Course outline:

An essential guide

for

BEES6800

The Science of Science Communication

School of Biological, Earth
and Environmental Sciences

Faculty of Science

Term 3, 2020

1. Staff

Position	Name	Email
Course Convener	Dr Carol Oliver	carol.oliver@unsw.edu.au

2. Course information

Units of credit: 6

Teaching times and locations: **Fully online**

Course summary

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

The Science of Science Communication course aims to teach science students how to effectively communicate across a range of audiences about why science matters, how it works and its relevance to the way we live our lives.

Students will learn to communicate effectively in a digital age where content is easily accessed but understanding that content is harder to achieve. They will also learn how to measure the effectiveness of their communication of science.

The course is entirely online.

Assessment will be through three connected online assignments that directly address course outcomes. These outcomes include understanding the nature and processes of science, being able to communicate science clearly with multiple audiences in multiple modes, understanding the best use of new and emerging technologies to communicate science, thinking critically and creatively, and knowing how to measure the effectiveness of science communication.

Students should have completed at least one year of university courses to tundertake this science elective course. There is no assumed knowledge of science communication. There is no final exam.

Course aims:

- To introduce students to the steps in communicating science effectively with multiple target audiences from peer to public.
- To develop skills in clearly articulating science in simple language, using powerful visualisation and in appropriate use of new and emerging communication technologies.
- To inspire students to connect audiences with science through storytelling in a personable and meaningful way and to use metaphors and analogy to allow non-experts to understand how science works and why science matters.
- To expose students to the challenges of communicating science to the public and through traditional and social media.
- To provide students to access with ways of measuring the effectiveness of their science communication initiatives and activities.

This course is aimed at filling a gap for students wishing to apply their science expertise to future roles where there is an increasing demand for science communication, or to apply these skills as a practising scientist in the future.

Course learning outcomes

The course learning outcomes enable students to:

1. Apply strategies in communicating science with words, visuals, and in multimedia across multiple types of audiences ranging from peer to public
2. Communicate scientific uncertainty and the nature of science with the objective of maintaining and gaining public trust in science
3. Apply robust measurement in evaluating the effectiveness of science communication
4. Apply the models of science communication to the practice of science communication
5. Employ the art of knowing the audience, telling a good story, and to do these two things with an achievable, measurable objective in mind

6. Design an effective social media science communication strategy for multiple audiences

How to be successful in this online course

NOW: Treat this course as you would a face-to-face course. Review the course outline carefully and create a work and assignment schedule in relation to your other courses to stay on track. Don't go a whole week without connecting with the course – students who do this generally get low marks or sometimes fail.

DAILY: Read any announcements posted in the course.
DAILY: Read and respond to any course email messages, within 24 hours.
ON A WEEKLY BASIS: plan to spend approximately 10-16 hours a week completing coursework requirements, including readings and assessments. Take notes when reading course materials or watching videos. Research shows that writing notes by hand helps you to reflect more easily on the materials and do better on assignments. Use the course journal you create in Week 1 and use it to undertake non-assessed activities. Start assignments 2 and 3 at least one week in advance.
ON A WEEKLY BASIS: Connect with me, Carol, your instructor if you have any questions in advance of due dates. I am here to help, and I really like to see my students do well !! :)

Graduate attributes developed in this course

Faculty of Science Graduate Attributes	**Level of Focus** 0 = No Focus 1 = Minimal 2 = Minor 3 = Major	**Related Tasks & Assessment**
1. Research, inquiry, and analytical thinking abilities.	3	Evaluation of primary literature; digital literacy through evaluation of information.

2. Capability and motivation for intellectual development.	3	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.
3. Ethical, social and professional understanding.	3	The course contains ethical considerations from what objectivity means in engaging public audiences with the stories of science, particularly in the way information is framed.
4. Communication.	3	Students learn how to be good science communicators – to know their audience, to tell a good story, and to have an achievable, measurable objective 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://www.science.unsw.edu.au/our-faculty/science-graduate- attributes

Strategies and approaches to learning

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 the creation and presentation of a public talk. These skills are usually learned from lengthy trial and error. This course aims to fill that gap as well as offer the opportunity for other students to consider science communication as a career option.

The teaching strategy is to focus on engaging students with lifelong learning. To avoid rote learning thinking, there is no final exam. .

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.

Assignments are designed to explore different aspects of science communication. The first assignment 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). The second assignment practices the art of storytelling using metaphor or analogy as a way of making science accessible across disciplines and among public and government audiences. In the third assignment, students construct a social media strategy for a research centre. The latter is to assess student understanding of key the elements of the course, and thus a final exam is not required.

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..

Assumed knowledge: There is no assumed knowledge of science communication but students taking this course must have completed 48 Units of Credit equal to one year of study at the university level.

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 and activities 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.

THERE IS NO FINAL EXAM

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

Three assignments: **A1 = 25%; A2 = 25%; A3 = 50%**

Course schedule and structure

What to do in each week	Topics	What is due this week
Week 1 Theme 1 Introduction to science communication. Public understanding of science and audiences	**Elements of science communication** 1. Introduction to science communication 2. Public understanding of the nature of science	Activity 1: Watch video and create course journal Activity 2: In course journal discuss the role of oxytocin in storytelling Activity 3: Compare the public's high interest in science with low public scientific literacy. Post onto forum. (activities are not assessed, but I will engage with you on what you post in the forum)
Week 2 Theme 2 Scientific uncertainty compared to everyday uncertainty, communicating risk and the role of public trust in science and scientists	**Scientific uncertainty, risk and trust in science** 3. Communicating scientific uncertainty and risk 4. Credibility, relevance and legitimacy	Two short journal activities, and one short forum activity.

Week 3 Theme 3 This theme explores the relationship between the media and scientists. It also examines the ethical implications of communicating science and the consequences of choosing a frame in connecting public audiences with science/	**Media, Framing and ethics** 5. Science and the media 6. Ethics and framing	Two short journal activities; one short forum activity
Week 4 Theme 4 We examine the science communication framework of models that characterise approaches in science communication from deficit to dialogue and the public participation in science research. The models help match the goals and objectives of science communication to the desired outcomes.	**Models of science communication** 7. Deficit model 8. Other models of science communication	One short journal activity **Assignment 1 (25%)** Assignment 1 is a 1,500-word news article on a subject that explores the communication of the nature and processes of science, probability, risk and uncertainty. This assessment tests themes 1 and 2. In 2020, this theme is on COVID-19.
Week 5 Theme 5 We explore the art of storytelling in science communication and how it is linked to engaging presentations	**Storytelling as an essential tool** 9. Wired for story 10. Engaging presentations	Two short journal activities, one short forum activity
Week 6	**Flexible week – time to reflect: No new course content or assignments due**	

Week 7 Theme 6 We complete the toolbox of the good science communicator with ethos (appealing to ethics), logos (appealing to logic) and pathos (appealing to emotions) among other science communication tools	**Writing persuasively** 11. Ethos, logos and pathos as persuasive tools 12. Other communication tools	One short journal activity **Assignment 2 (25%)** Assignment 2 is a 3-minute video with the public as the target audience. Select one of three scientific discoveries to narrate as a story with a beginning, a middle and an end. Students must also submit a reference list in a PDF format. Assessing themes 3, 4 a nd 5
Week 8 Theme 7 The internet has changed the way we access information about science. The 2020 global pandemic has forever changed the way we do business. This week we examine communicating science and navigating a post-truth fake news world.	**Science communication in a digital world** 13. Communicating science in a post-truth world 14. Engaging with experts and public audiences online	One short journal activity **Assignment 3 (10%) PT A** Create an outline social media strategy from one of four BEES research centres for Part A. Receive feedback and then develop your research centre chosen in Part A for Parts B and C.
Week 9 Theme 8 Science is influenced by society and vice versa. Understanding this interconnection, its impact on science policy and how it shapes our science-based world also impact the way we communicate science among public audiences.	**Science and society** 15. The role of scientists and Civic engagement 16. Creating impact through Science communication and science policy	One short journal activity, one short forum activity

Week 10 Theme 9	Evidence-based science communication	Assignment 3 PTS B and C
There is a growing mantra in science communication: If you cannot measure it, you cannot improve it. Another way to think of it is that measurement is needed to avoid planning science communication as 'a good idea' without learning from previous efforts. In addition, science is an evidence-based enterprise and it is reasonable to expect scientists to demand evidence of the effectiveness of science communication.	17. Measuring the effectiveness of science communication 18. Interpretation of the evidence	Part B (40%) Your social media strategy should consider a platform or combination of platforms, as well as the goals, the aims, and t he intended outcomes. You must include a robust measurement strategy to assess the effectiveness of the strategy after six months. Part C: The assessment tests all elements of the course, but especially themes 6, 7, 8 and 9. **Please fill out the MyExperience survey**

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 paraphrase someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism. This course uses APA referencing style.

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.*1* At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

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

NO LEVEL OF PLAGIARISM IS ACCEPTABLE. It is your responsibility to check your similarity score in Turnitin after submission. **You will lose marks for 'stringing together' phrases that essentially adds up to copying another author's work.** You may delete your assignment, resubmit, and recheck as many times as you like up to the deadline for submission. Note that Turnitin can pick up references, proper nouns, your name and zID as plagiarised – and in these cases, it is not counted as plagiarism.

Additional support for students

The Current Students' 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

Virtual Office Hours: Engage with me!

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 am also very happy to answer any questions or provide advice via my email address.

I generally aim to respond to your enquiries with 12 hours and often much sooner, 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 (the latter especially if the answer could potentially be useful to the whole class). From time to time during the course, you will have the opportunity to join a class conference via Zoom.