



# Unit Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Unit Title:** MACHINE SYSTEM DESIGN

**Unit ID:** ENGIN5301

**Credit Points:** 15.00

**Prerequisite(s):** Nil

**Co-requisite(s):** Nil

**Exclusion(s):** Nil

**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: 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	<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.** Assess and explain how sustainability, environmental and social constraints impact the design of machinery.
- K4.** 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.** Investigate, analyse and synthesise complex design problems and concepts.
- S3.** Synthesise and select appropriate designs for machine systems.
- S4.** Construct technical and theoretical findings and demonstrate these to an audience.
- S5.** 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:

- 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.

**Learning Task and Assessment:**

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K4, S1-S5, A1, A2, A3	Conduct a major design project and write a report examining a concept in engineering. The assessment task includes assessed subtasks as follows: 1. Use of computer-aided engineering packages to perform design calculations 2. Load calculations in a mechanical system taking into account dynamic loading 3. Selection of suitable prime movers and flywheel design 4. Machine component design 5. Communication of design ideas in writing and graphically 6. Discussing design proposals at group meetings, and with unit coordinator	Report	100%

**Alignment to the Minimum Co-Operative Standards (MiCS)**

The Minimum Co-Operative Standards (MiCS) are an integral part of the Co-Operative University Model. Seven criteria inform the MiCS alignment at a Course level. Although Units must undertake MiCS mapping, there is NO expectation that Units will meet all seven criteria. The criteria are as follows:

1. Co-design with industry and students
2. Co-develop with industry and students
3. Co-deliver with industry
4. FedTASK alignment
5. Workplace learning and career preparation
6. Authentic assessment
7. Industry-link/Industry facing experience

MiCS Course level reporting highlights how each Course embraces the principles and practices associated with the Co-Operative Model. Evidence of Course alignment with the MiCS, can be captured in the Course Modification Form.

**MICS Mapping has been undertaken for this Unit**                      No

Date:

**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](#)