Course Outline (Higher Education)

School: School of Engineering, Information Technology and Physical Sciences

Course Title: ADVANCED ROBOTICS

Course ID: ENGIN5304

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): (ENMEC7080)

ASCED: 030701

Description of the Course:

This course encompasses an in depth analysis of robotic systems and focuses on the contemporary engineering methods for dynamic modelling and simulation of robots. This course is designed to enable students to solve real world dynamic problems involving a wide range of industrial applications. Throughout the course 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 course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate						

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Advanced					✔	

Learning Outcomes:

On successful completion of the course 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. Evaluate the advanced theory and infer the appropriate methods and tools to model, design and calibrate robotic manipulators.

K3. Develop 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. Analyse computer-aided engineering models of advanced robotic systems.

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

S4. Function as an ethical, resposible team member, know your task and understand how it relates to the tasks assigned to other members. Produce your share of work in a way which ensures success for the team

S5. Communicate your ideas clearly in various forms

Application of knowledge and skills:

A1. Apply highly developed skills to independently undertake research-based problem-solving assignments in the area of robotics and communicate the achieved outcome effectively.

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

Course 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
- Programming the robot.
- Interaction with the environment.

Values:

V1. Consideration of social and economic factors which underline engineering developments.

V2. Recognition of the significance of research and investigatory skills for an accomplished mechanical engineer.

V3. Research-driven appreciation of performance, reliability and accuracy in the field of industrial automation.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1 - K3 and S1-S3	AT1, AT2
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	NA	Not applicable
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	S4 and S5	AT1
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	A1, A2, S4 and S5	AT1, AT2
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	S4 and S5	AT1

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K3, S1-S3, A1-A2	Research-based analytical design.	Report	50-70%
K1-K3, S1-S3, A1-A2	Active participation in all learning activities including attendance and participation in classes, exercises, recommended and supplementary readings and other activities as suggested.	Test	30-50%

Adopted Reference Style:

Other (IEEE-Refer to the library website for more information)

Refer to the library website for more information

Fed Cite - referencing tool