

HURON UNIVERSITY COLLEGE
Undergraduate Course Outline 2021–2022

HistSci2200E: The History of Scientific Thought

Fall/Winter Term 2021–2022
Wednesdays, 6:30–9:30pm
Room: W116 (Huron)

Instructor: Emerson Doyle
email: edoyle9@uwo.ca
Office Hours: Lucas House Annex (Wed, 2:00–4:00)

Course Description

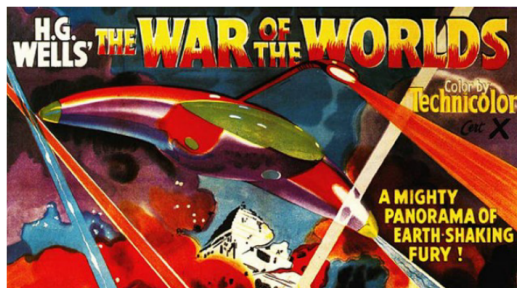
This course is a survey of the physical and biological sciences from pre-history to the 20th century. Our focus will be an understanding of the landmark theories in these sciences as informing issues in the foundations and philosophy of science. We will engage questions of scientific methodology, the sources/reliability of scientific knowledge, the various goals and attitudes of and toward science, and the relationships between science, religion, culture, society, and the individual.

Anti-Requisite(s): Phil2203E, the former Hist200E **Western Foot Patrol:** 519-661-3650

Course Objectives & Methods

Fundamentally this is a course about the history of ideas—specifically the development of *Scientific Methods*. Students should finish the course with an understanding of what science is, its methods, and why it was and continues to be so important to the development of civilization. Students should also gain an understanding of multiple scientific theories, both historical and contemporary, and acquire an appreciation for why scientific methods continue to be so useful. Successful students will improve their writing and general communication skills, especially with regard to writing from various perspectives and evaluating arguments and ideas in their relevant contexts.

We will take a multifaceted approach to the material so as to benefit as many learning styles as possible. Besides typical lectures, we will engage in discussion (both in class and online), light group work and peer-editing, watch videos, and perform simple experiments to reinforce key concepts. There will be a large number of web links posted to encourage self-discovery, and each week I will post a set of “Questions for Thought” that further reinforce and review the material. *I encourage you to see me with any questions or to recommend alternate approaches; while I will do my best to encourage a safe and positive atmosphere in the classroom.* In my experience this course is the most fun and beneficial when everyone is engaged and feels comfortable offering contributions.



Texts

- Lindberg, David C. (2007) *The Beginnings of Western Science, 2nd Ed.* UC Press.
- Various individual readings to be made available on OWL.

A meat-space version of the text is available at the Western Bookstore. An e-book is available from the University of Chicago Press website. I'll also place a copy on reserve at the Huron Library.

Requirements

Fall Semester

- Active Learning: 10% (in-class activities, group work, and short assignments)
- Guided Essay: 10% (4 pages maximum, several due-dates)
- Essay the Second: 10% (6 pages maximum, several due-dates)
- Mid-Year Exam: 15% (during the Fall 2021 exam period)

Winter Semester

- Active Learning: 10% (in-class activities, group work, and short assignments)
- Research Essay: 30% (10 pages maximum, several due-dates)
- Final Exam: 15% (during the Winter 2022 exam period)

Active Learning will include group discussions/activities during class, take-home assignments, and contributions to Forum discussions. Something will be offered most weeks—you must complete to a high quality 10 such activities per semester to get full points. If you are participating in the class online due to officially recognized COVID circumstances, equivalents will be available via the OWL Discussion Forums, but please *speak directly with me as soon as possible*.

The **Guided Essay** and **Essay the Second** are both multi-part, designed to develop and reinforce the essentials of academic writing. Topics will be distributed in advance. Late work without arrangement with me **in advance** will be penalized **5% per day late**, including weekends.

The **Research Essay** will be a more substantial argumentative paper. Students are expected to develop their own research question in consultation with me, and to engage in independent research outside the bounds of course material. Again, multi-part: Question/Meetings/Peer Editing/Final.

Exams will occur during the appropriate exam periods. These will be “take-home” style assignments requiring a demonstration of understanding and a significant synthesis of course content.



Schedule

*Please be advised that the reading list is tentative.

Fall Term

- Week 1 (Sept 08) **Introductory Week: Just What are We Talking About?**
- Okasha, “What is Science?” (on OWL)
 - McGrew, “The Ancient & Medieval Periods” (on OWL)
- Week 2 (Sept 15) **In the Beginning: Prehistory & Pre-Socratic Thought**
- Lindberg, Chp. 1 “Science Before the Greeks” (pp. 1–12)
 - Lindberg, Chp. 2 “The Greeks and the Cosmos” (pp. 21–34)
- Week 3 (Sept 22) **Plato’s Heaven & The Mathemagical World of Euclid**
- Jourdain, selection from *The Nature of Mathematics* (on OWL)
 - Lindberg, Chp. 5 “The Mathematical Sciences. . .” (pp. 82–86)
 - Lindberg, Chp. 2 “The Greeks and the Cosmos” (pp. 34–44)
 - Plato, “Plato’s Cosmology” (on OWL)
- Week 4 (Sept 29) **Up, Up, and Away! Early Astronomy**
- Lindberg, Chp. 1 “Science Before the Greeks” (pp. 12–17)
 - Lindberg, Chp. 5 “The Mathematical Sciences. . .” (pp. 86–95)
 - Aristotle, “The Structure and Motion of the Heavenly Spheres” (on OWL)
- Week 5 (Oct 06) **You’re Going to do WHAT to Me!?! Early Medicine**
- Lindberg, Chp. 1 “Science Before the Greeks” (pp. 18–20)
 - Lindberg, Chp. 6 “Greek and Roman Medicine”
 - Celsus, selections from *De Medicina* (on OWL)
- Week 6 (Oct 13) **Aristotles & Atoms**
- Lindberg, Chp. 3 “Aristotle’s Philosophy of Nature”
 - Aristotle, “Change, Natures, and Causes” (on OWL, ignore pars. 4–7)
 - Lucretius, “The Explanatory Power of Atomism” (on OWL)
- Guided Essay due October 13th — 10%**
- Week 7 (Oct 20) **Early Medieval Science—Reading More Than Just the Bible(s)**
- Lindberg, Chp. 7 “Roman and Early Medieval Science”
 - Pliny the Elder, selections from *The Natural History* (on OWL)
- Week 8 (Oct 27) **Medieval Medicine, Historiography, and Interpretation**
- Green, “In Search of an ‘Authentic’ Women’s Medicine” (on OWL)
 - Lindberg, Chp. 13 “Medieval Medicine. . .” (pp. 321–348)
- Essay Review Assignment due Friday October 29th**
- Week ☹ (Nov 3) **Reading Week! (Whew!)**

Week 10 (Nov 10)

Ptolemaic Astronomy—Teach the Controversy

- Lindberg, Chp. 5 “The Mathematical Sciences...” (pp. 95–105)
- Okasha, “Realism and Anti-Realism” (on OWL)
- Ptolemy, “The Earth: It’s Size, Shape, and Immobility” (on OWL)
- Maimonides, “Against the Reality of Epicycles and Eccentrics” (on OWL)

Week 11 (Nov 17)

West Meets East: Islamic Science

- Lindberg, Chp. 8 “Islamic Science”
- Ibn Sina, selections from *Concerning the Soul* (on OWL)
- Ibn Rushd, selections from *On Islam and Philosophy* (on OWL)

Essay the Second Outline due Friday November 19th

★Week 12 (Nov 24)
**Full-Year Course
Drop Week**

“New” (ha!) Knowledge & Christianity in Europe

- Lindberg, Chp. 9 “The Revival of Learning in the West”
- Henry, “The Western Middle Ages” (on OWL)

Week 13 (Dec 01)

A Synthesis in Scholasticism

- Lindberg, Chp. 10 “The Recovery and Assimilation...”
- R. Bacon, selections from *Opus Maius* (on OWL)
- Oresme, “The Possibility of a Rotating Earth” (on OWL)

Week 14 (Dec 08)

Motion from God? Of Religion & Revolutions

- Lindberg, Chp. 12 “The Physics of the Sublunar...” (pp. 295–309)
- Philoponus, “Projectile Motion” (on OWL)
- Philoponus, “Free Fall” (on OWL)
- Buridan, “Impetus and its Applications” (on OWL)

Essay the Second due December 8th — 10%

Mid-Year Exam during Fall Exam Period — 15%



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Winter Term

*Reading list is still tentative.

Week 15 (Jan 5)

The All-New Astronomy! (And Again, & Again...)

- Osiander, “The Unsigned Letter” (on OWL)
- Brahe, “The New Star” (on OWL)
- Kepler, “Eight Minutes of Arc” (on OWL)

Week 16 (Jan 12)

Empiricism v Rationalism II: Rumble in the Renaissance

- F. Bacon, “The Inductive Method” (on OWL)
- Descartes, “Rationalism and Scientific Method” (on OWL)
- Gribbin, “Renaissance Men” & “Science Finds its Feet” (on OWL)

Week 17 (Jan 19)

Just Look at It! New Instruments & The Galileo Controversy

- Galileo, “A Moving Earth is More Probable...” (on OWL)
- Galileo, “The Ship and the Tower” (on OWL)
- Galileo, “The Copernican View Vindicated” (on OWL)

Week 18 (Jan 26)

Newton’s Solution to the ‘Chief World Systems’—Derivative?

- Newton, “Four Rules of Reasoning” (on OWL)
- Newton, “General Scholium” (on OWL)
- Newton, “The System of the World” (on OWL)

Research Question due January 26th — 5%

Week 19 (Feb 02)

Alchemy & The All-New Chemistry! (A Little Late...)

- Lindberg, Chp. 12 “The Physics of the Sublunar...” (pp. 286–295)
- Boyle, “The ‘Corpuscular’ Philosophy” (on OWL)
- *Skim*: Gribbin, “Chemistry Catches Up” (on OWL)

Week 21 (Feb 09)

Religion and Science: Together at Last?

- Lindberg, Chp. 11 “Astrology” (pp. 270–277)
- Broad, “Cavendish & Glanvill: Science, Religion, & Witchcraft” (on OWL)
- Ben-Yehuda, “The European Witch Craze...” (first & last sections, on OWL)

Week 22 (Feb 16)

Phlogiston! Phlogiston Everywhere! (Or is it Oxygen?)

- *Finish*: Gribbin, “Chemistry Catches Up” (on OWL)
- Lavoisier, “The Nature of Scientific Explanation” (on OWL)
- Smeaton, “Monsieur & Madame Lavoisier in 1789” (on OWL)

Week ☹ (Feb 23)

No Class — Reading Week!! (whew!)

Week 23 (Mar 02)

The Return of the Invisible (and Indivisible!) Atoms

- Gribbin, “Atoms and Molecules” (on OWL)
- Maxwell, “The Ontological Status of Theoretical Entities” (on OWL)

Research Essay Draft due March 02nd

Week 24 (Mar 09)

Cause & Effect—Steam, Coal, and Electricity Seem to Work!

- Okasha, “Scientific Inference” (on OWL pp. 16–30)
- Bowler & Morus, “The Conservation of Energy” (on OWL)
- Hume, “The Nature of Cause and Effect” (on OWL)

Week 25 (Mar 16)

Seriously Folks, We’re Animals—The Darwinian Revolution

- Bowler & Morus, “The Darwinian Revolution” (on OWL)
- Okasha, “What are Biological Species?” (on OWL pp. 96–104)
- Darwin, “The Explanatory Scope of the Evolutionary Hypothesis” (on OWL)

Peer Editing due March 16th — 5%

Week 26 (Mar 23)

Germ, eh... So You’re Saying I Should Wash My Hands?

