# Unit Outline (Higher Education)

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

**Unit Title:** Machine Design

**Unit ID:** ENGRG3302

**Credit Points:** 15.00

**Prerequisite(s):** (ENGRG2301 and ENGRG2305)

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

**Exclusion(s):** (ENGIN5301)

**ASCED:** 030701

**Description of the Unit:**
This unit enables students to describe and explain the principles of machine design and analysis, to relate and integrate environmental, social, organisational, and economic aspects in engineering design and to identify and emphasise issues of sustainable development in engineering practice. It introduces students to the methods of product and component design and to their analysis using computer algebra systems and other available CAD Packages.

**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 | | | | | | |

| Level of Unit in Course | AQF Level of Course | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 |
| Intermediate | | | | | | |
| Advanced | | | ✔ | | | |

**Learning Outcomes:**

**Knowledge:**

**K1.** Analyse and explain the principles of the design process.
**K2.** Explain how computer-aided engineering is utilised for machine design
**K3.** Investigate the concepts of efficiency and safety in machine systems.

**Skills:**

**S1.** Investigate, analyse and synthesise design problems and concepts.
**S2.** Synthesise and select appropriate designs for machine systems.
**S3.** Demonstrate independent learning with an aptitude for further enquiry and development.

**Application of knowledge and skills:**

**A1.** Apply developing creative thinking and initiative to tackle new and emerging problems.
**A2.** Demonstrate self-reliance and autonomy in problem solving of technical and design projects.
**A3.** Design mechanical systems and communicate your work professionally

**Unit Content:**

Topics may include:

- Failure theories and analysis.
- Component design for functionality and safety
- Computer-aided analysis in machine design.
- Design optimisation.
- Sustainability in mechanical design.

**Learning Task and Assessment:**

| Learning Outcomes Assessed | Assessment Tasks | Assessment Type | Weighting |
|---|---|---|---|
| K1 and K3, S1-S3, A1-A3 | Submitted design reports and drawings | Report | 50% - 70% |
| K1 - K3, S3, A2 and A3 | Ongoing assessments | Progress marks | 10% - 30% |
| K1-K2, S3 and A3 | Design ability | Project demonstration as described by assignment | 10% - 30% |

**Adopted Reference Style:**

IEEE

Refer to the library website for more information

Fed Cite - referencing tool