Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	MODELLING AND CHANGE (ADVANCED LEVEL)
Unit ID:	MATHS3001
Credit Points:	15.00
Prerequisite(s):	(MATHS1001) (At least 15 credit points from MATHS subject-area at any level)
Co-requisite(s):	Nil
Exclusion(s):	(MATHS2006)
ASCED:	010101

Description of the Unit:

This unit will cover advanced topics in mathematics, building upon the foundations that students would have obtained in calculus in earlier units. The student will be given examples on how mathematics, in particular advanced calculus, can be used to model real life situations and study techniques for solving these models. The material covered in this unit give a strong theoretical grounding for techniques widely applied in business, industry, economics and defence.

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. Recognise the common principles in a variety of real-life applications of mathematical modelling.

K2. Express the important concepts of multivariate calculus coherently and effectively in the written form.

K3. Recognise the importance of rigour and structure in the calculus context.

Skills:

S1. llustrate the convergence or divergence of given sequences or series and calculate the limits of convergent sequences and series.

S2. Construct power series representations for given functions.

S3. Evaluate partial derivatives and gradients of functions.

S4. Evaluate multiple integrals and other notions of integrals using Cartesian, polar, cylindrical, and spherical coordinates.

S5. Solve problems using the Green's, Stokes' and Divergence theorems.

S6. Utilise appropriate technology to assist in the solution and investigation of mathematical problems.

Application of knowledge and skills:

A1. Apply concepts of single variable and multivariable calculus to model and analyse simple problems in science and technology.

A2. Interpret results produced by a mathematical model.

Unit Content:

Topics may include:

- Functions of several variables.
- Areas and volumes.
- Parametric curves.
- Spherical and cylindrical co-ordinates.
- Multiple integrals.
- Vectors and their algebraic properties.
- Vector calculus.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K3, S1-S6, A1-A2	A range of tasks and problems explored individually or in groups to support the understanding of the content and the development of skills and knowledge throughout the unit.	Assignments/Projects/Presentations/Quizzes	40 - 50%

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K3, S1-S5	A test and/or examination on any part of or all the material covered in the unit.	Test(s)/Examination(s)	50 - 60%

Adopted Reference Style:

APA

Refer to the library website for more information

Fed Cite - referencing tool