Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Applied Mathematics 3

Unit ID: MATHS3100

Credit Points: 15.00

Prerequisite(s): (MATHS1100)

Co-requisite(s): Nil

Exclusion(s): (MATHS3001)

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. In particular, it covers concepts of advanced calculus (multivariate and vector) to model real life situations and techniques for solving these models. In addition, this unit also cover numerical methods and Laplace transform for solving differential equations. The material covered in this unit gives a strong theoretical grounding for techniques widely applied in engineering, industry and science.

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						

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

Learning Outcomes:

This unit introduces students to vector and multivariate calculus, numerical methods for differential equations and Laplace transform. After successfully completing this unit, students should be able to:

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. Investigate problems using the concepts from vector calculus.

S2. Evaluate multiple integrals and other notions of integrals using Cartesian, polar, cylindrical, and spherical coordinates.

S3. Evaluate partial derivatives and gradients of functions.

S4. Calculate approximate solutions of differential equations using numerical techniques.

S5. Utilise appropriate technology to assist in the solution and investigation of problems.

Application of knowledge and skills:

A1. Apply Laplace transform/numerical techniques to solve differential equations in the context of engineering and science problems.

A2. Apply concepts of multivariate and vector calculus to model and analyse problems in engineering and science.

Unit Content:

Topics may include:

- Vector calculus with applications.
- Multivariate calculus with applications.
- Numerical methods for differential equations.
- Laplace transform.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K3, S1-S5	A range of tasks and problems are explored to support understanding the content and the development of skills and knowledge throughout the unit.	Assignments	30% - 50%
K1, K3, S4, S5, A1-A2	A range of tasks and problems are explored in a group to support the understanding of the content and the development of mathematical communication.	Project/Presentation	20% - 40%
K1-K3, S1-S4, A1-A2	A test on any part of or all the material covered in the unit.	Test	30% - 50%

Adopted Reference Style:

IEEE

Refer to the library website for more information

Fed Cite - referencing tool