



Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Mechanism and Machine Theory
Unit ID:	ENGRG2305
Credit Points:	15.00
Prerequisite(s):	(MATHS2100)
Co-requisite(s):	Nil
Exclusion(s):	(ENGIN2303)
ASCED:	030701

Description of the Unit:

Within mechanical and mechatronics engineering the motion and control of mechanisms is fundamental to designing machines that move. In this unit students will be introduced to the basic concepts and mathematical models employed to simulate how machines and mechanisms respond to different stimuli. By the end of the unit students will be skilled to undertake linkage design and analysis tasks both individually and in teams.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

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			~			
Advanced						



Learning Outcomes:

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

Knowledge:

- K1. Explain how linkages are designed and integrate them successfully into machine system assemblies.
- **K2.** Describe dynamic models of mechanisms on the basis of the desired performance criteria.
- K3. Describe how computers are employed for mechanism design and analysis.

Skills:

- **S1.** Analyse and synthesise machine components and subassemblies, and integrate them successfully into machine system assemblies.
- **S2.** Design and analyse typical machines and drives.
- **S3.** Predict dynamic characteristics and operating conditions of machines and drives.
- **S4.** Apply advanced computer aided engineering techniques to the design and analysis of machines and drives.

Application of knowledge and skills:

- **A1.** Apply advanced computer aided engineering techniques to the design and analysis of machines and drives.
- A2. Present findings in textual, graphical and mathematical formats.

Unit Content:

Topics may include:

- 1. Mobility and kinematics of linkages
- 2. Computer-aided mechanism analysis
- 3. Motion generation and control via cam-follower systems
- 4. Power transmission and flywheel design
- 5. Introduction to robotics: planar manipulators

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.

	Development and acquisition of FEDTASKS in the Unit		
FEDTASK attribute and descriptor	Learning Outcomes (KSA)	Assessment task (AT#)	



ENGRG2305 MECHANISM AND MACHINE THEORY

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit		
		Learning Outcomes (KSA)	Assessment task (AT#)	
FEDTASK 1 Interpersonal	 Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills inperson and/or online in: Using effective verbal and non-verbal communication Listening for meaning and influencing via active listening Showing empathy for others Negotiating and demonstrating conflict resolution skills Working respectfully in cross-cultural and diverse teams. 	Not applicable	Not applicable	
FEDTASK 2 Leadership	 Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: Creating a collegial environment Showing self -awareness and the ability to self-reflect Inspiring and convincing others Making informed decisions Displaying initiative 	Not applicable	Not applicable	
FEDTASK 3 Critical Thinking and Creativity	 Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: Reflecting critically Evaluating ideas, concepts and information Considering alternative perspectives to refine ideas Challenging conventional thinking to clarify concepts Forming creative solutions in problem solving. 	Not applicable	Not applicable	
FEDTASK 4 Digital Literacy	 Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: Finding, evaluating, managing, curating, organising and sharing digital information Collating, managing, accessing and using digital data securely Receiving and responding to messages in a range of digital media Contributing actively to digital teams and working groups Participating in and benefiting from digital learning opportunities. 	Not applicable	Not applicable	
FEDTASK 5 Sustainable and Ethical Mindset	 Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts Committing to social responsibility as a professional and a citizen Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses Embracing lifelong, life-wide and life-deep learning to be open to diverse others Implementing required actions to foster sustainability in their professional and personal life. 	Not applicable	Not applicable	

Learning Task and Assessment:



Unit Outline (Higher Education)

ENGRG2305 MECHANISM AND MACHINE THEORY

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K3, S1, S3, S4, A1, A2	A detailed design of a machine or mechanism will be undertaken in a group.	Project report	20 - 30%
K2, K3, S2	Within the unit a range of tutorial problems will be submitted for assessment.	Report containing solutions to specified problems	20 - 30%
S1, S2, K1, K2	Assessment of all or part of the unit by examination.	Test	40 - 60%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool