Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	ADVANCED ROBOTICS
Unit ID:	ENGPG9024
Credit Points:	15.00
Prerequisite(s):	(ENGRG2305)
Co-requisite(s):	Nil
Exclusion(s):	(ENGIN5304)
ASCED:	030701

Description of the Unit:

This unit encompasses an in depth analysis of robotic systems and focuses on the contemporary engineering methods for dynamic modelling and simulation of robots. This unit is designed to enable students to solve real world dynamic problems involving a wide range of industrial applications. Throughout the unit students will use computer algebra systems such as Maple for dynamic analysis and for correlation of results obtained through computer modelling with those measured experimentally in the laboratory or industrial setting.

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						
Intermediate						

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Advanced					✔	

Learning Outcomes:

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

Knowledge:

K1. Identify and critique the theories and concepts which underlie the field of robot analysis and control.

K2. Discern and appreciate advanced theory to infer the appropriate methods and tools used to model, design and calibrate robotic manipulators.

K3. Demonstrate practical insights into how certain engineering constraints can limit robot application in industry.

Skills:

S1. Investigate and analyse the mechanical behaviour of industrial robots.

S2. Synthesise computer-aided engineering models of advanced robotic systems.

S3. Analyse established robotics theory to independently solve technical problems in the field of robotics, and effectively communicate the outcome.

Application of knowledge and skills:

A1. Solve independently, and in teams, research-based problem-solving assignments and communicate the achieved outcome effectively.

A2. Apply theory-based technical solutions and advanced tools in the field of robotics.

Unit Content:

Topics may include:

- Definitions and classification.
- Degree of freedom and the adequacy for intended tasks
- Kinematic description and control of robots.
- Calibration of a robot manipulator.
- Mobility and differential motion
- Interaction with the environment.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K3, S1-S3, A1-A2	Submitted analytical and research assignments.	Report	40-60%
K2-K3, S1-S3,A2	Apply the knowledge and skills acquired in the unit to solve assigned test problems.	Test	40-60%
K1, K2, S1, A1	Demonstrate an understanding of fundamental knowledge of the topics delivered.	Oral or written explanatory tasks, or a small design task.	10-30%

Adopted Reference Style:

IEEE

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