- Okasha, “Science and its Critics” (on OWL)
- Manger, selections from *A History of Infectious Diseases...* (on OWL)

Week 27 (Mar 30)

Back to The Continuity Question

- Okasha, “Scientific Change and Scientific Revolutions” (on OWL)
- Lindberg, Chp. 14 “The Legacy of Ancient & Medieval Science”

Research Essay Final due March 30th — 20%

Final Exam during Winter Exam Period — 15%

SCIENCE
Ruining Everything Since 1543



Appendix to Course Outlines: Academic Policies & Regulations 2021 - 2022

Prerequisite and Antirequisite Information

Students are responsible for ensuring that they have successfully completed all course prerequisites and that they have not completed any course antirequisites. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Pandemic Contingency

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, typically using a combination of synchronous instruction (i.e., at the times indicated in the timetable) and asynchronous material (e.g., posted on OWL for students to view at their convenience). Any remaining assessments will also be conducted online at the discretion of the course instructor. In the unlikely event that changes to the grading scheme are necessary, these changes will be clearly communicated as soon as possible.

Student Code of Conduct

Membership in the community of Huron University College and Western University implies acceptance by every student of the principle of respect for the rights, responsibilities, dignity and well-being of others and a readiness to support an environment conducive to the intellectual and personal growth of all who study, work and live within it. Upon registration, students assume the responsibilities that such registration entails. While in the physical or online classroom, students are expected to behave in a manner that supports the learning environment of others. Please review the Student Code of Conduct at: <https://huronatwestern.ca/sites/default/files/Res%20Life/Student%20Code%20of%20Conduct%20-%20Revised%20September%202019.pdf>.

Attendance Regulations for Examinations

A student is entitled to be examined in courses in which registration is maintained, subject to the following limitations:

- 1) A student may be debarred from writing the final examination for failure to maintain satisfactory academic standing throughout the year.
- 2) Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course will be reported to the Dean of the Faculty offering the course (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course. The Dean of the Faculty offering the course will communicate that decision to the Dean of the Faculty of registration.

Review the policy on Attendance Regulations for Examinations here:

https://www.uwo.ca/univsec/pdf/academic_policies/exam/attendance.pdf.

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf. The appeals process is also outlined in this policy as well as more generally at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/appealsundergrad.pdf.

Turnitin.com

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Statement on Use of Electronic Devices

It is not appropriate to use electronic devices (such as, but not limited to, laptops, cell phones) in the classroom for non-classroom activities. Such activity is disruptive and distracting to other students and to the instructor, and can inhibit learning. Students are expected to respect the classroom environment and to refrain from inappropriate use of technology and other electronic devices in class.

Statement on Use of Personal Response Systems (“Clickers”)

Personal Response Systems (“clickers”) may be used in some classes. If clickers are to be used in a class, it is the responsibility of the student to ensure that the device is activated and functional. Students must see their instructor if they have any concerns about whether the clicker is malfunctioning. Students must use only their own clicker. If clicker records are used to compute a portion of the course grade:

- the use of somebody else’s clicker in class constitutes a scholastic offence
- the possession of a clicker belonging to another student will be interpreted as an attempt to commit a scholastic offence.

Academic Consideration for Missed Work

Students who are seeking academic consideration for missed work during the semester may submit a self-reported absence form online provided that the absence is **48 hours or less** and the other conditions specified in the Senate policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf are met.

Students whose absences are expected to last **longer than 48 hours**, or where the other conditions detailed in the policy are not met (e.g., work is worth more than 30% of the final grade, the student has already used 2 self-reported absences, the absence is during the final exam period), may receive academic consideration by submitting a Student Medical Certificate (for illness) or other appropriate documentation (for compassionate grounds). The Student Medical Certificate is available online at https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

All students pursuing academic consideration, regardless of type, must contact their instructors no less than 24 hours following the end of the period of absence to clarify how they will be expected to fulfill the academic responsibilities missed during their absence. **Students are reminded that they should consider carefully the implications of postponing tests or midterm exams or delaying submission of work, and are encouraged to make appropriate decisions based on their specific circumstances.**

Students who have conditions for which academic accommodation is appropriate, such as disabilities or ongoing or chronic health conditions, should work with Accessible Education Services to determine appropriate forms of accommodation. Further details concerning policies and procedures may be found at: <http://academicsupport.uwo.ca/>.

