



Course Outline (Higher Education)

School:	School of Engineering, Information Technology and Physical Sciences
Course Title:	MACHINE SYSTEM DESIGN
Course ID:	ENGIN5301
Credit Points:	15.00
Prerequisite(s):	(ENGIN3002 or Equivalent)
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	030701

Description of the Course:

This course 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 course 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: 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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:**Knowledge:**

- K1.** Explain complex theory and processes related to integrating whole-of-system design.
- K2.** Recall design principles in a mechanical engineering setting.
- K3.** Consider how sustainability, environmental and social constraints impact the design of machinery.
- K4.** Research and evaluate concepts of efficiency and reliability in machine systems.

Skills:

- S1.** Mastery of theoretical and applied methods in the area of machine design.
- S2.** Investigate, analyse and synthesise complex design problems and concepts.
- S3.** Review and select appropriate designs for machine systems.
- S4.** Communicate, justify and interpret technical and theoretical findings to an audience.
- S5.** Undertake 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.** Apply self-reliance and autonomy in problem solving of technical and research-based projects.

Course Content:

Topics may include:

- Fatigue considerations in machine design.
- Failure theories and analysis.
- Surface failure and lubrication.
- Reliability analysis.
- Finite element analysis and computer modelling.
- Design optimisation.
- Sustainability in mechanical design.

Values:

- V1.** Appreciation of the importance of research and investigatory skills for the design of machine systems.
- V2.** Knowledge-supported understanding of the constraints which impact the machine design process.
- V3.** Theory-based recognition that machine system design change with emerging knowledge and technology.

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-K4, S1-S3, A1, A2	AT1
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.	K1-K4, S1-S3, A1, A2	AT1
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.	K3, S4, 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.	K1, S4	AT1
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	AT1

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K4, S1-S5, A1-A2	Conduct a major design project and write a report examining a concept in engineering.	Report	100%

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](#)