

Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: SCIENTIFIC PRACTICE

Unit ID: SCCOR1300

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): (ENCOR1015 and MATHS1000)

ASCED: 010199

Description of the Unit:

On completion of this unit students should have developed the mathematical understanding and tools needed to undertake studies in a science discipline. After successfully completing this unit, students will be able to demonstrate competency with basic calculation skills required for science including calculations involving percentages, proportions, ratios and fractions; recognise unit prefixes and confidently convert between units; use functions involving powers, logarithms and exponents; manipulate a wide range of algebraic equations in order to substitute values and to transform to solve for a particular variable; solve systems of linear equations; perform calculations involving area, surface area and volume on a range of two and three dimensional shapes; present data graphically and use numerical summaries; use a spreadsheet tool to graph experimental data including correct labelling and the use of error bars; apply the above skills in context to solve scientific problems.

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	<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"/>	<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 basic mathematical functions.
- K2.** Identify how mathematical functions arise in science
- K3.** Distinguish 2D and 3D geometrical properties relevant to the science disciplines.
- K4.** Recognise the uses and relevance of elementary descriptive statistics in the science disciplines.
- K5.** Explain rates of change and area as applied to graphs.

Skills:

- S1.** Demonstrate confidence with basic calculation skills required for science.
- S2.** Confidently convert between scientific units.
- S3.** Manipulate algebraic expressions accurately.
- S4.** Use functions involving powers, logarithms and exponents.
- S5.** Present data graphically and use numerical summaries.
- S6.** Think critically when analysing problems.
- S7.** Model physical situations mathematically.

Application of knowledge and skills:

- A1.** Identify and apply appropriate mathematical methods to the sciences
- A2.** Analyse mathematical data and draw appropriate conclusions
- A3.** Communicate mathematical results in an appropriate manner

Unit Content:

Topics may include:

- Arithmetic: Operations, number rules, percentages and scientific notation, fractions, ratios, unit conversions, indices.
- Algebra: Constants and variables, word problems and equations, solving linear and quadratic equations and simultaneous linear equations.
- Geometry: Shapes in 2 and 3 dimension, length, area, volume, Pythagoras theorem and coordinate geometry.
- Functions: Simple algebraic functions: Polynomial and rational. Other useful functions: Logarithmic and exponential.
- Basic descriptive statistics: Presenting categorical and measurement data, frequency distributions, location and spread and the use and abuse of statistics.
- Mathematical literacy: using a mathematical argument and appropriate equations, graphs and data to support a claim within a report as well as presentation of mathematical material using digital media.

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, interact 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 	S6	A1, AT2
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 attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
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
A1-A3	Demonstrated satisfactory engagement with weekly tutorial and online activities.	Participation	10- 20%
K1-K5, S1-S7	Identify and apply appropriate mathematical methods to solve science-based problems. Apply appropriate methods of communicating mathematical information, including formulas, tables and graphs	Assignment(s)	20 - 30%
K1-K5, S1-S7, A2-A3	Completion of in-semester tests and/or quizzes	Topic review tests/quizzes	10 - 20%
K1-K4, S1-S7, A2-A3	Application of mathematical tools to problem solving, covering all unit content.	Exam/Test	40 - 50%

Alignment to the Minimum Co-Operative Standards (MiCS)

The Minimum Co-Operative Standards (MiCS) are an integral part of the Co-Operative University Model. Seven criteria inform the MiCS alignment at a Course level. Although Units must undertake MiCS mapping, there is NO expectation that Units will meet all seven criteria. The criteria are as follows:

1. Co-design with industry and students
2. Co-develop with industry and students
3. Co-deliver with industry
4. FedTASK alignment
5. Workplace learning and career preparation
6. Authentic assessment
7. Industry-link/Industry facing experience

MiCS Course level reporting highlights how each Course embraces the principles and practices associated with the Co-Operative Model. Evidence of Course alignment with the MiCS, can be captured in the Course Modification Form.

MICS Mapping has been undertaken for this Unit

No

Date:

Adopted Reference Style:

APA

Refer to the [library website](#) for more information

Fed Cite - [referencing tool](#)