Policy on Academic Consideration for a Medical/ Non-Medical Absence

(a) Consideration on Medical Grounds for assignments worth *less than 10%* of final grade: Consult Instructor Directly and Contact Academic Advising

When seeking consideration on **medical grounds** for assignments worth *less than 10%* of the final course grade, and if the student has exceeded the maximum number of permissible Self-Reported absences, the student should contact the instructor directly. The student need only share broad outlines of the medical situation. The instructor **may** require the student to submit documentation to the academic advisors, in which case she or he will advise the student and inform the academic advisors to expect documentation. If documentation is requested, the student will need to complete and submit the [Student Medical Certificate](#). The instructor may **not** collect medical documentation. The advisors will contact the instructor when the medical documentation is received, and will outline the severity and duration of the medical challenge as expressed on the Student Medical Certificate and in any other supporting documentation. The student will be informed that the instructor has been notified of the presence of medical documentation, and will be instructed to work as quickly as possible with the instructor on an agreement for accommodation.

(b) Consideration on Non-Medical Grounds: Consult Huron Support Services/Academic Advising, or email huronsss@uwo.ca.

Students seeking academic consideration for a **non-medical** absence (e.g. varsity sports, religious, compassionate, or bereavement) will be required to provide appropriate documentation where the conditions for a Self-Reported Absence have not been met, including where the student has exceeded the maximum number of permissible Self-Reported. All consideration requests must include a completed [Consideration Request Form](#). Late penalties may apply at the discretion of the instructor.

Please review the full policy on Academic Consideration for medical and non-medical absence at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf. Consult [Huron Academic Advising](#) at huronsss@uwo.ca for any further questions or information.

Support Services

For advice on course selections, degree requirements, and for assistance with requests for medical accommodation, students should email an Academic Advisor in Huron's Student Support Services at huronsss@uwo.ca. An outline of the range of services offered is found on the Huron website at: <https://huronatwestern.ca/student-life/student-services/>.

Department Chairs, Program Directors and Coordinators are also able to answer questions about individual programs. Contact information can be found on the Huron website at: <https://huronatwestern.ca/contact/faculty-staff-directory/>.

If you think that you are too far behind to catch up or that your workload is not manageable, you should consult your Academic Advisor. If you are considering reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines. Please refer to the Advising website, <https://huronatwestern.ca/student-life/student-services/academic-advising/> or review the list of official Sessional Dates on the Academic Calendar, available here: <http://www.westerncalendar.uwo.ca/SessionalDates.cfm>.

You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. Note that dropping a course may affect OSAP and/or Scholarship/Bursary eligibility.

Huron Student Support Services: <https://huronatwestern.ca/student-life/student-services/>

Office of the Registrar: <https://registrar.uwo.ca/>

Student Quick Reference Guide: <https://huronatwestern.ca/student-life/student-services/#1>

Academic Support & Engagement: <http://academicsupport.uwo.ca/>

Huron University College Student Council: <https://huronatwestern.ca/student-life/beyond-classroom/hucsc/>

Western USC: <http://westernusc.ca/your-services/#studentservices>

Mental Health & Wellness Support at Huron and Western

University students may encounter setbacks from time to time that can impact academic performance. Huron offers a variety of services that are here to support your success and wellbeing. Please visit <https://huronatwestern.ca/student-life-campus/student-services/wellness-safety> for more information or contact staff directly:

Wellness Services: huronwellness@huron.uwo.ca

Community Safety Office: safety@huron.uwo.ca

Chaplaincy: gthorne@huron.uwo.ca

Additional supports for Health and Wellness may be found and accessed at Western through, <https://www.uwo.ca/health/>.