Executive Summary - Certificate in Science Communication

A joint proposal from the Faculties of Science and Public Affairs

Program Description

1. Overview & Rationale

As the Canadian government continues to place an increased emphasis on the value of science and evidence-based governance, the need for skilled communicators, those able to bridge the gap between the world of the researcher and the general public, becomes increasingly important. As academics, it is our responsibility to respond - to balance our teaching in a way that prepares students to be active citizens and ethical members of their communities and professions, while ensuring they complete their degrees with skills that are relevant to the contemporary workplace.

Science communication offers significant breadth of interpretation, and science communicators may come from varied backgrounds, with variable levels of scientific expertise, and with a range of largely non-scientific target audiences. However, the overarching aims of science communication remain consistent - increasing awareness and understanding of science; and mobilizing scientific knowledge.

The Institute of Environmental and InterdisciplinaryScience (IEIS) is proposing a new, collaborative program between the Faculty of Science and the Faculty of Public Affairs – a Certificate in Science Communication. The certificate will be open to students from Faculty of Science, FPA and FASS and will consist of 5.0 undergraduate credits plus a professional workshop.

Moving forward we will continue to explore options to expand the elective and capstone course selection to facilitate wider access to the certificate across all faculties. Currently, the certificate allows for 0.5 credits of any 1000-level science course, a further 0.5 credits of any faculty of Science course, and includes a capstone option - ISAP 4907 - which is available to all students registered in the certificate, providing a pathway for entry and completion.

2. Certificate Governance

The Certificate in Science Communication will be administered by the Institute of Environmental and Interdisciplinary Science (IEIS), with joint governance by the Faculty of Science and Faculty of Public Affairs. A Science Communication Certificate committee, chaired by a faculty member from the Interdisciplinary Science and Practice Program (ISAP) and a faculty member from FPA, and including a representative from each contributing unit, will be responsible for curriculum decisions, application review, program requirements, and regulations. The certificate committee co-chairs will be appointed by their respective Deans, in consultation with Chairs/Directors of participating units.

3. Program Goals

The certificate program is intended to provide fundamental and practical knowledge, such that upon completion we expect that students will be able to:

- Analyze the impact of science on society.
- Explain the intersection between science and communication.
- Apply the study of media, and theory and approaches to effective science communication.
- Communicate science using a range of media and technology.

Overview of existing science communication certificates.

An analysis of currently available science communication certificates[1] reveals a range of program structure and focus. Some programs, such as those at Dalhousie University, University of Illinois, or the University of Waterloo, are intended to highlight aspects of a science student's current program, with the intention of developing leadership and communication skills in those for whom science will remain their primary expertise. As such, instruction in the communication of science either forms only a small part of the requirements, together with courses on leadership, ethics, and the nature of science; or is largely reliant upon attendance at 'science communication' events. Ultimately these programs largely serve as an adjunct to develop communication skills within a discipline specific context.

Other programs however, such as those at Laurentian University or the University of Edinburgh (online), have an alternative focus and are intended to provide both theoretical foundations and the practical experiences required to develop a career in science communication and public engagement – essentially preparing participants to help fill the gap between science and stakeholders. Although these types of programs are open to individuals from a range of disciplines, notably, they are only offered as graduate certificates, diplomas, or master's degrees.

It is our intention to offer a certificate program that will be unique in Canada. We are proposing an undergraduate certificate, open to students across the Faculty of Science, FPA, and FASS, that will provide students with the skills necessary to translate scientific knowledge for wider public audiences for the benefit of the economy, culture and society. The course structure that we propose below combines fundamental knowledge of the process of science and its potential end-users, with the theory and practice of communication that enables the mobilization of knowledge to these groups. Importantly, the aims of our certificate are consistent with the goals of the Carleton University Strategic Integrated Plan, to share knowledge, shape the future, and to serve Ottawa and the wider World.

[1] Program requirements for the certificates referred to can be found in Appendix 1.

4. Program structure

The Certificate in Science Communication will be administratively governed by IEIS, in keeping with the role and expertise of that Institute in developing faculty and university-wide programming in the practice of science.

Admission Requirements.

The Certificate in Science Communication is only available to be taken concurrently with a bachelor's Honours degree program. Admission to the certificate requires completion of at least 4.0 credits in an Honours degree program, and a CGPA of 10.0 or higher. Enrollment is limited.

During the initial development of the certificate we would cap the enrolment at 10 per year, with an aim to increase that number to a maximum of 20 students per year in the long term.

Certificate Requirements.

Given the Certificate is a supplementary credential, it is anticipated that students enrolled in an honours program may require additional credits to satisfy the Certificate requirements.

Students enrolled in the certificate will be drawn from programs across FS, FPA and FASS, and as such will possess relative strengths/weaknesses in scientific training and knowledge mobilization. Whilst students not in the faculty of Science will be encouraged to also take a minor in science, the certificate requirements are designed to ensure students have the opportunity to develop their interests in both disciplines, whilst ensuring that the learning objectives are met.

In particular, the core ISAP courses, which include instruction on the nature of science and the scientific method, the perception of science, and the impact and implications of scientific discovery, will provide all students, regardless of background, with the foundational knowledge to explore the impact of science on society, and apply approaches to effective science communication.

The Certificate comprises 5.0 credits, and is organized around a set of core courses, a capstone course, and elective options. In addition, all students must partake in a 0.0 credit professional development workshop (developed by S. Everts, CTV Chair in Digital Science Journalism), that will provide practical skills development as a key part of the Certificate's experiential learning:

JOUR 4999 [0.0 credit] Science Communication Certificate Professional Development Workshop
A one-day workshop providing practical skills development for becoming an effective science communicator. Topics for discussion will include defining the audience and framing of information, reviews of effective science communication, career opportunities for science communicators, and one-to-one analysis of participants writing skills.

This course is restricted to students enrolled in the Certificate of Science Communication, and who have completed at least 2.0 credits towards the certificate, including one of COMS 2500 or ISAP 3003.

Courses:

1.5 Credits from -
COMS 1001 [0.5 credit] Foundations in Communication and Media Studies
ISAP 2001 [0.5 credit] Foundations in Critical Inquiry
JOUR 1003 [0.5 credit] Discovering Journalism: Traditional Tales to Tweets, or
JOUR 1001 [0.5 credit] Foundations of Journalism: Journalism in Context[2]

1.0 Credit from -
COMS 2500 [0.5 credit] Communication and Science
ISAP 3003 [0.5 credit] Science Communication

1.0 Credit from* -
ISAP 4907 [1.0 credit] Capstone Course--Research Essay **
OR
BIOL 4905 [1.0 credit] Honours workshop[3]
COMS 4908 [1.0 credit] Honours Research Essay[4]
FOOD 4905 [1.0 credit] Food Science Honours Workshop[5]
HLTH 4906 [1.0 credit] Capstone course--Research Essay[6]
HLTH 4909 [1.0 credit] Capstone course--Field Placement and Research Project
HLTH 4910 [1.0 credit] Honours Individual Research Thesis
JOUR 4303 [0.5 credit] Specialized Journalism: Health and Science[7]
JOUR 4304 [0.5 credit] Specialized Journalism: Environment and Science
NEUR 4905 [1.0 credit] Honours Workshop
PAPM 4908 [1.0 credit] Honours Research Essay

****NOTE***: In order to count towards the certificate, all research essay, research project, and research thesis topics must focus on Science Communication, and be approved at the proposal stage by the unit representative on the certificate committee.

*****NOTE***: The ISAP 4907 course is available as a capstone option to all students enrolled in the certificate.

0.5 Credit in any 1000-level science course (see Appendix 2)

0.5 Credit in any Faculty of Science course

0.5 Credit from approved electives –
Elective courses fit into the two broad themes of the certificate: the process of science and/or knowledge mobilization, and are intended to provide an accessible range of options based on the program and interests of the individual student. As noted above, we will continue to explore elective options to facilitate wider access to the certificate across all faculties.
BIOL 1105 [0.5 credit] Biological Methods, Analysis and Interpretation
COMS 3412 [0.5 credit] Communication and Health[8]
COMS 4407 [0.5 credit] Communication and Critical Data Studies[9]
HLTH 1002 [0.5 credit] Health Science Communication
HLTH 2001 [0.5 credit] Health Research Methods and Skills
HLTH 4701 [0.5 credit] Knowledge Translation[10]
HLTH 4901 [0.5 credit] Directed Studies in Health***

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[2] JOUR 1001 is restricted to B.J. students.
[3] Restricted to students in an Honours Biology program.
[4] COMS 4908 is restricted to B.CoMS students.
[5] FOOD 4905 is restricted to students in the Food Science program.
[6] HLTH 4906, 4909, and 4910 are restricted to students in the B.H.Sc. Honours.
[7] JOUR 4303 & JOUR 4304 are restricted to B.J. students.
[8] Students must have third-year standing in Communication and Media Studies or permission of the School of Journalism and Communication.
[9] Students must have fourth-year standing in Communication and Media Studies (including BPAPM related specializations) or permission from the School of Journalism and Communication.
[10] HLTH 4701 and 4901 are restricted to students in the B.H.Sc program.

ISAP 2002 [0.5 credit] Research Principles for Interdisciplinary Science
ISAP 3004 [0.5 credit] Science Policy
ISAP 4901 [0.5 credit] Directed Studies***[11]
JOUR 2003 [0.5 credit] Delivering Journalism: Innovators v. Imposters
NEUR 2001 [0.5 credit] Introduction to Research Methods in Neuroscience
NSCI 1000 [0.5 credit] Seminar in Science
IPAF 4900 [0.5 credit] Research Experience Course***

***NOTE**: In order to count towards the certificate, HLTH 4901 Directed Study, ISAP 4901 Directed Studies, and IPAF 4900 Research Experience Course topics must focus on Science Communication, and be approved at the proposal stage by the unit representative on the certificate committee.

In addition, all students must complete a one-day 0.0 credit workshop:
JOUR 4999 [0.0 credit] Science Communication Certificate Professional Development Workshop

[11] Restricted to ISAP students.

Example progression through certificate.
The course structure below illustrates the typical recommended course progression, however Certificate curriculum advisors from IEIS will be available to help students navigate course selection.

First Year of Certificate – 2.0 Credits:
1.5 Credits from -
COMS 1001 [0.5 credit] Foundations in Communication and Media Studies
ISAP 2001 [0.5 credit] Foundations in Critical Inquiry
JOUR 1003 [0.5 credit] Discovering Journalism: Traditional Tales to Tweets, or
JOUR 1001 [0.5 credit] Foundations of Journalism: Journalism in Context[12]

0.5 Credit in any 1000-level science course

Second Year of Certificate – 2.0 Credits:
1.0 Credit from -
ISAP 3003 [0.5 credit] Science Communication
COMS 2500 [0.5 credit] Communication and Science

0.5 Credit in any Faculty of Science course

0.5 Credits from the following electives -
BIOL 1105 [0.5 credit] Biological Methods, Analysis and Interpretation
COMS 3412 [0.5 credit] Communication and Health[13]
COMS 4407 [0.5 credit] Communication and Critical Data Studies[14]
GEOG 2006 [0.5 credit] Introduction to Quantitative Research
HLTH 1002 [0.5 credit] Health Science Communication
HLTH 2001 [0.5 credit] Health Research Methods and Skills
HLTH 4701 [0.5 credit] Knowledge Translation[15]
HLTH 4901 [0.5 credit] Directed Studies in Health
ISAP 2002 [0.5 credit] Research Principles for Interdisciplinary Science
ISAP 3004 [0.5 credit] Science Policy
ISAP 4901 [0.5 credit] Directed Studies[16]
JOUR 2003 [0.5 credit] Delivering Journalism: Innovators v. Imposters
NEUR 2001 [0.5 credit] Introduction to Research Methods in Neuroscience
NSCI 1000 [0.5 credit] Seminar in Science
IPAF 4900 [0.5 credit] Research Experience Course

PLUS: JOUR 4999 [0.0 credit] Science Communication Certificate Professional Development Workshop (can be taken in either 2nd or 3rd year of the certificate, providing pre-requisites are met).

[12] JOUR 1001 is restricted to Bachelor of Journalism students.
[13] Students must have third-year standing in Communication and Media Studies or permission of the School of Journalism and Communication.
[14] Students must have fourth-year standing in Communication and Media Studies (including BPAPM related specializations) or permission from the School of Journalism and Communication.
[15] HLTH 4701 and 4901 are restricted to students in the B.H.Sc program.
[16] Restricted to ISAP students.

Third Year of certificate – 1.0 Credit:

BIOL 4905 [1.0 credit] Honours workshop
COMS 4908 [1.0 credit] Honours Research Essay
FOOD 4905 [1.0 credit] Food Science Honours Workshop
HLTH 4906 [1.0 credit] Capstone course-- Research Essay
HLTH 4909 [1.0 credit] Capstone Course--Field Placement and Research Project
HLTH 4910 [1.0 credit] Honours Individual Research Thesis
ISAP 4907 [1.0 credit] Capstone Course--Research Essay
JOUR 4303 [0.5 credit] Specialized Journalism: Health and Science
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NEUR 4905 [1.0 credit] Honours Workshop
PAPM 4908 [1.0 credit] Honours Research Essay

PLUS: JOUR 4999 [0.0 credit] Science Communication Certificate Professional Development Workshop (can be taken in either 2nd or 3rd year of the certificate, providing pre-requisites are met).

Impact on Other programs

Certificate programs at Carleton University are intended to be taken concurrently, or as a stand-alone credential, and is not expected to draw students away from other programs. Whilst some units may be affected by making courses available to students enrolled in the certificate, given the numbers under discussion, this effect will be minimal; though on an individual basis there may be some requirement for special permission to override pre-requisites.

At Carleton, all undergraduate degree students (other than those in B.COMS) are eligible to take a Minor in Communication and Media studies – this minor has a broad scope encompassing areas such as language, politics, and regulatory frameworks. Similarly broad, the Minor in News Media and Information, available to all students outside the Journalism program, covers the responsibilities, roles, and challenges of how news media interacts with the general public. Neither of these programs delivers the science-centric approach of our certificate. In addition, the Bachelor of Journalism (BJ) Combined Honours program has a Journalism with Concentration in Health Sciences option, however, this is a BJ program open only to Journalism students, and has a focus on the communication of health science, rather than the wider discipline as a whole. Students within this concentration will also be eligible to take the Certificate in Science Communication.

Through collaboration between the Department of English and the School of Linguistics & Language Studies, Carleton currently offers a Certificate in Professional Writing. This program is geared towards the practice of specialized types of writing across a range of professional contexts and disciplines.

Finally, IEIS administers the new Certificate in Science and Policy, which is intended to help students navigate and better integrate the worlds of scientific/technical knowledge production and policy analysis/policymaking. While students in that Certificate enhance their skills in science communication, it is not the focus of the Certificate, and is limited to communication between scientists and policy analysts and decision makers.

In summary, the proposed certificate is different from the other options mentioned above in that it intended for students in any program with an interest in developing the particular skills required for the communication of science.

Societal Need

The effective communication of science is of benefit not just to the researchers generating the data, but to society as a whole. Quality communication of science has the potential to increase visibility of vital research, to protect public health by promoting engagement and generating informed debate through clear and accurate representation (the COVID-19 pandemic serving as a pertinent example of the need for such communication), and to help reinforce the importance of the role of science in our society.

Scientists themselves are increasingly recognizing the need to improve their communication skills, and organizations such as the Science Writers & Communicators of Canada (https://sciencewriters.ca/) and the National Association of Science Writers (https://www.nasw.org/) provide a wealth of online

resources for individuals interested in science and communication. Yet, there still remains an absence of opportunities and formalized instruction for science-centric communications training at the university level.

A key part of Carleton University's response to the increased emphasis on science-based governance has been the formation of the Interdisciplinary Science and Practice program, whose mandate is to provide resources to the entire university community that better prepares our students to be at the forefront of this change. Much like the Science and Policy Certificate, this Certificate in Science Communication aligns with the core goals of ISAP**.**

Student Demand

The evidence for student demand remains largely anecdotal at this point; however, it is clear that many of our students do not wish to be academics or research scientists, but instead wish to pursue careers in teaching, writing, policy making, and other areas that demand skills and experiences that are missing from our current offerings. A canvassing of faculty members across departments in both the Faculty of Science and the Faculty of Public Affairs reveals a consistent pattern of student interaction around the topic of science communication. Students' comments relating to a wish for more training in communication, or more chances to explore and practice the way science is transmitted to society are numerous, and a number of faculty report that previous students have since gone on to college training programs in order to pursue their interests as communicators. Indeed, the relatively recent increase in diplomas, certificates, or master's programs in science communication across Canada (see for example Dalhousie University, University of Waterloo, and Laurentian University) would indicate that other universities are having the same conversations. In addition, one can again point to the formation of ISAP as a response to student demand for training in skills such as communication that in science were once considered 'soft' and are now considered indispensable.

Resources

It is not expected that the certificate in Science Communication will require any new academic staff, or, given proposed student numbers, generate overwhelming advising requests for IEIS, who will be responsible for administering the certificate. The proposed courses are all already in existence, and the certificate would draw on existing resources.

In future, should we opt to increase enrolment above the current cap of 20, additional resources will be sought for the Professional Development Workshop, in order that the student to instructor ratio required to provide the one-to-one feedback central to this experiential learning experience can be maintained. The training and identification of suitable candidates will be provided by the CTV Chair in Digital Science Journalism. The typical cost for hiring a trained individual to assist with delivery of such a workshop would be in the range of $1500-2000, provided jointly by the offices of the Dean of the Faculty of Science and the Dean of the Faculty of Public Affairs.

Appendix 1 - Program requirements for Science communication certificates referred to above

Dalhousie University – Certificate in science leadership & communication (Undergraduate)
Students are required to complete the following six components:
1. Leadership: Core course
SCIE 4444.03/BIOL 4444.03: Leadership in Science

2. Communicating Science - One of the following two courses with a practicum component
SCIE 3111.03: Communicating Science
PSYO 3010.06: Advanced General Psychology

3. Ethics in Science - One of the following courses in ethics
PHIL 2680.03: Ethics in Science (credit is not given for PHIL 2680 and 1050)
PHIL 1050.03: Ethics in Science

4. Understanding the nature of science - One of the following courses
HSTC 2400.03: Science and the Media
HSTC 2000.06: Introduction to the History of Science
HSTC 2204.03: The Darwinian Revolution
HSTC 2205.03: Totalitarianism and Science
HSTC 2206.03: Biopolitics: Human Nature in Contemporary Thought
HSTC 3201.03: Science and Religion: Contemporary Perspectives
HSTC 3212.03: The Biosphere: Global Perspectives in Science and Philosophy
HSTC 3411.03: Feminism and Science
HSTC 4301.03: History of Neuroscience
HSTC 1801.03: Technology and Engineering: From Industrial Age to Cybernetic Age
HSTC 4000.06: Science and Nature in the Modern Period
BIOL 3580.03/PHIL 3580.03: Philosophy of Biology
PHIL 2660.03: Understanding Scientific Reasoning
PHIL 2480.03: Environmental Ethics
ECON 3360.03: Ethics, Justice and Economics

5. Discipline-specific courses: situating your discipline - One of the following courses:
BIOL 2040.03: Evolution
ECON 2850.03/PHYC 2850.03: Science and Economics of Climate Change
ENVS 3501.03: Environmental Problem-solving I
ERTH 3001.03: Field school
BIOL 4664.03/MARI 4664.03*: History of Marine Sciences
NESC 2007.03: Neuroscience Principles and Methods
PSYO 2000.03: Methods in Experimental Psychology
PSYO 3581.03: History of Psychology I
PSYO 3582.03: History of Psychology II
BIOC 4510.03: Medical Biotechnology I
MICI 2400.03 Laboratory Methods in Microbiology and Immunology
OCEA 2020.03 Tools and Concepts in Ocean Sciences I

6. Portfolio of leadership development (SCIE 4445.00): only register for this zero-credit hour course in the semester that you are submitting your completed portfolio for evaluation.

University of Waterloo - Science Communication Certificate (Undergraduate)

The UWaterloo Departments of English Language and Literature and Communication Arts have recently taken on an important initiative. In several courses, students learn about professional genres of communication, the norms and values communicated through those genres, and the epistemic commitments of different fields of science and engineering. Royal Canadian Institute for Science (RCIScience) Science Communication Certificate builds on these courses.

WHAT ARE THE REQUIREMENTS FOR THIS SCIENCE COMMUNICATIONS CERTIFICATE?

- Students must successfully complete a course in science, technical, or engineering communication (ENGL/SPCOM 191, ENGL/ SPCOM 192, or ENGL/ SPCOM 193; or GENE 199 taken fall 2017 or fall 2018; or GENE 191 taken in fall 2018; or SPCOM 193).
- Students must attend four RCIScience events within a one-year time period.
- Students must submit a summary of at least one talk they attended. The top submission among these summaries will be published in *RCIScience Magazine*, and others may be considered for the rciscience.ca blog.

University of Edinburgh - Science Communication and Public Engagement (Online Learning) MSc, PgCert, PgDip

Year 1 (Certificate) - courses currently on offer include:

- Introduction to Science Communication and Public Engagement
- Science Education
- Understanding Science
- Principles and Practice in Public Engagement with Science
- Science in Context
- The Role of Social Media in Science Communication

Year 2 (Diploma) - courses currently on offer include:

- Science, Policy and Practice
- Dialogue for Science Communication and Public Engagement
- Science and the Media
- Creative Arts in Science Engagement
- Museums Exhibitions, Interpretation and Inf ormal Learning
- Principles and Practice in Public Engagement with Science

Year 3 (Masters)

- Dissertation project.

Laurentian University – Master/Graduate Diploma in Science Communication

A mix of experiential learning (each course incorporates practical components, often involving project based teamwork), guest speakers (science journalism, medical writing, animation, filmmaking), field trips (RSC, ROM, SNOlab, Perimeter), and an internship.

Examples of courses available:

Master in Science Communication (33 credits)

SCOM 5016 Audiences and Issues
SCOM 5026 Learning Theories and Practice in Science Communication
SCOM 5036 Theories and Principles in Science Communication
SCOM 5056 Design Theory in Science Communication
SCOM 5066 Science Communication Practice I: Orientation
SCOM 5116 Research Methods in Science Communication
SCOM 5125 Major Research Paper in Science Communication
SCOM 5136 Communication Science Through New Media
SCOM 5146 Science Communication Practice II: Professional Experience

Electives (Choose one)
SCOM 5076 Communicating Science Through Exhibits
SCOM 5106 Communicating Science Through Traditional Media

Graduate Diploma (27 credits)

SCOM-5016EL-Audiences and Issues
SCOM-5026EL-Learning: Theories and Practice
SCOM-5036EL-Theories and Principles of Science Communication
SCOM-5056EL-Design Theory in Science Communication
SCOM-5066EL-Science Communication Practice
SCOM-5116EL-Research Methods in Science Communication
SCOM-5136 EL Communicating Science Through New Media
SCOM-5146 EL Science Communication Practice II: Professional Experience

1 of the following 2 courses:
SCOM-5076EL-Communicating Science Through Exhibits
SCOM-5106EL-Communicating Science Through Traditional Media

U Illinois - Certificate in Science Communication (Graduate)

The Certificate in Science Communication is offered jointly by the 21st Century Scientists Working Group and the Center for Innovation in Teaching and Learning. It is designed for graduate students currently enrolled at the University of Illinois at Urbana-Champaign, but also open to postdocs.

Requirements

1. Attend three 21st Century Scientists Working Group journal clubs or talks, and present at one 21st Century Scientists Working Group journal club.
2. Attend a minimum of 10 hours of science communication-themed workshops or seminars. This must include attending at least **four** hours of 21st Century Scientist workshops. You may select from the following or request to have another workshop accepted.

- 21st Century Scientist monthly meetings
- ComSciCon (comscicon.com, local or national)
- AAAS science communication workshop
- science communication track at professional meeting (with prior approval)

3. Read, watch, or listen to an experienced science communicator and complete a report describing the content, what the communicator did well, what could have been improved upon (if anything), and what you learned from the experience.

4. Complete at least one public engagement project, selected from the options below, and complete a report on your experience (what you did and what you learned from it). (See below for details on report requirements.)

- Maintain a blog/vlog/podcast covering science for a lay audience (minimum 5 posts)
- Publish a science story in a popular press publication
- Create a related series of videos on science for a lay audience and publish them (e.g. on YouTube) (minimum 5 videos)
- Participate in planning and implementing a public science event, such as in a school classroom, at a farmer's market, or in a museum (contact 21st Century Scientists Working Group for assistance in identifying groups currently running such events)
- Complete a science communication class at U of I (from this list of courses, or you may petition to have a new class accepted)
- Complete a one-semester or longer SciComm internship (contact 21st Century Science Working Group for assistance in setting one up)
- Present on science to a live lay audience (minimum 20 minutes)
- Other project, with prior approval

5. Complete a reflective piece on your philosophy of science communication and public engagement (any format allowed in the reflective report guidelines is acceptable). Possible topics that you might cover include: What does science communication mean to you? Why is science communication important? What is an audience, or, what is *your* audience? How do you prefer to engage with your audience, and how do you determine whether that engagement has been successful? Ideally, this report will include how your understanding changed over time during the course of completing the requirements.

<u>Appendix 2</u> – 1000-level science courses that can be used towards the 0.5 credits requirement.

Biology	BIOL 1010, BIOL 1103, BIOL 1104, BIOL 1105, BIOL 1902
Chemistry	CHEM 1001, CHEM 1002, CHEM 1005, CHEM 1006, CHEM 1101
Computer Science	COMP 1005, COMP 1006, COMP 1405, COMP 1406, COMP 1501, COMP 1601, COMP 1805
Earth Sciences	ERTH 1006, ERTH 1009
Environmental Science	ENSC 1500
Food Science	FOOD 1001
Geography	GEOG 1010
Geomatics	GEOM 1004
Health Science	HLTH 1000, HLTH 1001, HLTH 1002
Interdisciplinary Science	NSCI 1000, ISAP 1001, ISAP 1002
Math	MATH 1004, MATH 1005, MATH 1007, MATH 1107, MATH 1052, MATH 1104, MATH 1119, AMTH 1152, MATH 1401, MATH 1402, MATH 1800
Neuroscience	NEUR 1201, NEUR 1202
Physics	PHYS 1001, PHYS 1002, PHYS 1003, PHYS 1004, PHYS 1007, PHYS 1008, PHYS 1901, PHYS 1902

Certificate in Science Communication LOs

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Canada's Capital University

School of Journalism and Communication
Journalism
4th Floor Richcraft Hall
1125 Colonel By Drive
Ottawa, ON K1S 5B6 Canada
Tel: (613) 520-2600, ext. 7408
communication@carleton.ca
https://carleton.ca/sjc/communication/

February 10, 2021

RE: Statement of support for the proposed Certificate in Science Communication

The Interdisciplinary Science and Practice program (ISAP) is proposing a new, collaborative venture between the Faculty of Science and the Faculty of Public Affairs – a Certificate in Science Communication.

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The proposed certificate will be open to students from both faculties and will consist of 4.5 undergraduate credits plus a professional workshop. The certificate program is intended to provide fundamental and practical knowledge, and will enable our students to analyze the impact of science on society, explain the intersection between science and communication, apply the study of media, and theory and approaches to effective science communication, and communicate science using a range of media and technology.

The Certificate in Science Communication will be administered by the Institute of Environmental and Interdisciplinary Science (IEIS), with joint governance by the Faculty of Science and Faculty of Public Affairs. A Science Communication Certificate committee, composed of a representative from each contributing unit, appointed in consultation with Chairs/Directors, will be responsible for curriculum decisions, program requirements and regulations. This committee will be chaired by a faculty member from the Interdisciplinary Science and Practice Program (ISAP) and a faculty member from FPA.

This letter is intended as a statement of support for the creation and introduction of the Certificate in Science Communication, including student access to courses in Communication and Media Studies (COMS) described within.

Josh Greenberg
Director School of Journalism & Communication
Program Head, Communication & Media Studies

Carleton UNIVERSITY | SCHOOL OF Journalism & Communication

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With regards,

Allan Thompson

Allan Thompson
Associate Director – Journalism Program Head
School of Journalism and Communication
Feb. 11, 2021

Carleton UNIVERSITY
Canada's Capital University

Arthur Kroeger College of Public Affairs
D199 Loeb Building
1125 Colonel By Drive
Ottawa, ON K1S 5B6 Canada
Tel: (613) 520-7560
Fax: (613) 520-7559
akcollege@carleton.ca
www.carleton.ca/akcollege

March 9, 2021

To Whom It May Concern:

RE: Statement of support for the proposed Certificate in Science Communication

The Interdisciplinary Science and Practice program (ISAP) is proposing a new, collaborative venture between the Faculty of Science and the Faculty of Public Affairs – a Certificate in Science Communication.

This letter is intended as a statement of support for the creation and introduction of the Certificate in Science Communication, including student access to the courses described within.

Yours sincerely,

Mary Francoli,
Associate Dean and Director, Arthur Kroeger College

New Program Proposal

Date Submitted: 03/29/21 6:39 pm

Viewing: TBD-2042 : Certificate in Science Communication

Last edit: 04/13/21 1:20 pm

Last modified by: nataliephelan

Changes proposed by: michellesantoianni

In Workflow

1. **IEIS ChairDir UG**
2. **PA Dean**
3. **SCI Dean**
4. **PA FCC**
5. **SCI FCC**
6. **PA FBoard**
7. SCI FBoard
8. PRE SCCASP
9. SCCASP
10. SQAPC
11. Senate
12. PRE CalEditor
13. CalEditor

Approval Path

1. 10/20/20 4:03 pm Steven Cooke (stevencooke): Approved for IEIS ChairDir UG
2. 12/16/20 5:04 pm David Mendeloff (davidmendeloff): Rollback to IEIS ChairDir UG for PA Dean
3. 02/09/21 11:40 am Sarah Cleary (sarahcleary): Rollback to Initiator
4. 03/04/21 10:18 pm Steven Cooke (stevencooke): Approved for IEIS ChairDir UG
5. 03/08/21 3:05 pm David Mendeloff (davidmendeloff): Rollback to Initiator
6. 03/09/21 9:17 am Steven Cooke (stevencooke): Approved for IEIS ChairDir UG
7. 03/09/21 12:18 pm David Mendeloff (davidmendeloff): Approved for PA Dean
8. 03/22/21 2:24 pm Julia Wallace

(juliawallace): Rollback to Initiator
9. 03/29/21 2:40 pm Michelle Santoianni (michellesantoianni): Rollback to Initiator
10. 03/29/21 6:37 pm Michelle Santoianni (michellesantoianni): Rollback to Initiator
11. 03/29/21 8:20 pm Steven Cooke (stevencooke): Approved for IEIS ChairDir UG
12. 03/30/21 9:58 am David Mendeloff (davidmendeloff): Approved for PA Dean
13. 03/30/21 11:50 am Julia Wallace (juliawallace): Approved for SCI Dean
14. 03/30/21 12:23 pm David Mendeloff (davidmendeloff): Approved for PA FCC
15. 03/30/21 12:54 pm Julia Wallace (juliawallace): Approved for SCI FCC

Effective Date	2022-23
Workflow	majormod
Program Code	TBD-2042
Level	Undergraduate
Faculty	Faculty of Science Faculty of Public Affairs
Academic Unit	Institute for Environmental and Interdisciplinary Sciences
Degree	
Title	Certificate in Science Communication

Program Requirements

Certificate in Science Communication (5.0 credits)

May be taken concurrently with an Honours degree within the Faculty of Science, Faculty of Public Affairs, or the Faculty of Arts and Social Science, with completion of a minimum of 4.0 credits, and a minimum CGPA of 10.0. Enrollment is limited.

Requirements

1. 0.5 credit in any 1000-level approved Science course		**0.5**
2. 0.5 credit in any Faculty of Science course		**0.5**
3. 1.5 credits in:		**1.5**
COMS 1001 [0.5]	**Foundations in Communication and Media Studies**	
ISAP 2001 [0.5]	**Foundations in Critical Inquiry**	
JOUR 1001 [0.5]	**Foundations: Journalism in Context**	
or JOUR 1003 [0.5]	**Discovering Journalism: Traditional Tales to Tweets**	
4. 1.0 credit in:		**1.0**
COMS 2500 [0.5]	**Communication and Science**	
ISAP 3003 [0.5]	**Science Communication**	
5. 0.5 credit from:		**0.5**
BIOL 1105 [0.5]	**Biological Methods, Analysis and Interpretation**	
COMS 3412 [0.5]	**Communication and Health**	
COMS 4407 [0.5]	**Communication and Critical Data Studies**	
GEOG 2006 [0.5]	**Introduction to Quantitative Research**	
HLTH 1002 [0.5]	**Health Science Communication**	
HLTH 2001 [0.5]	**Health Research Methods and Skills**	
HLTH 4701 [0.5]	**Knowledge Translation**	
HLTH 4901 [0.5]	**Directed Studies in Health**	
ISAP 2002 [0.5]	**Research Principles for Interdisciplinary Science**	
ISAP 3004 [0.5]	**Science Policy**	
ISAP 4901 [0.5]	**Directed Studies**	
JOUR 2003 [0.5]	**Delivering Journalism: Innovators v. Imposters**	
NEUR 2001 [0.5]	**Introduction to Research Methods in Neuroscience**	
NSCI 1000 [0.5]	**Seminar in Science**	
IPAF 4900 [0.5]	**Research Experience Course**	
6. 1.0 credit from:		**1.0**
ISAP 4907 [1.0]	**Capstone Course - Research Essay**	
OR		
BIOL 4905 [1.0]	**Honours Workshop**	
COMS 4908 [1.0]	**Honours Research Essay**	
FOOD 4905 [1.0]	**Food Science Honours Workshop**	
HLTH 4906 [1.0]	**Capstone course – Research Essay**	
HLTH 4909 [1.0]	**Capstone Course – Field Placement and Research Project**	
HLTH 4910 [1.0]	**Honours Individual Research Thesis**	
JOUR 4303 [0.5]	**Specialized Journalism: Health and Science**	
JOUR 4304 [0.5]	**Specialized Journalism: Environment and Science**	
NEUR 4905 [1.0]	**Honours Workshop**	
PAPM 4908 [1.0]	**Honours Research Essay**	
7. 0.0 credit in:		
JOUR 4999/ISAP 4999 [0.0]	**Science Communication Certificate Professional Development Workshop**	
Total Credits		5.0

Note: For **item 5** and **item 6**, any directed study, research essay, thesis or project must be on an approved topic related to science communication.

New Resources	No New Resources
Summary	The Interdisciplinary Science and Practice program (ISAP) is proposing a new, collaborative program between the Faculty of Science and the Faculty of Public Affairs – a Certificate in Science Communication. The certificate will be open to students from Arts and Social Science, Public Affairs and Science faculties and will consist of 5.0 undergraduate credits plus a professional workshop.
Rationale	The certificate program is intended to provide fundamental knowledge around the intersection between science and communication, including, but not exclusive to, science writing, the study of media, and the tools, theory and approaches to effective science communication, and the impact of science communication on society.
Transition/Implementation	The Certificate in Science and Policy will be administered by the Institute of Environmental and Interdisciplinary Science (IEIS), with joint governance by the Faculty of Science and FPA. IEIS will oversee the day-to-day administration of the program, including student advising and daily operations.
Program reviewer comments	**davidmendeloff (12/16/20 5:04 pm):** Rollback: As per discussion between IEIS and FPA, rolling back for development for 22-23 **sarahcleary (12/16/20 5:17 pm):** Updating effective year to 2022-2023 and moving into Future Cycle as per D. Mendeloff. **sarahcleary (02/09/21 11:40 am):** Rollback: Rollback as per units request. **sarahcleary (02/23/21 10:26 am):** Formatted for standardized calendar layout. **sarahcleary (02/23/21 10:27 am):** Updated credit value to be 5.0 credits. **davidmendeloff (03/08/21 3:05 pm):** Rollback: Rollback for revisions per the ES **davidmendeloff (03/09/21 12:12 pm):** Added note, indicated no new resources. **sarahcleary (03/15/21 8:57 am):** Added GEOG 2006 to section 4 as per updated executive summary. Added language regarding admission. **sarahcleary (03/15/21 9:03 am):** Updated Summary to outline students from FASS, FPA and FS are able to take this certificate. **juliawallace (03/22/21 2:24 pm):** Rollback: Change to course list requested by FPA curriculum committee **michellesantoianni (03/29/21 2:40 pm):** Rollback: correction to note required **michellesantoianni (03/29/21 6:37 pm):** Rollback: correction to ISAP 4999JOUR 4999 course **sarahcleary (03/30/21 8:25 am):** Corrected section 7 for crossed-listed courses. Updated Summary to reference that the certificate now has 5.0 credits. **nataliephelan (04/13/21 1:20 pm):** Changed order of courses in Item 6 to promote ISAP 4907.

Key: 2042

Associated Minors

Course Code	Course Name	Reason
ISAP 4907	Capstone Course-Research Essay	Changed prerequisite to permission of the Institute so Science Communication students can register.
ISAP 4999	Science Communication Certificate Professional Development Workshop	New Course
JOUR 4999	Science Communication Certificate Professional Development Workshop	New Course

Institutional Quality Assurance Process

New Certificate Not Requiring a Library Report

Date: September 23, 2020

From: George Duimovitch, Collection Librarian, STEM & Sylvie Lafortune, Collection Librarian, Business and Public Affairs

To: Robyn Green, Program Officer, Faculty of Arts & Social Sciences and Faculty of Science, Office of the Vice-Provost & Associate Vice-President (Academic)

cc Amber Lannon, University Librarian
Laura Newton Miller, Head, Collections & Assessment
Sally Sax, Head, Electronic Resources & Acquisitions
Patti Harper, Head, Research Support Services

Recommendation

After review of Carleton University Library's information resources and services, no additional Library resources are required and so no report from the Library is necessary for the QA process for the new program:

Certificate in Science Communication

This is a formal notification for your records.