

## SCIE1003: Advanced Scientific Thinking

Callaghan

Semester 1 - 2024



THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

# OVERVIEW

### Course Description

Science is critical for contributing new knowledge and finding solutions to societal challenges. But, how does it do this? Further still, how does it do this in a world filled with more and more fake facts? How do we differentiate between good science, poor science and non-science? How do you become the best scientist you can be so that you too can solve the important challenges that face us? That is what we explore in this course. This course will immerse you with your student colleagues and with academic staff to begin the process of 1) building a learning community that will likely become your professional network through the remainder of your career and 2) building an understanding of what it is to be a high-quality scientific professional in today's world. You will learn about the many ways to think scientifically. You will explore how science informs debate and decision-making about public issues. You will gain an understanding of what it means to be a professional having scientific literacy and how you can contribute to a better future using your scientific knowledge. You will also meet inspiring scientists and have the opportunity to hone your communication, critical thinking and interpersonal skills – three skills that are essential for successful and fulfilling careers in science and beyond.

### Academic Progress Requirements

Nil

### Requisites

If you have successfully completed SCIE1001 you cannot enrol in this course. This course is only available to students in the Bachelor of Science (Advanced), Bachelor of Psychological Science (Advanced), or Bachelor of Mathematics (Advanced) programs.

### Contact Hours

#### Callaghan

#### Integrated Learning Session \*

Face to Face On Campus

1 hour(s) per week(s) for 13 week(s) starting Week 1

#### Online Activity

Online

3 hour(s) per week(s) for 13 week(s) starting Week 1

#### Workshop

Face to Face On Campus

2 hour(s) per week(s) for 13 week(s) starting Week 1

#### Workshop

Face to Face On Campus

1 hour(s) per week(s) for 1 week(s) starting Week 9

\* This contact type has a compulsory requirement.

# COURSE OUTLINE

[www.newcastle.edu.au](http://www.newcastle.edu.au)

CRICOS Provider 00109J

---

**Unit Weighting** 10

**Workload** Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

## CONTACTS

**Course Coordinator** **Callaghan**  
Dr Emma Beckett  
[emma.beckett@newcastle.edu.au](mailto:emma.beckett@newcastle.edu.au)  
Consultation: Via email or Zoom appointment.

**Teaching Staff** Other teaching staff will be advised on the course Canvas site.

**School Office** **School of Environmental and Life Sciences**  
Room C228 Chemistry Building  
Callaghan  
Science-SELS@newcastle.edu.au  
+61 2 4921 5080  
9am-5pm (Mon-Fri)

## SYLLABUS

**Course Content**

- What is science and the scientific method?
- How do scientists think?
- How to differentiate high-quality science, poor science and non-science.
- The role of science in contributing to societal challenges.
- The role of the scientist as a responsible and ethical world citizen.
- The limits of science.
- Learning science at university.
- Developing oral communication, critical thinking and interpersonal skills.

**Course Learning Outcomes** **On successful completion of this course, students will be able to:**

1. Identify and articulate the methods of science;
2. Explain the thinking that supports high-quality science;
3. Justify the role of the ethical scientist and relevance of science in society;
4. Identify and consider your responsibilities as students of scientific inquiry;
5. Articulate the importance of the scientific community for the success of science;
6. Articulate the importance of oral communication, critical thinking and interpersonal skills for successful and fulfilling careers in science and beyond.

**Course Materials**

**Multi-Media Resource:**

- All stimulus materials are accessible via Canvas

**Recommended Reading:**

- All stimulus materials are accessible via Canvas

**Required Reading:**

- All stimulus materials are accessible via Canvas

# COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

## Contact Hour Requirements:

- Integrated Learning Session: There is a compulsory attendance requirement in this course.

# SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	26 Feb	Welcome to SCIE1003 and the beginning of your Advanced Program	Online material, learning activities & 2 hr workshop	
2	4 Mar	Pseudoscience, Fake Facts and Science Denial - The challenge for science	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
3	11 Mar	What is science and where did it come from? - An alternative to non-science	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
4	18 Mar	What makes science special? - Philosophy and practice of science	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
5	25 Mar	Scientific scholarship with integrity	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
6	1 Apr	How do scientists think? - Contrasting ways of thinking scientifically	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
7	8 Apr	The Eureka moment - why creative thinking is so important in science	Online material, learning activities & 2 hr workshop	Online Oral Presentation; Workshop Preparation Notes
<b>Mid-Semester Recess</b>				
<b>Mid-Semester Recess</b>				
8	29 Apr	Hang On! Really? - The power of critical thinking	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
9	6 May	Lies, damn lies, and statistics! - The importance of data and its sound interpretation	Online material, learning activities & 2 hr workshop; Q&A Panel (1 hr)	Workshop Preparation Notes
10	13 May	Bias, quackery and the irrational - Identifying poor scientific thinking	Online material, learning activities & 2 hr workshop	Nobel Prize Nomination; Workshop Preparation Notes
11	20 May	Doing the right thing - Ethical practice in science	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
12	27 May	Beyond Science	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
13	3 Jun	Meeting some real scientists - Testing course theory in practice	Online material, learning activities & 2 hr workshop	Workshop Preparation Notes
<b>Examination Period</b>				Reflective Journal
<b>Examination Period</b>				

# ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Online Oral Presentation	14 April	Individual	30%	1, 2, 5, 6
2	Nobel Prize Nomination	19 May	Individual	20%	1, 2, 3, 5, 6
3	Reflective Journal	12 June	Individual	30%	3, 4, 5, 6
4	Workshop Preparation Notes	Beginning of your scheduled workshop each week	Individual	20%	1, 2, 3, 4

**Late Submissions** The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

## Assessment 1 - Online Oral Presentation

**Assessment Type** Presentation

**Purpose** This task gives you the opportunity to demonstrate both your learning in the early weeks of the course and your presentation skills.

