



Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Electrical Machines Fundamentals
Unit ID:	ENGRG2205
Credit Points:	15.00
Prerequisite(s):	ENGRG1004
Co-requisite(s):	Nil
Exclusion(s):	ENGIN2404
ASCED:	031301

Description of the Unit:

This unit provides a broad overview of electrical and electronic drives and allows students to learn about machinery fundamentals and principles, transformers and AC / DC motors and generators. The unit also covers the fundamental concepts of power electronics and explains its application in motor control.

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"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

On successful completion of the unit the students are expected to be able to:

Knowledge:

- K1.** Explain electric machinery principles in describing operations and characteristics of transformers, motors and generators.
- K2.** Describe power electronics application to electronic motor control.
- K3.** Explain operations and principles of single phase special purpose motors.
- K4.** Differentiate between different machinery and their applicability to execute a specific task

Skills:

- S1.** Calculate machine power and performance parameters.
- S2.** Draw circuit equivalence for relevant transformers, motors and generators.
- S3.** Design and select suitable power electronics control element for motor control.

Application of knowledge and skills:

- A1.** Determine a suitable machinery for a particular engineering system operating under certain conditions.
- A2.** Design and construct an electronic motor controller.

Unit Content:

Topics may include:

- Introduction to machinery principles
- Transformers
- Introduction to power electronics
- AC and DC machinery fundamentals
- Synchronous motors and generators
- DC motors and generators
- Single phase and special purpose motors (e.g. stepper motors)

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
S1-S3, A1-A2	Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the unit	Reports, demonstrations	10 - 30%
K1-K4, S1-S3	Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the unit	Assignments, quizzes	10 - 30%
K1-K4	Questions and problems related to the unit contents	Mid and / or End of semester examination	40 - 60%

Adopted Reference Style:

IEEE

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

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