



Unit Outline (Higher Education)

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|----------------------------|---|
| Institute / School: | School of Science, Engineering and Information Technology |
| Unit Title: | ACTUATORS AND DRIVES IN MECHATRONIC SYSTEMS |
| Unit ID: | ENGIN5402 |
| Credit Points: | 15.00 |
| Prerequisite(s): | Nil |
| Co-requisite(s): | Nil |
| Exclusion(s): | Nil |
| ASCED: | 031301 |

Description of the Unit:

This unit provides an in-depth understanding of the use of electrical drives and actuators in mechatronic systems. The unit also covers special motor and drive systems together with the advanced 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"/> | <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.** Account for the operational principles of different power electronic devices applicable to electrical drives and mechatronic systems.
- K2.** Articulate in-depth operations and principles of motion control related to electrical drive systems.
- K3.** Research and discriminate different machinery and their applicability to execute a specific task.

Skills:

- S1.** Calculate and appraise the performance of different power electronic devices used in electrical drive control.
- S2.** Design and select suitable power electronics control element for motor control.
- S3.** Examine and evaluate machine power and electrical drive system performance parameters.

Application of knowledge and skills:

- A1.** Interpret physical principles, fundamental theories and modelling techniques to dissect different power electronic devices used for motion control of electrical drive systems.
- A2.** Apply computer simulation tools to analyse power electronic devices in electrical drive systems.
- A3.** Adapt and determine a suitable machinery for a particular engineering system operating under certain conditions.

Unit Content:

Topics may include:

- Principles of power electronics
- Switching electronic devices
- Rectifiers and controlled rectifiers
- Fundamentals of electromechanical motion devices
- Special motors and drive systems
- Motion control systems

Learning Task and Assessment:

| Learning Outcomes Assessed | Assessment Tasks | Assessment Type | Weighting |
|----------------------------|---|--|-----------|
| K1 - K3, S1 - S3, A1 - A3 | Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the unit. | Reports, demonstrations | 15% - 25% |
| K1 - K3, S1 - S3, A1 - A3 | Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the unit. | Assignments, quizzes | 15% - 25% |
| K1 - K3, S1 - S3, A1 - A3 | Questions and problems related to the materials covered in the unit. | Mid and / or End of semester examination | 50% - 70% |

Adopted Reference Style:

Other (IEEE)

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

Fed Cite - [referencing tool](#)