BEES 6800
Arizona State University TWC371

The Science of Science Communication

School of Biological, Earth and Environmental Sciences

Faculty of Science

Term 2, 2021
1. Staff

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Email</th>
<th>Consultation times and locations</th>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Convenor</td>
<td>A/Prof Carol Oliver</td>
<td><a href="mailto:carol.oliver@unsw.edu.au">carol.oliver@unsw.edu.au</a></td>
<td></td>
<td>0417 477 612</td>
</tr>
<tr>
<td>Lecturer</td>
<td></td>
<td></td>
<td></td>
<td>International:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0061 417 477 612</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Location: Room 5112, Building E26 Biosciences, Kensington campus, Sydney.</td>
</tr>
<tr>
<td>ASU lead</td>
<td>Prof Andy Mara</td>
<td><a href="mailto:andrew.f.mara@asu.edu">andrew.f.mara@asu.edu</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Course information

Units of credit: 6

Pre-requisite(s): Eight full credit courses or equivalent

Teaching times and locations:

This course is fully online and asynchronous (students can study the week’s module at any time in that week). There are three optional synchronous virtual one-hour classes that are also recorded to assist with a sense of learning community and to offer assignment help.

2.1 Course summary

In a world where fake science news threatens our ability to communicate science effectively, being able to apply an evidence-based approach to science communication has become an important skill.

The Science of Science Communication course aims to teach students to effectively communicate across a range of audiences about why science matters, how it works and its relevance to society. Students explore the nature of science and the public communication of scientific risk and uncertainty. They also learn about models and purposes of science communication, trust and credibility among public audiences and measuring the effectiveness of science communication. These insights are the foundation for the effective communication of science.

Assessment will be through three connected online assignments that directly address course outcomes. These outcomes include understanding uncertainty and risk in science, the theories and models of science communication, persuasive writing and the art and science of storytelling in science, communicating online in the post-truth world, social contexts of science communication, and knowing how to measure the effectiveness of science communication.
2.2 Course aims

Communication is a vital skill in an increasingly information-rich world. Science impacts all of our lives from a global pandemic to climate change, and how science communicate these major shared challenges with non-expert audiences has proven to be critical to the outcomes for a science and technology driven society as a whole. Such challenges are not limited by national borders. Effective communication is at the heart of the future we want for ourselves and our children. The need for good science communicators has never been greater. The aim of this course is to provide a foundation of the basic skills required for effective evidence-based science communication.

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply strategies in communicating science with words, visuals, and in multimedia for non-expert audiences.
2. Write concisely, design an effective PowerPoint slide deck, and create powerful presentations for multiple audiences. You will also be able to apply these science communication skills to other areas of study, research and workplace.
3. Communicate scientific uncertainty, risk and the nature of scientific inquiry with the objective of maintaining and gaining public trust in science.
4. Apply robust measurement in evaluating the effectiveness of science communication
5. Apply the theories and models of science communication to the practice of science communication.
6. Employ the art of knowing the audience, telling a good story, and to do these two things with achievable, measurable objectives in mind.
7. Design an effective social media science communication strategy for non-expert audiences.

2.4 Graduate attributes gained from this course

<table>
<thead>
<tr>
<th>Faculty of Science Graduate Attributes</th>
<th>Level of Focus 0 = No</th>
<th>1 = Minimal</th>
<th>2 = Minor</th>
<th>3 = Major</th>
<th>Related Tasks &amp; Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research, inquiry, and analytical thinking abilities.</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Evaluation of primary literature; digital literacy through evaluation of information.</td>
</tr>
<tr>
<td>2. Capability and motivation for intellectual development.</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>The course is aimed at encouraging lifelong learning. There is no rote learning, no final exam, and all three assignments are aimed at higher order thinking to develop skills necessary for lifelong learning.</td>
</tr>
<tr>
<td>3. Ethical, social and professional understanding.</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td>The course contains ethical considerations in engaging public audiences with the stories of science, particularly in the way information is framed, and the persuasive skills that are used to engage audiences with science.</td>
</tr>
</tbody>
</table>
4. Communication.  3  Students learn how to be good science communicators – to know their audience, to tell a good story and to have achievable, measurable goals and objectives in mind.

5. Information literacy.  3  Using primary literature; Using the library and online resources to research science communication literature.

For more information, visit: https://teaching.unsw.edu.au/sites/default/files/upload-files/unsw-graduate-attributes_0.pdf

3. Strategies and approaches to learning

3.1 Learning and teaching activities

Successful scientists must be effective communicators. They instinctively know how to craft their messages into different shapes for different audiences – from writing a research paper to presentation skills. However, scientists and students alike rarely get the opportunity to learn how to effectively communicate with non-expert public audiences – a critical part of the process of science given the impact on society. This course aims to fill that gap. Students taking this course may consider it a foundation for considering a career as a science communicator.

The teaching strategy is to focus on engaging students with lifelong learning. Communication strategies require practice not rote learning and therefore there is no final exam. There are also no quizzes – the focus is on practicing the skills that are taught.

The teaching strategies and rationale are designed to open student minds to multiple ways of communicating science now and in the future. The techniques, strategies and content taught in this course are evidence-based, using both the foundational and most recent research in science communication. This is underpinned with the critical and creative scientific thinking throughout the course to allow students to effectively communicate how science works, why science matters and what its relevance is to our culture and to our society.

Assessments are designed to explore different aspects of science communication. The first assessment encourages students to think about the communication of both the processes of science and science knowledge in the context of a theme that is currently engaging public audiences (the theme therefore changes each year). In the first assessment, you will consider scientific uncertainty, risk and public trust in science. The second assessment practices the art and science of storytelling as a way of making science accessible for non-expert public and government audiences. In the third assessment, students construct a social media strategy for a research centre. The latter is to assess student understanding of key elements of the course, and thus a final exam is not required.

Assumed knowledge: There is no assumed knowledge of science communication but students taking this course must have completed 48 Units of Credit equal (UNSW students) or to one year of study at the college level (ASU students). They should be reasonably confident of basic communication skills in writing and presenting. Some online asynchronous tutorials will be offered to close some gaps with pointers to university central resources to help with those skills.
3.2 Expectations of students

Students are expected to:

- Engage with the weekly online modules in the week they are delivered.
- Attend as many of the three virtual synchronous one hour (dates and times in the course schedule, Sydney and Tempe times provided).
- Engage with fellow students via the Course Microsoft Teams.
- Read and respond (if needed) to any course messages via Teams, e-mail or the course forum.

The course requires 150 hours of study. Approximately one third is for course materials, one third for the assignments and one third for self-directed study to support your learning. Suggestions are made on additional reading materials.

Course activities are:

Lessons – The core content is delivered via short electronic books (e-books) containing text, images and videos fully online and aimed at student comprehension of the key concepts in science communication and to provide students with the tools to communicate science effectively to peer and lay audiences. Students also undertake readings to deepen understanding.

Three assessments – These assessments are aimed at helping students build confidence in their understanding of science communication. They are all formative as well as summative activities, so should be treated as learning opportunities supported by the course materials.

Your total course marks out of 100% will be based on:

Assessment 1 A and B = 25%; Assessment 2 A and B = 25%; Assessment 3 A, B and C = 50%.

4. Course schedule and structure

This course consists of four hours per week to complete modules plus four one-hour online classes (total 40 hours). You are expected to take the remaining 110 hours to complete assessments, practicing the skills taught and undertaking additional suggested reading. Week 6 (flexibility week) is free of new course materials and assessments. Week 10 is also free of new materials but support for the final assessment is provided.

