Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Computational Skills for Engineers
Unit ID:	ENGRG1001
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	ENGIN1004
ASCED:	039999

Description of the Unit:

This unit is structured to familiarize students with computational tools relevant to engineering, with a strong focus on computer-aided design (CAD) and computational tools like MATLAB. It involves extensive use of widely-recognized engineering software, including AutoDESK's AutoCAD, and teaches the basics of creating and communicating technical drawings using these tools.

Moreover, the unit serves as a platform for simulating engineering systems, employing a variety of mathematical and computer-based models to describe physical systems and their responses to varied inputs. The teaching approach will provide practical insights into the methods engineers use to analyze physical systems, forecast their behaviour, and ensure their safety in real-world applications.

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	☐	☐	☐	☐	☐	☐
Advanced	☐	☐	☐	☐	☐	☐

Learning Outcomes:

Knowledge:

K1. Describe the range of engineering computing tools commonly available to aid in, and solve, engineering problems.

K2. Characterise engineering systems and problems within a computing context.

K3. Explain the common strategies for modelling real world engineering systems and problems.

K4. Reproduce, reorganise, and review engineering drawings.

Skills:

S1. Select an appropriate problem solving technique for an engineering system.

S2. Apply an appropriate analytical technique through a computer program to an engineering system.

S3. Exhibit basic proficiency in developing and using computer code.

S4. Use engineering drawings as communication tools.

Application of knowledge and skills:

A1. Develop a computer program to implement an engineering model, simulate an engineering system and generate appropriate results.

A2. Apply appropriate computational tool to explore mathematics in engineering applications.

A3. Apply knowledge of drafting principles to produce high quality drawings.

Unit Content:

Numerous modeling techniques are available to depict a system's characteristics. This unit will guide you through representing both mathematical models and CAD models within a computer program, enabling you to simulate the system's behavior under various conditions. Engineers use this type of analysis daily, and mastering the ability to implement engineering models on a computer and generate results predicting outcomes under specific scenarios is an invaluable skill. Throughout this unit, we will employ case studies and engineering software to demonstrate diverse modeling techniques, helping you to anticipate the behavior of typical industrial and engineering systems.

Topics may include:

- Computer representation of mathematical models
- Script-based programming using MATLAB or an equivalent language.
- Introduction to using computer software to undertake two and three-dimensional modelling.
- Professional display of results and technical drawings,

Learning Task and Assessment:

Students will be evaluated on their proficiency in computer-aided design (CAD) and computer simulation.

Additionally, assessments will cover group collaboration, critical thinking, and problem-solving skills.

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K4, S1-S4	Modelling and simulation based tasks	Test / Quiz	10% - 30%
S1-S4, A1-A3	Simulation and modelling based assessments focusing upon a relevant engineering topic	Assessed Tutorial / Assignment	30% - 50%
K1-K4, S1-S4	Project based task focusing upon a relevant engineering area	Report / Presentation	20% - 40%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool