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

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:

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:
1. Introduction to machinery principles
2. Transformers
3. Introduction to power electronics
4. AC and DC machinery fundamentals
5. Synchronous motors and generators
6. DC motors and generators
7. 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

Fed Cite - referencing tool