

Course Outline (Higher Education)

School:	School of Science, Engineering and Information Technology
Course Title:	ADVANCED MECHATRONIC SYSTEMS DESIGN
Course ID:	ENGIN5401
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	030701

Description of the Course :

This course provides the technical background and practice of mechatronics including sensing, actuation and integration technologies for engineering environments. The course provides a general understanding of automation technology in industry based applications and provides the skills in designing intelligent mechatronics systems incorporating artificial intelligence. Through this course, students will appraise their understanding of the applications and importance of mechatronics system in engineering applications. Students will be able to interpret, analyse and exemplify different areas of mechatronics system design. Integrating this course with the knowledge and understanding obtained in previous courses, students will be able to contextualise, develop and analyse mechatronics systems for engineering processes.

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:

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

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Knowledge:

- K1.** Account for advanced understanding of the theory and applications of mechatronic systems.
- K2.** Explain principles for developing mechatronic systems and the failure criteria.
- K3.** Articulate comprehensive and authoritative understanding of different mechatronic system designs and criteria.

Skills:

- S1.** Reduce and interpret the behaviour of a complex mechatronic systems into appropriate sub-systems/elements.
- S2.** Evaluate performance of different mechatronic system designs.
- S3.** Design mechatronic systems with given specification.

Application of knowledge and skills:

- A1.** Interpret mathematical and theoretical knowledge to design and model effective mechatronic systems.
- A2.** Analyse suitable automatic control system in order to automate an engineering system.
- A3.** Apply computer simulation tools to model and examine mechatronic system designs.

Course Content:

Topics may include:

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- Introduction to artificial intelligence technology in industry
- Understanding of the use of artificial intelligence in industrial automation
- Industrial sensing and actuation technologies
- Mechatronic system design
- Mechatronics in innovation

Values:

- V1.** Appreciate the importance of mechatronic systems in a modern engineering process.
- V2.** Appreciate learning as a lifelong process and acknowledge the importance of mechatronics in automating industrial processes.

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

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Attribute	Brief Description	Focus
Critical, creative and enquiring learners	Demonstration of the skills needed to be an independent, critical, and creative learner is an essential feature of engineering education. Within their studies, students will demonstrate an advanced ability to be creative, critical and enquiring.	High
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.	High
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.	Medium

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1 - K3, S1 - S3, A1 - A2	Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the course. Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the course.	Reports / demonstrations / assignments / quizzes	30% - 50%
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)