

Course Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Course Title: ENGINEERING COMPUTER MODELLING

Course ID: ENGIN1006

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): (ENCOR1021 and GPENG1006)

ASCED: 039999

Description of the Course:

This course is designed to act as a mechanism to demonstrate how the theory developed within your first year courses can be used to simulate engineering systems. In this course you will use a range of mathematical and computer based formulations to represent the physical systems and predict the response of the system to changing inputs. The approach used in this course will expose you to the methods used by engineers in the real world to understand physical systems, predict their performance and ensure that they are safe.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Does Recognition of Prior Learning apply to this course? No

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	■	■	✓	■	■	■
Intermediate	■	■	■	■	■	■
Advanced	■	■	■	■	■	■

Learning Outcomes:

On successful completion of the course the students are expected to be able to:

Knowledge:

- K1.** Describe the range of engineering computing tools commonly available to aid in, and solve, engineering problems.
- K2.** Within a computing context, characterise engineering systems and problems.
- K3.** Explain the common strategies for modelling real world engineering systems and problems.

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.

Application of knowledge and skills:

- A1.** Develop a computer program to implement an engineering model.
- A2.** Simulate an engineering system and generate appropriate graphs of the results.

Course Content:

There are many modelling techniques that can be used to describe the characteristics of a system. In this course you will learn to represent the mathematical models developed in other courses within a computer program so that for a range of conditions you can explore how the system is likely to behave. This sort of analysis is used by engineers on a daily basis so being able to implement engineering models in a computer and plot graphs of what will happen in certain conditions is a powerful tool in the engineers arsenal. In the course case studies and engineering software applications will be used to illustrate a variety of different modelling techniques that you can utilise to predict the behaviour of common industrial and engineering systems including: mechatronics, mechanical, electrical, civil, environmental, fluid, magnetic, thermal or transport.

Topics may include:

- Computer representation of mathematical models
- Script based programming using Matlab or an equivalent language
- Professional display of results

Graduate Attributes

The Federation University Federation 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-K3, S1-S3	1, 2
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.	A1, A2	1, 2
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.	Not applicable	Not applicable
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.	Not applicable	Not applicable
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.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1 - K3, S1 - S3, A1 - A2	Development and analysis of an engineering system through a mathematical model implemented in a computer program.	Report/Presentation/Demonstration	50 - 70%
K1 - K3, S1 - S3, A1 - A2	Actively participate in all learning activities including attendance and participation in classes, exercises, recommended and supplementary readings or other activities.	Online quiz/Class test	30 - 50%

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 program level. Although courses must undertake MiCS mapping, there is NO expectation that courses 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 program level reporting highlights how each program embraces the principals and practices associated with the Co-Operative Model. Evidence of program alignment with the MiCS, can be captured in the Program Modification Form.

MICS Mapping has been undertaken for this course No

Date:

Adopted Reference Style:

Other (Refer to the library website for more information: IEEE)

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

Fed Cite - [referencing tool](#)