

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

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

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:

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

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: <ul style="list-style-type: none"> Using effective verbal and non-verbal communication Listening for meaning and influencing via active listening Showing empathy for others Negotiating and demonstrating conflict resolution skills Working respectfully in cross-cultural and diverse teams. 	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: <ul style="list-style-type: none"> Creating a collegial environment Showing self-awareness and the ability to self-reflect Inspiring and convincing others Making informed decisions Displaying initiative 	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: <ul style="list-style-type: none"> Reflecting critically Evaluating ideas, concepts and information Considering alternative perspectives to refine ideas Challenging conventional thinking to clarify concepts Forming creative solutions in problem solving. 	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: <ul style="list-style-type: none"> Finding, evaluating, managing, curating, organising and sharing digital information Collating, managing, accessing and using digital data securely Receiving and responding to messages in a range of digital media Contributing actively to digital teams and working groups Participating in and benefiting from digital learning opportunities. 	Not applicable	Not applicable
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts Committing to social responsibility as a professional and a citizen Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses Embracing lifelong, life-wide and life-deep learning to be open to diverse others Implementing required actions to foster sustainability in their professional and personal life. 	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K4, S1, S2, S3, 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, S3, 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, K2, K3, K4, S1, S2, S3, S4, 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

Fed Cite - [referencing tool](#)