**Description** In this assessment task, you will be required to pick something interesting you have learnt in the content of this course from Weeks 1 through 4. Your challenge is to explain it to your lay audience in an engaging multimedia oral presentation.

**Weighting** 30%

**Length** Three minutes

**Due Date** 14 April

**Submission Method** Online  
Via Canvas

**Assessment Criteria** Marking rubric available via the course Canvas site

**Return Method** Online

**Feedback Provided** Online - Within 15 University working days. Marking rubric, written and/or verbal feedback.

**Opportunity to Reattempt** Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 2 - Nobel Prize Nomination

**Assessment Type** Written Assignment

**Purpose** The Nobel Prize nomination assessment task is a way for you to communicate your understanding of what it means to be a high-quality scientist.

**Description** In making your nomination you will use what you have learned in the content of this course to identify qualities important to engaging in high-quality science, and you'll then identify these qualities in a scientist of your choice.

**Weighting** 20%

**Length** 500 words

**Due Date** 19 May

**Submission Method** Online  
Via Canvas

**Assessment Criteria** Marking rubric available via the course Canvas site

**Return Method** Online

**Feedback Provided** Online - Within 15 University working days. Marking rubric, written and/or verbal feedback.

**Opportunity to Reattempt** Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 3 - Reflective Journal

**Assessment Type** Journal

**Purpose** This assessment task gives you the opportunity to demonstrate your capacity for reflecting on your learning experiences.

**Description** First, each week, in response to prompting questions, you will document and reflect in a

	journal on your experience of the course content and learning activities. Then, you will draw on your journal entries made through the semester in order to provide a meta-reflection on your learning experiences due at the end of semester.
<b>Weighting</b>	30%
<b>Length</b>	1,000 words
<b>Due Date</b>	12 June
<b>Submission Method</b>	Online Via Canvas
<b>Assessment Criteria</b>	Marking rubric available via the course Canvas site
<b>Return Method</b>	Online
<b>Feedback Provided</b>	Online - Within 15 University working days. Marking rubric, written and/or verbal feedback.
<b>Opportunity to Reattempt</b>	Students WILL NOT be given the opportunity to reattempt this assessment.

## Assessment 4 - Workshop Preparation Notes

<b>Assessment Type</b>	Written Assignment
<b>Purpose</b>	This task supports you to prepare well for the course workshops, and therefore supports you to engage effectively in the learning experiences this course offers, including through the course's other assessment tasks.
<b>Description</b>	For each of ten weeks (2% per week, for a total of 20%), you will bring to class preparatory notes identifying and summarising key ideas and questions for each week's topics.
<b>Weighting</b>	20%
<b>Length</b>	Two pages each week
<b>Due Date</b>	Beginning of your scheduled workshop each week
<b>Submission Method</b>	In Class
<b>Assessment Criteria</b>	Marking rubric available via the course Canvas site
<b>Return Method</b>	In Class
<b>Feedback Provided</b>	In Class - During your scheduled workshop each week. Brief verbal and/or written feedback.
<b>Opportunity to Reattempt</b>	Students WILL NOT be given the opportunity to reattempt this assessment.

## ADDITIONAL INFORMATION

### Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

\*Skills are those identified for the purposes of assessment task(s).

---

<b>Attendance</b>	Attendance/participation will be recorded in the following components: <ul style="list-style-type: none"><li>- Integrated Learning Session (Method of recording: UoN app)</li></ul>
<b>Communication Methods</b>	Communication methods used in this course include: <ul style="list-style-type: none"><li>- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.</li><li>- Email: Students will receive communications via their student email account.</li><li>- Face to Face: Communication will be provided via face to face meetings or supervision.</li></ul>
<b>Course Evaluation</b>	Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement. Critical Incident Questionnaire
<b>Oral Interviews (Vivas)</b>	As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the <a href="#">Oral Examination (viva) Procedure</a> . In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the <a href="#">Student Conduct Rule</a> .
<b>Academic Misconduct</b>	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <a href="https://policies.newcastle.edu.au/document/view-current.php?id=35">https://policies.newcastle.edu.au/document/view-current.php?id=35</a> .
<b>Adverse Circumstances</b>	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where: <ol style="list-style-type: none"><li>1. the assessment item is a major assessment item; or</li><li>2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;</li><li>3. you are requesting a change of placement; or</li><li>4. the course has a compulsory attendance requirement.</li></ol> Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: <a href="https://policies.newcastle.edu.au/document/view-current.php?id=236">https://policies.newcastle.edu.au/document/view-current.php?id=236</a>
<b>Important Policy Information</b>	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at <a href="https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures">https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures</a> that support a safe and respectful environment at the University.

*This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.*

© 2024 The University of Newcastle, Australia