

Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: Applied Mathematics 2

Unit ID: MATHS2100

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): (MATHS1005 and MATHS1102)

ASCED: 010101

Description of the Unit:

This unit aims to offer students from diverse backgrounds an introduction to the use of mathematical methods applicable to business, industry, engineering and science. The unit introduces students to the concepts and techniques of linear algebra and linear programming which have applications in various fields. In addition, an introduction to statistics with applications is considered.

The unit will be particularly valuable to science and engineering students, prospective senior secondary school mathematics teachers, and any student interested in improving their understanding of these commonly encountered concepts and applications of mathematics.

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:

This unit introduces students to the fundamentals of linear algebra, linear programming and statistics with applications in various fields. After successfully completing this unit, students should be able to:

Knowledge:

- K1.** Recognise the basic techniques used for solving problems in linear algebra.
- K2.** Explain and classify the fundamental structure of vectors, matrices and matrix arithmetic.
- K3.** Express real world problems into mathematical models using linear equations and inequalities to represent objective function and constraints.
- K4.** Recognise basic statistical concepts used to solve problems in science and engineering.

Skills:

- S1.** Perform operations on vectors and matrices.
- S2.** Solve systems of linear equations.
- S3.** Solve constrained optimisation problems using linear programming.
- S4.** Utilise appropriate software to assist in the solution and investigation of problems.

Application of knowledge and skills:

- A1.** Apply statistical techniques to investigate problems in science and engineering.
- A2.** Formulate basic problems in science and engineering as mathematical problems using concepts from linear algebra and linear programming.

Unit Content:

Topics may include:

- Vector spaces, inner products, linear independence, basis, dimension and rank of matrices;
- Matrix representations and solving of systems of linear equations.
- Operations research (Linear programming and scheduling techniques).
- Statistics basics and applications

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K4, S1-S4	A range of tasks and problems are explored to support the understanding of the content and the development of skills and knowledge throughout the unit.	Assignments	30% - 50%
S2-S4, 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 and presentation	20% - 40%
K1-K4, S1-S3, A1	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

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