Course Outline (Higher Education)

Institute / School: Institute of Innovation, Science, and Sustainability

Course Title: IOT IN SMART ENERGY SYSTEMS

Course ID: ENGIN5101

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 031301

Description of the Course:
This course 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. You 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)

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate					✔	
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.

Course 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

Values:

V1. Appreciate and apply safe practices in an environment that may contain potential electrical hazards along with the applicable standards and grid codes.

V2. Appreciate learning as a lifelong process and the importance of the application of IoT in smart energy electrical systems.

Graduate Attributes

The Federation University Federation graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor	Development and acquisition of GAs in the course	
	Learning Outcomes (KSA)	Assessment task (AT#)

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		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1, K2, K3, S1, S2, S3, A1, A2, A3	1, 2, 3
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	K1, K3, S1, S2, S3, A2	1, 2, 3
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	K1, K2, S3, A3	1, 2, 3
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K3, S3, A1	1, 2
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	K1, K2, S1, S3, A3	1, 2, 3

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1, K3, S1, S3;	Relevant tasks and problems to enforce understanding of the students and help in the gradual development of knowledge and skills throughout the course. Questions and problems related to the materials covered in the course.	Quizzes/Assignments/Mid-semester Test/Online Test	20% - 30%
K2, S1, S2, A2, A3, S3	Projects to verify students' ability to apply knowledge and skills acquired in the course.	Team Project/Report/Presentation	20% - 40%
S3, K3, A1, A3	Conceptual questions and numerical problems related to the materials covered in the course.	End of the Semester Final Test	30% - 50%

Adopted Reference Style:

Other (IEEE)

Refer to the library website for more information

Fed Cite - referencing tool