McMaster University | School of Interdisciplinary Science

***COURSE OUTLINE***

***LIFESCI 4P03 – Science in a Post-Truth World***

***Fall 2018***

**INSTRUCTOR:** Kalina Kamenova, PhD Email: kalinak@mcmaster.ca Location:

**INSTRUCTIONAL ASSISTANT:** N/A

**Course Description:** Over the past few years there has been a growing sense that we live in a "post-truth" reality in which objectivity and facts do not matter anymore. In this course, we will explore the impact of a looming epistemic crisis on science and its institutions, focusing on how science-based validation is challenged by emotion, personal beliefs and "alternative facts" in public controversies over vaccines, climate change, evolution, GMOs, and other emerging techno-scientific developments. We will further look at the social and political ramifications of such "manufactured" scientific controversies, science denialism and why it persists, and what scientists can do to confute deceptive arguments about science. Three hours (lecture); one term.

**Prerequisite(s):** Registration in Level IV of an Honours Life Science program

**Learning Objectives:**

*This course aims to enable students to*:

- Learn concepts and methodologies from disciplines such as science and technology studies (STS) and science communication relevant to the analysis of public controversies over scientific and technical issues;
- Apply critical perspectives to policy challenges and practical problems arising from the declining public trust in science, science-based validation, and the infallibility and neutrality of expertise;
- Understand complex political, social, and cultural contexts that influence public perceptions and attitudes towards emerging techno-scientific developments in the life sciences and biomedicine, including the growing phenomenon of science denial;
- Use a "group politics" approach to analyze scientific controversies (e.g., to identify efforts by political actors to "manufacture" a non-existent scientific controversy to influence public opinion and science policy decisions;
- Recognize challenges arising from communicating scientific developments online and in the social media (e.g., media hype, the spread of misinformation and fake news);
- Apply research and analytical skills to locate pertinent information, evaluate research data, and critically analyze primary and secondary sources;
- Write engaging research blogs, using language accessible to policymakers and lay audiences.

**Class Activities:** Lectures, Fridays 11:30AM - 2:20PM, BSB B139

**Office Hours:** Fridays 10AM – 11AM or by appointment

**Required Texts & Materials:**

Weekly readings will be posted on the course website on Avenue to Learn.

**Evaluation:**

20% Attendance and Participation (throughout the term)
25% Oral Presentation and Summary (throughout the term)
25% Blog Post (due October 19 on Avenue)
30% Exam (November 23 in class)

**Assignment Description:**

Attendance and Participation – 20%

Students' attendance (10%) and participation (10%) will be evaluated. Consistent attendance is essential for success in this course. Participation in class discussions is a key aspect of students' learning. Active involvement in class can greatly enhance learning outcomes as students are exposed to different interpretations on course topics and benefit from peer learning. Students learn to articulate critical arguments, clarify errors and misunderstandings, and tend to remember better the material studied. It is expected that students will complete the assigned readings prior to each class and will contribute thoughtful opinions to the class discussions. Students are encouraged to contact the Instructor for interim feedback on their participation grades.

Oral Presentation and Summary – 25%

Each student will give an oral presentation on a selected course reading. The student is expected to highlights facts, points and arguments that s/he considers relevant to the weekly topic, and to raise questions for class discussion. On the day of her/his presentation, the student will also submit a short outline of the presentation (maximum 4 pages double spaced). The student may choose either give a PowerPoint presentation, or simply talk informally to the class. Decisions about distribution of readings and presentation dates will be made on the first day of class.

Blog Post – 25%

In this assignment, students will write a blog post on an issue concerning science and post-truth politics, which will be intended for a general audience. The topic should be approved by the Instructor prior to submission of the assignment. Your blog post should be 1,000 - 1,200 words long (not including the reference list) and include two visual images (photos you take, hand-drawings, or Creative commons

images). To demonstrate originality, please include information from at least 5 sources outside of the assigned readings. Type your blog post in a Word document and insert the pictures into the appropriate location in the text. A list of suggested topics, detailed instructions and criteria for assessment of this assignment will be posted on Avenue.

Exam – 30%

A final written exam will be held in class on November 23. The exam will be two hours in duration and will consist of multiple choice questions that cover material from the lectures and the required readings. The Instructor will conduct an exam review and provide a study guide the week before the exam date, so it is essential to attend this class, as well as the class in which the exam will take place. Rewrites will not be permitted. Deferred exams may be granted in exceptional circumstances with prior permission of the Instructor. Students must have well-documented reasons for requesting a make-up exam, such as illness, compassionate grounds, etc., and are required to submit supporting documentation (e.g., a doctor's letter). *Deferred exams will not necessarily be the same format*.

**Course Schedule:**

| Week | Date | Topic and Readings (*denotes required readings) |
|---|---|---|
| 1. | Sept. 7 | **Course Overview: Post-Truth Politics and the War on Science**<br>Readings:<br>Course syllabus<br>https://www.americanscientist.org/article/ending-the-crisis-of-complacency-in-science |
| 2. | Sept. 14 | **Mixed Messages about Public Trust in Science: The Public vs. Experts**<br>Readings:<br>*Funk (2017), *Real Numbers: Mixed Messages about Public Trust in Science* http://issues.org/34-1/real-numbers-mixed-messages-about-public-trust-in-science/<br>*McFadden (2016), *Examining the Gap between Science and Public Opinion about Genetically Modified Food and Global Warming* https://doi.org/10.1371/journal.pone.0166140 |
| 3. | Sept. 21 | **Approaches to Studying Scientific Controversies**<br>Readings:<br>*Martin & Richards (1995), *Scientific Knowledge, Controversy, and Public Decision-Making* http://www.bmartin.cc/pubs/95handbook2.pdf<br>*Engelhardt & Caplan (1987). Introduction (pp. 1-23) in *Scientific controversies: Case studies in the resolution and closure of disputes in science and technology* (PDF on Avenue) |

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| 4. | Sept. 28 | **Science, Rhetoric and Public Debate**<br>Readings:<br>*Ceccarelli (2011), *Manufactured Scientific Controversy: Science, Rhetoric, and Public Debate* (PDF on Avenue)<br>*Jasanoff & Simmet (2017), *No funeral bells: Public reason in a 'post-truth' age* (PDF on Avenue)<br>Gross (1994), *The roles of rhetoric in the public understanding of science* (PDF on Avenue) |
| 5. | Oct. 5 | **Public Mistrust of Vaccines**<br>Readings:<br>*Dube at al. (2016), Understanding Vaccine Hesitancy in Canada: Results of a Consultation Study by the Canadian Immunization Research Network *https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0156118*<br>*Larson et al. (2016), *The State of Vaccine Confidence 2016: Global Insights Through a 67-Country Survey* *https://www.sciencedirect.com/science/article/pii/S235239641630398X*<br>Dixon & Clarke (2013), Heightening Uncertainty Around Certain Science: Media Coverage, False Balance, and the Autism-Vaccine Controversy (PDF on Avenue) |
| 6. | Oct. 12 | **No class (mid-term recess)** |
| 7. | Oct. 19 | **Politicizing the Public Debates over Climate Change and Evolution**<br>Readings:<br>*Nisbet (2009), Framing Science: A New Paradigm in Public Engagement (40-67) in Kahlor & Stout (eds) *Communicating Science: New Agendas in Communication* (PDF on Avenue)<br>*Dryzek & Lo (2015), *Reason and rhetoric in climate communication* (article posted on Avenue and is also available online https://hub.hku.hk/bitstream/10722/210139/1/content.pdf)<br>Lienesch (2010), *The Persistent Presence of Creationism in the United States* (PDF on Avenue)<br>Dunlap & McCright (2010), *Organized Climate Change Denial* (PDF on Avenue)<br><br>**Research Blog Assignment Due** |
| 8. | Oct. 26 | **Science, Post-Truth and Social Media: The Good, the Bad, and the Ugly**<br>Readings:<br>*Broniatowski et al. (2018), Weaponized Health Communication: Twitter Bots and Russian Trolls Amplify the Vaccine Debate https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2018.304567 |

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| | | *Hannan (2018), *Trolling ourselves to death? Social media and post-truth politics* (PDF on Avenue)<br>Vosoughi (2018), *The spread of true and false news online* (PDF on Avenue) |
| 9. | Nov. 2 | **Ethical Responsibilities of Scientists as Public Communicators: The Hype Surrounding Stem Cell Therapies**<br>Readings:<br>*Kamenova & Caulfield (2015), *Stem cell hype: Media portrayal of therapy translation,* http://stm.sciencemag.org/content/7/278/278ps4.full<br>Turner & Knoepfler (2016), *Selling Stem Cells in the USA: Assessing the Direct-to-Consumer Industry, https://www.cell.com/cell-stem-cell/pdfExtended/S1934-5909(16)30157-6*<br>Shineha et al. (2017), *Science communication in regenerative medicine: Implications for the role of academic society and science policy, https://www.sciencedirect.com/science/article/pii/S2352320417300305*<br>Benjaminy et al. (2016) *Social Responsibility in Stem Cell Research - Is the News All Bad?* (PDF on Avenue) |
| 10. | Nov. 9 | **Decision-Making and Scientific Uncertainty: Gene Drive Technology**<br>Readings:<br>*National Academies of Sciences, Engineering, and Medicine (NASEM) Report (2016), *Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values*, Chapter 4, pp. 63-80 (PDF on Avenue)<br>**Additional Readings will be posted later in the term** |
| 11. | Nov. 16 | Guest Lecture/Exam Review<br>Readings:<br>TBD |
| 12. | Nov. 23 | **In-Class Exam** |
| 13. | Nov. 30 | Course Review and Evaluation<br>Presentations |

**Absences & Missed Work:**

If you are absent from the university for a minor medical reason, lasting up to 3 calendar days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form (MSAF). Absences for a longer duration or for other reasons must be reported to your Faculty office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to course instructor. You must contact the instructor immediately (normally within 2 working days) by email. The instructor will indicate what relief may be granted for the work you have missed, and relevant details such as revised deadlines, or time and location of a make-up exam/quiz/test. Please note that the MSAF may not be used for final deliverables, nor can it be used for a final examination or its equivalent.

**Extensions:**

Extensions on assignments will be granted on a case-by-case basis. If an extension is needed, the student must contact the instructor via email *prior* to the due date of the assignment. Extensions will not be granted after the due date, except for extenuating circumstances (e.g. bereavement, hospitalization, serious incidents). The late penalty for any assignment not submitted on time will be 5% per day.

***Checking Your Grades:***

Your marks will be recorded on Avenue. It is your responsibility to check that all grades entered into Avenue are recorded properly. All grade concerns and discrepancies must be reported to the Instructor within a week of receiving the grade.

**Re-mark Policy:**

You will have one week from the date that an assignment (or exam) is returned to you to appeal your mark. If you wish to appeal a grade, you must submit to the instructor a written note justifying why you wish to have the assignment remarked, with the assignment attached. If your instructor considers the written justification to be insufficient (e.g. simply wanting a higher grade is insufficient), the assignment will not be re-graded. If the justification is considered sufficient, the entire assignment will be re-graded. You must therefore understand that your mark can increase or decrease.

Any term mark corrections must be made BEFORE the Final Exam is written. There are no alternative assignments that can be completed by students for the purpose of increasing their final grade.

**Communication between Students and the Instructor:**

Any e-mails addressed to faculty must have a brief, relevant subject line and must come from a mcmaster.ca e-mail account. All e-mail communication addressed to students will be sent to their mcmaster.ca e-mail account.

All assignments must be handed in via Avenue, in the specified file format (usually pdf). Author(s) name(s) and group designations, if applicable, must be clearly marked on the first page of the work handed in. Submitted files must be named in a way to easily identify the assignment and the author and/or group designation. Work that is late, handed in to the wrong person, inadequately identified, or in the wrong format, risks losing marks.

Instructors will endeavour to return marked materials within two weeks of hand-in.

**Plagiarism Detection**

In this course, we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

https://www.mcmaster.ca/academicintegrity/

https://www.mcmaster.ca/academicintegrity/turnitin/students/index.html

**Policy about Online Access or Online Course Work Requirements:**

In this course we will be using Avenue. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

**Student Responsibilities:**

To get the most out of the course, you must be prepared to:

- attend all sessions, make up all missed work, and provide documentation for authorized absences;
- interact frequently with faculty, students, TAs, and other support staff;
- plan and manage your own time;
- complete preparatory tasks (such as reading, writing assignments, and initial research) in advance of sessions;
- develop and use reflective learning skills (for example identifying learning objectives, planning and carrying out research tasks, acting on academic feedback);
- work as an effective, efficient, and responsive team member on group assignments;
- follow all the guidelines as outlined in the Introduction section of the Laboratory Manual;

- check the course Avenue site, and your McMaster and Avenue e-mail daily for updates; and,
- follow all university policies and guidelines, and in all ways be a responsible university member.

**Senate Student Policies:**

Students can view full policies here (http://www.mcmaster.ca/policy/Students-AcademicStudies/).

Senate Policy Statements are also available from the Senate Secretariat Office, Room 104, and Gilmour Hall.

**Academic Integrity:**

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty.

The following illustrate only four of many forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained;
- copying or using unauthorized aids in laboratory exercises;
- improper collaboration in group work; and,
- copying or using unauthorized aids in quizzes, tests and examinations.

All students are reminded of the importance of academic integrity, and the serious consequences of academic dishonesty.

**Student Code of Conduct:**

https://www.mcmaster.ca/policy/Students-AcademicStudies/Code_of_Student_Rights_and_Responsibilities.pdf

You acknowledge that your behavior in all aspects of this course should meet the standards of the McMaster University Student Code of Conduct. You understand that any inappropriate behavior directed against any of your colleagues, teaching assistants, or the instructional team will not be tolerated. Disruptive behavior during any session (e.g. lecture, seminar, lab, tutorial) such as talking, sleeping or non-class computing while an individual presents information, or constantly being late, will also not be tolerated. Abuse, ridicule, slander, inappropriate language, and discrimination towards instructors teaching staff, teaching assistants and other students will not be tolerated in any capacity.

Shared spaces including e-spaces such as the Avenue to Learn course discussion board are to be considered inclusive and safe.

**Copyright Policy:**

In this course you will have access to material that is subject to copyright laws. This includes (but is not limited to) textbooks and all resources developed by the instructors such as lab manuals, demonstration videos, quizzes, assignments, tests, class notes and class slides. Under no circumstance are you allowed to share or redistribute this material in any printed or electronic form without the explicit written consent of the copyright holder. This includes posting any course material on Internet bulletin boards, course repositories, social networks, etc.

**McMaster Accommodation for Religious, Indigenous and Spiritual Observances Form (RISO):**

At the beginning of EACH term, visit the website of the Office of the Associate Dean (Academic) https://www.science.mcmaster.ca/associatedean/current-students/procedures-forms.html if you need accommodations for religious, Indigenous and/or spiritual observances. Follow the procedure explained there under "Accommodation for Religious, Indigenous and Spiritual Observances Form (RISO)".

**Inclusivity and Accommodations:**

McMaster University aims to foster a supportive, inclusive learning environment that will encourage both individual and collective growth. Students are required to register with Student Accessibility Services (SAS) first (https://sas.mcmaster.ca/). Any student who then wishes to invoke an accommodation for any aspect(s) of this course must contact the instructor at the beginning of the semester to discuss how the accommodations detailed in their SAS letter will be fulfilled in this course.

**The instructors and the university reserve the right to alter this outline if necessary.**

The instructors and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.