



Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Microgrids and Energy Storage System

Unit ID: ENGRG9206

Credit Points: 15.00

Prerequisite(s): (ENGRG2204)

Co-requisite(s): Nil

Exclusion(s): (ENGIN5102)

ASCED: 031301

Description of the Unit:

This unit provides an in-depth knowledge and understandings of micro-grid and smart-grid technologies along with their design and implementation strategies. The unit further introduces energy storage systems and provides a broad understanding and appreciation of the scientific principles that underpin the operation of such 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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:
Knowledge:

- K1.** Identify the main components of a micro-grid and discern the differences between micro-grid and smart-grid systems.
- K2.** Recognise the key standards and salient operational characteristics of micro-grid and smart-grid systems.
- K3.** Explain the scientific and conceptual principles underpinning the operation of energy storage systems and key characteristics which inform their selection for use.

Skills:

- S1.** Design micro-grids and smart-grids to meet specified criteria and performance standards.
- S2.** Conduct fault analysis specific to micro-grids and smart-grids.
- S3.** Evaluate and assess solutions to problems associated with a variety of energy storage systems in micro-grids.

Application of knowledge and skills:

- A1.** Apply industry standard software analysis tools to simulate and study characteristics and behaviour of micro-grids and smart-grids.
- A2.** Interpret and appraise different challenges associated with micro-grids and smart-grids.
- A3.** Develop and analyse the key objectives and applications of energy storage in electrical networks.

Unit Content:

Topics may include:

- Introduction to micro-grid
- Micro-grid - components, standards, applications, operations
- Use of micro-grid as smart-grid
- Smart-grid - standards, control, communication, cyber security and energy management
- Smart metering
- Energy storage systems - background, application and objectives
- Overview and study of different energy storage systems which can include, electrical, chemical, mechanical, electrochemical, thermochemical, thermomechanical, etc.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, S1, S3, A2, A3	Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the unit.	Assessments, quizzes	10% - 30%
K1 - K3, S1 - S3, A1 - A3	Experimental/simulation work to verify students' ability to apply knowledge and skills acquired in the unit.	Report, oral or written explanatory tasks.	10% - 30%
K1-K3, S1-S3, A2	The test or exam tests analytical and critical thinking and a general understanding of the unit materials.	Test or exam	40% - 60%

Adopted Reference Style:

IEEE

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)