailed assessment criteria will be specified in the brief.

- Provide evidence of innovation in the development of concepts for IoT (L01, L03, L04)
- Show an ability to create prototypes for connected devices (L03, L04)
- Show an understanding of code and software systems needed to connect physical computing hardware to networked data systems (L03, L04)
- Evidence skills in designing for user interface and physical objects using appropriate software, tools and materials (L03, L04)
- Show an increased awareness of impacts and implications of creating connected devices (L01)
- Show an understanding of entrepreneurial and business opportunities (L01)

Essential Reading list

1. Barabási, Albert-László (2003) *Linked : how everything is connected to everything else and what it means for business, science and everyday life*, London: Plume
2. Igoe, Tom (2011) *Making things talk,* Farnham: O'Reilly
3. McEwen, Adrian (2014) *Designing the Internet of Things*, Chichester: Wiley
4. Shepard, Mark (2011) *Sentient city: Ubiquitous computing, architecture, and the future of urban space,* Cambridge, MA: MIT Press