Course Outline (Higher Education)

Institute / School:	Global Professional School
Course Title:	ENGINEERING COMPUTER MODELLING
Course ID:	GPENG1006
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	039999

Description of the Course:

This course is designed to act as a mechanism to demonstrate how the theory developed within the course can be used to simulate engineering systems. In this course students 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 students 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.

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.

S4. Develop the appropriate English language and academic skills to successfully study at an undergraduate level.

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 are used to illustrate a variety of different modelling techniques 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

Values:

V1. Appreciate the role and limitations of physical laws and mathematical models in the analysis of real physical situations of relevance to engineering

V2. Appreciate the contribution of interactive programming and modelling in simplification of a complex engineering process to enhance user involvement and improve process performance.

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-S4	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 - S4, 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 - S4, 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%

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