<table>
<thead>
<tr>
<th>Week</th>
<th>Module</th>
<th>Content</th>
<th>Learning opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>May 31- June 4</td>
<td>Introduction to science communication</td>
<td>Non-expert audiences, public understanding of science and public scientific literacy</td>
</tr>
<tr>
<td>Week 2</td>
<td>June 7-11</td>
<td>Scientific uncertainty, risk and trust in science</td>
<td>Communication scientific uncertainty and risk; credibility and trust in science; relevance and perceptions of science in society.</td>
</tr>
<tr>
<td>Week 3</td>
<td>June 14-18</td>
<td>Science and the traditional and social media</td>
<td>Traditional and social media and the circle of influence; relationship between the media</td>
</tr>
</tbody>
</table>
| Week 4 | June 21-25 | The art and neuroscience of storytelling | The social brain and storytelling; ethos, logos and pathos; ethics of storytelling, persuasive writing and influence in science communication; slide creation and presentation skills. | Begin plan for Assessment A  
Virtual Class 2  
Friday 25 June 9.30 a.m.  
(Sydney time) |
|---|---|---|---|---|
| Week 5 | June 28 - July 2 | Theories and models of science communication | Framework of science communication from deficit to dialogue models; theories and practice of science communication. | Submit Assessment 2  
Part A  
Friday 2 July 7 p.m.  
(Sydney time) |
| Week 6 | July 5 - 9 | Flexibility week | No coursework or assessments |  |
| Week 7 | July 12 - 16 | Communicating science in a post-truth world | Past, present and future of social media; Navigating the communication of science in a post-truth world; Goals, objectives and strategies in writing a social media plan. | Submit Assessment 2  
Part B  
Friday 16 July 7 p.m.  
(Sydney time) |
| Week 8 | July 19 - 23 | Evidence-based science communication | Evaluation planning; measuring the effectiveness of science communication; interpretation of the evidence. | Submit Assessment 3  
Part A.  
Friday 23 July 7 p.m.  
(Sydney time) |
| Week 9 | July 26 - 30 | Communicating science in society | Creating engagement and impact in communicating science in society; Influencing science policy. | Virtual Class 3:  
Friday 30 July 9.30 a.m.  
(Sydney time) |
| Week 10 | August 2 - 6 | Assessment 3 support | No new material | Submit Assessment 3  
Parts B and C  
Sunday 8 August, 7 p.m.  
(Sydney time) |
5. Assessment

5.1 Assessment tasks

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Length</th>
<th>Weight</th>
<th>Mark</th>
<th>Due date</th>
</tr>
</thead>
</table>
| **Assessment 1:** Assignment 1 is an article on a subject that explores the communication of the nature and processes of science, probability, risk and uncertainty. This assignment is in two parts – Part A due in Week 2 in the outline and Part B is the full article due in Week 3 with the benefit of feedback from Part A’s submission. | Up to 1,500 words | 25% | 25 | Part A, Week 2  
Part B, Week 4 |
| **Assessment 2:** Assignment 2 Part A is a story plan due in Week 5. Part B is a script and a 3-minute video with the public as the target audience due in week 7. | Up to 600 words for Part A; script and 3-minute video | 25% | 25 | Part A Week 5  
Part B Week 7 |
| **Assessment 3:** Students prepare and justify a plan for a research centre to engage with the public through social media. The assignment has three parts. First, students produce an outline of a social media plan (600 words, worth 10% of the course marks and due in Week 8) to receive feedback before proceeding to the final plan. They then produce the final plan (1,500 words and worth 30% of the course marks) together with a sample of a posting (up to 150 words worth 10% of the course marks) due in Week 10. Feedback and final marks two weeks after the end of the course. | Part A: up to 600 words  
Part B: up to 1,500 words  
Part C: Up to 150 words | 50% | 50 | Part A Week 8  
Parts B and C Week 10 |

Further information

UNSW grading system: [https://student.unsw.edu.au/grades](https://student.unsw.edu.au/grades)


**Arizona State University students:** The difference between the UNSW and ASU grading systems is accounted for in conversion of your marks to the ASU system.
5.2 Assessment criteria and standards

Each assessment has a set of marking rubrics. You should read these in conjunction with the assessment to interpret the assessment. A key issue is that many students do not spend time making sure they understand the assignment and rubrics, and to check them against their intended submission to make sure nothing has been missed. Please feel free to ask A/Prof Carol Oliver (carol.oliver@unsw.edu.au) questions about the assignments and rubrics.

5.3 Submission of assessment tasks

All assignment submissions are made through a link in the modules to Turnitin. Your submission should be in PDF format. Turnitin will assess for plagiarism. You can check to make sure you have not plagiarised accidentally. If you wish to then change your assignment, you may unload and upload a new version providing all this is completed by the submission deadline. You will not be able to upload a late assignment. It will need to be forwarded to A/Prof Carol Oliver at carol.oliver@unsw.edu.au. Late assignments incur a penalty of 10% of the maximum marks for the assignment per day, beginning immediately after the deadline unless you have been granted special consideration. There are a range of reasons that qualify for special consideration. Students should visit https://student.unsw.edu.au/special-consideration.

5.4. Feedback on assessment

Feedback is an essential part of learning. Marks and feedback will be returned by a maximum of two weeks after submission but, in many cases, this is provided within one week or less of submission. Access you full feedback by opening the blue box with a pen through it in the upper right of your assignment after the marks are released.

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work that you use constitutes plagiarism.

In this course you should apply APA referencing. Further information about referencing styles can be located at https://student.unsw.edu.au/referencing.

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you do not follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and plagiarism can be located at:

- The Current Students site https://student.unsw.edu.au/plagiarism

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct.
7. Readings and resources

The textbook for this course is The Science of Communicating Science by Craig Cormick (CSIRO Publishing, 2019). This is freely available online through the UNSW Library. Links to specific chapters for reading are in the Leganto list, which has a link within the course.

8. Additional support for students

- Student gateway: https://student.unsw.edu.au/
- Academic Skills and Support: https://student.unsw.edu.au/academic-skills
- Student Wellbeing, Health and Safety: https://student.unsw.edu.au/wellbeing
- Disability Support Services: https://student.unsw.edu.au/disability-services
- UNSW IT Service Centre: https://www.it.unsw.edu.au/students/index.html

9. Virtual office hours

You can also request a one-on-one virtual meeting at a time convenient for you and for me by e-mailing me at carol.oliver@unsw.edu.au. I generally aim to respond to your enquiries with 12 hours and often much sooner, seven days a week during Term, so please feel free to follow up if you do not get a response in that timeframe.

I also strongly encourage ongoing feedback on what you like or do not like about the course.

You are strongly encouraged to engage with me in relation to the course content and the assignments either one-on-one electronically or in person, or on the course forum or in Teams.

10. What our graduates say about this course

“The best aspects included the freedom to explore through the openness of the assignments whilst also getting plenty of resources and references. The uniqueness of this course is one of the greatest things because it was incredibly informative and the level of knowledge around science communication was not what I had expected. The information was delivered in an effective manner through a mix of medium, such as videos as well as written information meaning that it was not just large amounts of continuous texts. In addition, the information was clear and well broken down, so it was manageable.” (The Science of Science Communication course graduate).

11. Career opportunities

Well-crafted communication of science plays an important part in establishing a dialogue between research and society. Good marketing and effective communication can be a strong influence on how science is perceived by people.

As a science communicator, you might be explaining climate change in a press release, briefing a government representative on a policy decision or developing a communications strategy inside a science organisation. Those who excel at science communication have a passion for storytelling and presenting the benefits of science.
Science communicators can also be found working in social media marketing, curating or designing museum exhibitions or writing scientific publications. In each of these fields, skilled communication with a variety of audiences is required.

**Relevant Roles**

- Science communicator
- Communications Manager/Director
- Social Media Producer/writer
- Public Relations Manager
- Museum Curator
- Press officer
- Freelance writer
- Broadcaster
- News presenter
- Science journalist
- Outreach Manager/Director
- Editor
- Medical or other specialist writer
- Author
- Academic researcher in science communication
- Academic teacher in science communication