



Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Advanced Machine Design

Unit ID: ENPGG9306

Credit Points: 15.00

Prerequisite(s): (ENPGG9301)

Co-requisite(s): Nil

Exclusion(s): (ENGRG9303)

ASCED: 030701

Description of the Unit:

This unit qualifies participants to apply an advanced body of knowledge in the area of Machine Design and equips them with highly developed skills for research and enquiry. As such, the unit presents advanced professional and scholarly platforms for further learning and development.

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	■	■	■	■	■	■

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

Knowledge:

- K1.** Analyse and explain complex theory and processes related to integrating whole-of-system design.
- K2.** Recall and appraise design principles in a mechanical engineering setting
- K3.** Investigate the concepts of efficiency and reliability in machine systems.

Skills:

- S1.** Demonstrate mastery of theoretical and applied methods in the area of machine design.
- S2.** Synthesise and select appropriate designs for machine systems.
- S3.** Construct technical and theoretical findings and demonstrate these to an audience.
- S4.** Demonstrate independent learning with an aptitude for further enquiry and development.

Application of knowledge and skills:

- A1.** Apply highly developed creativity and initiative to tackle new and emerging problems.
- A2.** Demonstrate self-reliance and autonomy in problem solving of technical and research-based projects.
- A3.** Design complex mechanical systems both independently and in teams to produce professional level outcomes

Unit Content:

Topics may include:

1. Fatigue considerations in machine design.
2. Failure theories and analysis.
3. Surface failure and lubrication.
4. Reliability analysis.
5. Design optimisation.
6. Sustainability in mechanical design.

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**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are 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.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students at this level will demonstrate an advanced ability in a range of contexts to effectively communicate, interact and work with others both individually and in groups. Students will be required to display high level skills in-person and/or online in: <ul style="list-style-type: none"> Using and demonstrating a high level of verbal and non-verbal communication Demonstrating a mastery of listening for meaning and influencing via active listening Demonstrating and showing empathy for others High order skills in negotiating and conflict resolution skills Demonstrating mastery of working respectfully in cross-cultural and diverse teams. 	Not applicable	Not applicable
FEDTASK 2 Leadership	Students at this level will demonstrate a mastery in professional skills and behaviours in leading others. <ul style="list-style-type: none"> Creating and sustaining a collegial environment Demonstrating a high level of self-awareness and the ability to self-reflect and justify decisions Inspiring and initiating opportunities to lead others Making informed professional decisions Demonstrating initiative in new professional situations. 	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students at this level will demonstrate high level skills in working in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: <ul style="list-style-type: none"> Reflecting critically to generate and consider complex ideas and concepts at an abstract level Analysing complex and abstract ideas, concepts and information Communicate alternative perspectives to justify complex ideas Demonstrate a mastery of challenging conventional thinking to clarify complex concepts Forming creative solutions in problem solving to new situations for further learning. 	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students at this level will demonstrate the ability to work competently across a wide range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: <ul style="list-style-type: none"> Mastering, exploring, evaluating, managing, curating, organising and sharing digital information professionally Collating, managing complex data, accessing and using digital data securely Receiving and responding professionally to messages in a range of professional digital media Contributing competently and professionally to digital teams and working groups Participating at a high level in digital learning opportunities. 	Not applicable	Not applicable
FEDTASK 5 sustainable and Ethical Mindset	Students at this level will demonstrate a mastery of considering and assessing the consequences and impact of ideas and actions in enacting professional ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> Demonstrate informed judgment making that considers the impact of devising complex solutions in ambiguous global economic environmental and societal contexts Professionally committing to the promulgation of social responsibility Demonstrate the ability to evaluate ethical, socially responsible and/or sustainable challenges and generating and articulating responses Communicating lifelong, life-wide and life-deep learning to be open to the diverse professional others Generating, leading and implementing required actions to foster sustainability in their professional and personal life 	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S2, S3, S4, A1, A2, A3	Major mechanical design project	Design Report	30% - 60%
K1, K2, S1, S3, S4, A2	Demonstrate understanding of the design process	Oral test	15%-45%
S1, S2, S3, A1, A2, A3	Graphical communication of mechanical design	Sets of formal engineering drawings	20%-30%

Adopted Reference Style:

IEEE ()

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)