

# Course Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Course Title:** SCIENTIFIC PRACTICE

**Course ID:** SCCOR1300

**Credit Points:** 15.00

**Prerequisite(s):** Nil

**Co-requisite(s):** Nil

**Exclusion(s):** (ENCOR1015 and MATHS1000)

**ASCED:** 010199

**Description of the Course:**

On completion of this course students should have developed the mathematical understanding and tools needed to undertake studies in a science discipline. After successfully completing this course, 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 course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

**Program Level:**

| Level of course in Program | AQF Level of Program     |                          |                          |                          |                          |                          |
|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                            | 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

#### Course 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 course, and all must be directly assessed in each program.*

| FEDTASK attribute and descriptor              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Development and acquisition of FEDTASKS in the course |                       |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------|
|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Learning Outcomes (KSA)                               | Assessment task (AT#) |
| FEDTASK 1<br>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"> <li>• Using effective verbal and non-verbal communication</li> <li>• Listening for meaning and influencing via active listening</li> <li>• Showing empathy for others</li> <li>• Negotiating and demonstrating conflict resolution skills</li> <li>• Working respectfully in cross-cultural and diverse teams.</li> </ul>                                                                     | Not applicable                                        | AT1                   |
| FEDTASK 2<br>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"> <li>• Creating a collegial environment</li> <li>• Showing self-awareness and the ability to self-reflect</li> <li>• Inspiring and convincing others</li> <li>• Making informed decisions</li> <li>• Displaying initiative</li> </ul>                                                                                                                                                                                                              | Not applicable                                        | AT1, AT2              |
| FEDTASK 3<br>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"> <li>• Reflecting critically</li> <li>• Evaluating ideas, concepts and information</li> <li>• Considering alternative perspectives to refine ideas</li> <li>• Challenging conventional thinking to clarify concepts</li> <li>• Forming creative solutions in problem solving</li> </ul>                                                                                                                                             | Not applicable                                        | AT1, AT2              |
| FEDTASK 4<br>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"> <li>• Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>• Collating, managing, accessing and using digital data securely</li> <li>• Receiving and responding to messages in a range of digital media</li> <li>• Contributing actively to digital teams and working groups</li> <li>• Participating in and benefiting from digital learning opportunities</li> </ul> | Not applicable                                        | AT1, AT2              |

| FEDTASK attribute and descriptor             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Development and acquisition of FEDTASKS in the course |                       |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------|
|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Learning Outcomes (KSA)                               | Assessment task (AT#) |
| FEDTASK 5<br>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"> <li>• Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>• Committing to social responsibility as a professional and a citizen</li> <li>• Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>• Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>• Implementing required actions to foster sustainability in their professional and personal life.</li> </ul> | 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.<br>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 course content.                                                                                                                 | Exam/Test                  | 40 - 50%  |

**Adopted Reference Style:**

Australian Harvard

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

 Fed Cite - [referencing tool](#)