Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: IOT IN SMART ENERGY SYSTEMS

Unit ID: ENGPG9208

Credit Points: 15.00

Prerequisite(s): (ENGPG9202)

Co-requisite(s): Nil

Exclusion(s): (ENGRG9205)

ASCED: 031301

Description of the Unit:
This unit provides in-depth exposure to the application of the Internet of Things (IoT) in the development of smart energy systems focusing on appliances and their remote control. Management of home and neighbourhood energy needs is covered with detailed discussions on the operations and interconnections between sensors and network protocols. Studnets will learn the cybersecurity principles and issues associated with the application of IoT in energy systems.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory						
Intermediate						

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Advanced					✔	

Learning Outcomes:

Knowledge:

K1. Explain detailed descriptions of the main components of IoT-based electrical energy systems.

K2. Classify key technologies that form home and neighborhood area management systems.

K3. Discern the principles of scalability, low communications, and network control overheads, requirements for voltage and flow control.

Skills:

S1. Synthesize, construct and critically evaluate smart IoT-based smart electrical energy systems.

S2. Assess the interconnections between sensors and protocols for management of HAM (Home Area Management) and NAM (Neighbourhood Area Management) systems.

S3. Evaluate solutions to problems associated with IoT based smart electrical energy systems.

Application of knowledge and skills:

A1. Interpret energy flow control models to extract desirable features.

A2. Apply industry-standard software analysis tools to simulate and study the characteristics and behaviour of smart electrical energy systems.

A3. Investigate different challenges associated with the use of IoT in smart electrical energy systems.

Unit Content:

Topics may include:

- Energy flow control models
- Centralised and decentralised transactive energy
- Key technologies for HAM (Home Area Management) and NAM (Neighbourhood Area Management) systems
- Smart transducer and sensor standard
- IoT protocols
- Cybersecurity

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K3, S1, S3;	Quizzes to test the understanding of the students on the subjects and help in the gradual development of knowledge and skills throughout the unit. Questions and problems related to the materials covered in the unit.	Quizzes	10% - 30%
K2, S1, S2, A2, A3, S3	Projects to verify students` ability to apply knowledge and skills acquired in the unit.	Team Project and presentation	30% - 50%
S3, K3, A1, A3	Conceptual questions and numerical problems related to the materials covered in the unit.	End of the Semester Final Test	20% - 40%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool