Course Outline (Higher Education)

School: School of Science, Engineering and Information Technology

Course Title: ACTUATORS AND DRIVES IN MECHATRONIC SYSTEMS

Course ID: ENGIN5402

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 031301

Description of the Course :

This course provides an in-depth understanding of the use of electrical drives and actuators in mechatronic systems. The course 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, etc.)

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks..

Program Level:

AQF Level of Program						
	5	**6**	**7**	**8**	**9**	**10**
Level						
Introductory						
Intermediate						
Advanced					✔	

Learning Outcomes:

Knowledge:

K1. Account for the operational principles of differnet 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.

Course Outline (Higher Education)

ENGIN5402 ACTUATORS AND DRIVES IN MECHATRONIC SYSTEMS

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.

Course 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

Values:

- **V1.** Appreciate and apply safe practices in an environment that may contain potential electrical hazards along with the applicable standards and grid codes.
- **V2.** Appreciate learning as a lifelong process and the importance of electrical drives in mechatronic systems and automation.

Graduate Attributes:

FedUni graduate attributes statement. To have graduates with knowledge, skills and competence that enable them to stand out as critical, creative and enquiring learners who are capable, flexible and work ready, and responsible, ethical and engaged citizens.

Attribute	Brief Description	Focus
Knowledge, skills and competence	Engineering is a fast-changing technological area, which affects our every-day life. Students will demonstrate the acquisition of all the knowledge, skills and competence needed to be a successful engineer.	High
Critical, creative and enquiring learners	Demonstration of the skills needed to be an independent, critical, and creative leaner is an essential feature of engineering education. Within their studies, students will demonstrate an advanced ability to be creative, critical and enquiring.	High

Course Outline (Higher Education)

ENGIN5402 ACTUATORS AND DRIVES IN MECHATRONIC SYSTEMS

Attribute	Brief Description	Focus
Capable, flexible and work ready	Engineering is inherently interdisciplinary in nature. It requires a teamwork approach to execute tasks to achieve common objectives. Training for this engagement is built in to the academic year through a demonstration of the detailed attention to detail that will be needed within the engineering workplace.	Medium
Responsible, ethical and engaged citizens	Through the breadth of learning the academic year of the engineering programmes delivers, a student will demonstrate a detailed understanding of the engineering needed for the advancement of humanity.	High

Learning Task and Assessment:

Learning Outcomes Assessed	Learning 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 course.	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 course.	Assignments, quizzes	15% - 25%
K1 - K3, S1 - S3, A1 - A3	Questions and problems related to the materials covered in the course.	Mid and / or End of semester examination	50% - 70%

Adopted Reference Style:

Other (IEEE)