Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Power System Analysis

Unit ID: ENGRG3201

Credit Points: 15.00

Prerequisite(s): (ENGRG2205)

Co-requisite(s): Nil

Exclusion(s): (ENGIN3102)

ASCED: 031301

Description of the Unit:
This unit provides an introduction to power system engineering fundamentals covering methods of power system analysis and design. Students will learn about the modelling of transmission lines for steady-state and transient conditions, balanced and unbalanced power system fault analysis, the basic power quality indices, and power quality analytical techniques.

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						
Advanced			✔			

Learning Outcomes:

Knowledge:

K1. Identify the importance of power system control and the behaviour of major types of components used in power systems.

K2. Discern the variety of power system component models using the appropriate model and mathematical notation

K3. Explain the concept of economic dispatch and the importance and relevance of this in the context of power system analysis.

Skills:

S1. Assess the performance characteristics, dynamics and stability of power systems.

S2. Evaluate complex load flow problems of large power systems with appropriate models of transmission line, transformer, generator and loads.

S3. Investigate surge propagation and circuit interruption theories and circuit breaker operation on reliable insulation and protection of electrical networks.

Application of knowledge and skills:

A1. Investigate different types of faults in power systems.

A2. Interpret the different challenges associated with quality in power systems.

A3. Apply software tools to simulate and study characteristics and behaviour of power systems.

Unit Content:

Topics may include:

- Power system analysis - concepts and representation
- Modelling circuit of power system components including transformers, generators, transmission lines and loads
- Steady-state and dynamic behaviour of power systems
- Network matrices and power flow analysis
- Power system fault calculations
- Surge propagation
- Power system stability and control
- Power system protection principles
- Economic dispatch

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1 - K2, S1, S2, A1, A3	Relevant tasks and problems to enforce understanding of the students and help in the gradual development of knowledge and skills throughout the unit. Experimental work and/or projects to verify students' ability to apply knowledge and skills acquired in the unit.	Simulation Lab and presentation	20% - 40%
K1 - K2, S2, A3	Questions and problems related to the materials covered in the unit.	Mid-semester Test	20% - 30%
K3, S1, S3, A2	Conceptual questions and numerical problems related to the materials covered in the unit.	End of Semester Final Test	30% - 50%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool