



Chemistry

UNIVERSITY OF TORONTO

CHM194H1 - Science and Human Values

Winter 2024/2025 Course Syllabus

I TEACHING TEAM

INSTRUCTOR

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Online student hours: upon request

II COURSE OVERVIEW

COURSE DESCRIPTION:

There is a tension between creativity and the search for truth, which in science can be looking for patterns in nature. With examples drawn particularly from reports of scientific discoveries that have generated controversy, this seminar course will introduce the underlying principles and history of science, as well as how science and its boundaries are evolving, and how these influence human values. Restricted to first-year students. Not available for CR/NCR option.

STUDENT LEARNING OUTCOMES:

One of your primary goals in this course should be engage in academically rigorous discussions and develop strong written, oral, and teamwork skills in the process. To facilitate that, this course has relatively few students in it, by limit. Smaller, more intimate courses can help you build relationships with professors and peers early on in your academic career.

PREREQUISITE COURSE(S):

None.

READINGS:

Required: See below in "Course organization."

Parts of

Science and Moral Imagination: A New Ideal for Values in Science, by M J Brown

<https://upittpress.org/wp-content/uploads/2020/10/9780822946267.pdf>

Interesting but not-assigned reading:

Personal Knowledge, Michael Polanyi

The Structure of Scientific Revolutions, Thomas S. Kuhn

The Logic of Scientific Discovery, Karl R. Popper

On Being A Scientist: Responsible Conduct In Research, by the National Academy of Sciences

The Telephone Gambit: Chasing Alexander Graham Bell's Secret, Seth Shulman

Science and Human Values, Jacob Bronowski
Silent Spring by Rachel Carson.

III COURSE ORGANIZATION

Wk 1: Introduction:

The Scientific Method

Reading/viewing:

Ch1, Science and Moral Imagination: A New Ideal for Values in Science

<https://upittpress.org/wp-content/uploads/2020/10/9780822946267.pdf>

(A hand-written summary of the materials will be prepared in class wk 1 (1/6) for this assignment. Bring a pen or pencil.)

Wk 2: A. Making oral presentations and working in teams

(Walker presents approach for discussion.)

B. Team discussion of The Scientific Method from wk 1

C. Fundamental and Applied Science

Readings and Viewings:

"It takes three to tango: citizen, fundamental and applied science"

<https://www.sciencedirect.com/science/article/pii/S1360138523000560>

(A written summary of the materials will be prepared in class wk 2 (1/13) for this assignment)

Wk 3: Pesticides in Farming

Reading/viewings:

Primary sources:

[Pesticides on plants and relation to human health](#)

[Effects of pesticides on bees and the environment](#)

[The benefits of pesticide use in agriculture](#)

(A written summary comparing the above three primary sources is due before class wk 3(1/20))

Wk 4: Theory of Evolution:

As developed by a) Darwin and b) Social Darwinism.

Reading/viewing:

Primary sources:

[The Origin of Species, Charles Darwin](#) (Ch 14)

[In the Name of Darwin, Daniel Kevles](#)

(A written summary comparing the above primary sources is due before class wk 4(1/27))

Wk 5: Artists as Scientists

Reading:

<https://www.artsy.net/article/artsy-editorial-9-artists-made-contributions-science-leonardo-da-vinci-samuel-morse>

In class exercise: (2/3)

Use art to communicate something you care about in science. Group or individual forms of expression are both fine.

Wk 6: Energy and the environment:

Climate change versus jobs?

Reading/viewing:

Primary sources:

[Why Nuclear Power Cannot Solve Climate Change Alone](#)
[NUCLEAR POWER FOR AI: HOW TO REOPEN THREE MILE ISLAND SAFELY](#)
[Will AI's huge energy demands spur a nuclear renaissance?](#)

A written summary discussing the above primary sources is due before class wk 6 (2/10)

Wk 7: Patenting Drugs:

a) What's in a patent, and why? b) Access in rich versus poor countries

Reading/viewing:

[Patents and the Pharmaceutical Industry](#)

[Why patent protection in the pharmaceutical industry is out of control](#)

b) FDA/Health Canada and drug development:

i) The regulatory process ii) Lives lost versus better tested drugs

iii) Better Clinical trial design and more effective web sites.

A written summary comparing the above primary sources is due before class wk 7 (2/24)

Wk 8: Rare Diseases:

a) Gene therapies b) Individual versus group benefits

Reading/viewing:

[Moral Dilemmas Complicate Treatment of Rare Diseases, Says Israeli Bioethicist](#)

[Therapies for rare diseases: therapeutic modalities, progress and challenges ahead](#)

A written summary comparing the above primary sources is due before class wk 8 (3/3)

Wk 9: Part 2: The science of history:

Reading:

<https://www.cnn.com/2023/08/31/world/ancient-egypt-balm-scent-scn/index.html>

Part 2:

"Science allows no unmoved movers: Moral Imagination"

Reading:

Introduction (pp. 3-25) of [Science and Moral Imagination: A New Ideal for Values in Science](#)

A written summary comparing the above primary sources is due before class wk 9 (3/10)

Wk 10: Do we need new values? Lecture and discussion

Reading/viewing: Your own previous summaries and Ch 3 [Science and Moral Imagination: A New Ideal for Values in Science](#)

A written summary of the above primary source is due before class wk 10 (3/17); alternatively, the first 9 readings may be compared. We will schedule some Final Oral presentations this day.)

Wk 11: Additional Final Oral Presentations and their discussions (likely 3/24)

IV EVALUATION/GRADING SCHEME

Critical summaries: (40% of the final mark)

- Each week readings or audiovisual recordings will be assigned for preparation of critical summaries and discussion questions. Written critical summaries will be circa 600 words in length, comparing the primary readings. In addition, 2 insightful discussion questions suitable for class consumption should be written after the summary. Students are expected to prepare these summaries/discussion questions for the 9 groups of readings or audiovisual recordings over the course of the semester, plus a last one summarizing the 9 groups or the new topic of wk10. These 10 summaries are due before the beginning of class, each worth 4% of the final mark and will be graded credit/no credit.

Team presentations of readings or viewings: (10% of the final mark)

- The readings or recordings will be discussed in break-out teams of roughly 5 students per team. Following the break-out groups, the class will reassemble and there will be 3 student presentations per week of 5-10 minutes each, with one student presenting summaries of each reading or recording to the entire class, and will lead class discussion. The presenting students are encouraged to prepare a powerpoint presentation for this purpose. This presentation, which may be edited during the teamwork phase of the class, will carry 5% weight for the presenting student. Contribution to team discussion in preparation of the team presentation will carry 5% weight for each team member over the course.

Term paper: (30% of the final mark, due 3/24)

- A written essay is assigned, 2500 -3000 words long, on a topic to be discussed before Oct 15 with the instructor. The first submission of the essay will be marked for 25% of the final mark. Preparation of a revision of the essay is encouraged and is worth up to an additional 5% of the final mark.
- The essay should feature a descriptive title, contain a thought-provoking thesis, be based on thorough text analysis (with ample page references), be well-structured and meticulously self-edited (write simply & precisely, avoid sloppy mistakes & convoluted/incomplete sentences). Specific instructions will be given.

Oral presentation of the term paper: (10% of the final mark, delivered on either 3/17 or 3/24).

Participation in overall class discussion: (10% of the final mark)

- Students are expected to participate in discussion when the whole class meets.

Extra Credit Opportunities:

- Throughout the semester, public or University events will occur. Should you discover one that is relevant to this class, please ask whether I will consider it for extra credit. In such cases, I ask for a 250-word reconstruction of the speaker's argument.

Note: Your student fees cover usage of the University Writing Centres (<https://writing.utoronto.ca/writing-centres/>). Evidence of using one of these centres for

class assignments will count as extra credit in this class, but students have to check with the instructor ahead of time for the suitability of the writing-centre usage.

IMPORTANT: if an unexpected technical issue occurs with a university system (e.g., Quercus services, network outage) that affects availability or functionality, it may be necessary to revise the timing or weighting of the quizzes/term tests.

Good to know:

First lecture: The first class meeting will be from 10:10AM-12noon. Bring a pen or pencil.

Delivery mechanism: In person. Location TBD

Who may take the course: Restricted to first-year students (Arts and Science). Not available for CR/NCR option;

Distribution Requirement: Science; *Breadth Requirement:* The Physical and Mathematical Universes (5)

V COURSE POLICIES

- Each member of this course is expected to maintain a:
 - (i) professional and respectful attitude during all course activities, including classes, tutorials and online activity.
 - (ii) personal calendar/schedule/organizer to ensure that all course activities are completed, and due dates are met.
 - (iii) collection of notes recorded independently based on concepts covered in course activities (students registered with Accessibility Services requiring a class note-taker will have access to this accommodation)
 - (iv) familiarity with the university policy on Academic Integrity (overleaf)
- The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. As a Course Instructor, I will neither condone nor tolerate behaviour that undermines the dignity or self-esteem of any individual in this course and wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment and hate speech will not be tolerated. If you have any questions, comments, or concerns, we encourage you to reach out to the staff in our Equity Offices.
- The instructor will endeavor to respond to email within 24 hrs. on weekdays.
- Privacy language and appropriate use of course materials:
<https://teaching.utoronto.ca/ed-tech/audio-video/sample-statements/>

- Submission methods: use Quercus only, except for in-class assignments that may be due at the end of the period.
- The class grade is an accumulative grade, i.e. low grades early in the term will hurt at the end. Late policy for written assignments: -10% per calendar day up to a maximum of 50% loss of credit. If you miss a session (this includes joining class after week 1), it's your responsibility to be/stay prepared, i.e. keep up with readings & assignments. If problems arise during the semester, you need to inform me as soon as possible by email or Quercus.
- No credit is awarded for missing pieces of work, except as accounted for by approved injury or illness, as indicated by a medical professional or a separate Faculty of Arts and Science Policy. [The Illness Verification form is here.](#)
- The process for re-grading of course work is to submit it within a week of its return by the instructor. There is no guarantee that the grade will change.

VI TECHNOLOGY REQUIREMENTS

- Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here: <https://www.vicprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/>
- Advice for students more broadly regarding online learning, if it occurs, is available here: <https://onlinelearning.utoronto.ca/getting-ready-for-online/>
- This course requires the use of computers, and technical issues are possible. When working on a piece of academic work, students are responsible for scheduling enough time to allow for reasonable delays due to technical difficulties to be overcome, so such issues will not be acceptable grounds for deadline extension. Particularly, maintaining an up-to-date independent backup copy of your work is strongly recommended to guard against hard-drive failures, corrupted files, lost computers, etc.

VII INSTITUTIONAL POLICIES & SUPPORT

ACADEMIC INTEGRITY

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but

are not limited to:

In a presentation or report:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Using an AI aid such as ChatGTP. This course policy is designed to promote your learning and intellectual development and to help you reach course learning outcomes.
4. Making up sources or facts.
5. Obtaining or providing unauthorized assistance on any report.

In general academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see www.academicintegrity.utoronto.ca/).

Plagiarism Detection

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

COPYRIGHT

If a student wishes to copy or reproduce class presentations, course notes or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Otherwise, all such reproduction is an infringement of copyright and is absolutely prohibited. More information regarding this is available here: <https://teaching.utoronto.ca/ed-tech/audio-video/copyright-considerations/>

ABSENCE

If you are absent from your studies due to illness or other reasons and unable to complete course work (e.g., a term test or an assignment) then a piece of written documentation is required. The following four items are the recognized forms of documentation:

1. Absence Declaration via ACORN (please note the circumstances under which an absence declaration can and cannot be submitted)
2. U of T Verification of Illness or Injury Form

3. College Registrar's letter
4. Letter of Academic Accommodation from Accessibility Services

Students who complete the ACORN Absence Declaration form must additionally contact me/the course coordinator/the course administrator to discuss their situation within five business days of the missed piece of work. This is essential action for any consideration to be granted.

For extended absences and for absences due to non-medical reasons, make sure to contact your College Registrar's Office. They can help you decide between a request for an extension or other types of academic consideration.

If you suspect or know that you have a disability that is affecting your studies, learn about the services and supports available through Accessibility Services. A disability can be physical disability, sensory disability, a learning disability, mental health disorder or a short-term disability like an injury. If you are not sure whether you have a disability, you can confidentially contact Accessibility Services with your questions.

ACCESSIBILITY NEEDS

Students with diverse learning styles and needs are welcome in this course. The University of Toronto is committed to accessibility: if you require accommodations for a disability, or have any other accessibility concerns about the course, please contact [Accessibility Services](#) as soon as possible.

ACCOMMODATIONS FOR RELIGIOUS OBSERVANCES

Following the University's policies, reasonable accommodations will be made for students who observe religious holy days that coincide with the due date/time of an assignment, tutorial, class or laboratory session. Students must inform the instructor **before** the session/assignment date to arrange accommodations.

ADDITIONAL SERVICES & SUPPORT

The following are some important links to help you with academic and/or technical service and support:

- General student services and resources at [Student Life](#)
- Full library service through [University of Toronto Libraries](#)
- Resources on conducting online research through [University Libraries Research](#)
- Resources on academic support from the [Academic Success Centre](#)
- Learner support at the [Writing Centre](#)
- Information for [Technical Support/Quercus Support](#)

ACKNOWLEDGEMENT OF TRADITIONAL LANDS

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca and, most recently, the Mississaugas of the Credit River. Today, this meeting place is

still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.