



# Unit Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science & Sustainability
<b>Unit Title:</b>	Power System Protection
<b>Unit ID:</b>	ENGRG3202
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	(ENGRG3201)
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	(ENGIN3103)
<b>ASCED:</b>	031301

## Description of the Unit:

This unit extends learning of power system analysis to provide in-depth knowledge and understanding of power system protection. Students will be introduced to instrument transformers, fundamentals of relaying, overcurrent protection and coordination, directional overcurrent protection, differential protection, distance protection, and distributed generation protection. The development and challenges related to the field of power system protection will be covered by linking theory to real industry examples.

**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.** Demonstrate and justify the choice, application, and operation of different protection devices for fulfilling power system protection under different operating conditions.
- K2.** Recognise the requirement of various protection schemes for the proper operation of the power system.
- K3.** Identify different protection devices and their impact on protection scheme performance.

#### Skills:

- S1.** Synthesize different (overcurrent, directional overcurrent, differential, distance) protection systems.
- S2.** Evaluate performance of different protection systems.
- S3.** Estimate key parameters that influence the design of typical protection systems.

#### Application of knowledge and skills:

- A1.** Interpret power system faults for balanced and unbalanced conditions.
- A2.** Apply the fundamental principles of power system protective devices for various applications.
- A3.** Investigate different challenges associated with power system protection.

#### Unit Content:

Topics may include:

- Fundamental protection concepts and protection schemes for various power system configurations
- Fault current calculations
- Protection devices
- Instrument transformers (CTs and VTs)
- Distance protection, protection signalling
- Protection of generators, transformers, transmission lines, busbars, feeders.
- Development and challenges in the field of power system protection

#### 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 the gradual development of knowledge and skills throughout the unit	Quizzes	30% - 40%
K3, A1, A2	Questions and problems related to the materials covered in the unit.	Mid-semester Test	20% - 40%
S3, A1, A3	Conceptual questions and numerical problems related to the materials covered in the unit.	Project and presentation of the project work	30% - 40%

#### Adopted Reference Style:

IEEE

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

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