

HURON UNIVERSITY COLLEGE
Undergraduate Course Outline 2017–2018

HistSci2200E: The History of Scientific Thought

Fall/Winter Term 2017–2018
Wednesdays, 6:00–9:00pm
Room: V208 (Huron)

Instructor: Emerson Doyle
email: edoyle9@uwo.ca
Office: A20 (Wednesdays 4:00–6:00)

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, and the relationships between science, philosophy, mathematics, 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 on the history of ideas—specifically the development of the *Scientific Method*. 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 the scientific method continues to be so useful. Finally, 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.
- McGrew, T., et al. (2009) *Philosophy of Science: An Historical Anthology.* Wiley-Blackwell.
- Various supplemental readings to be made available on OWL.

The texts should be available at the UWO Bookstore and from Amazon.ca. I will also place copies of the books on reserve at the Huron Library.

Requirements

Fall Semester

- Practicals: 5% (participation, homework, and in-class work)
- Guided Essay: 10% (4 pages maximum, several due-dates)
- Essay the Second: 15% (6 pages maximum, several due-dates)
- Mid-Year Exam: 15% (during the Fall 2017 exam period)

Winter Semester

- Practicals: 5% (participation, homework, and in-class work)
- Research Paper: 30% (10 pages maximum, several due-dates)
- Final Exam: 20% (during the Winter 2018 exam period)

Practicals consist of diversions from the main lecture at random points through the year. Designed to reinforce the material: Activities, Discussions, Group Work, Experiments, Responses, etc.

The **Guided Essay** and **Essay the Second** exercises are both multi-part, and designed to develop and reinforce the essentials of academic writing. Topics will be distributed in advance. Students may devise their own topic for Essay the Second, provided it is approved by me. Late work without arrangement with me in advance will be penalized **5% per day late**, including weekends.

The **Research Paper** 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 be scheduled by the Registrar's Office during the appropriate exam periods. Students will be responsible for developing questions for the exams; class time will be devoted to this exercise.



Schedule

*Please be advised that the reading list is tentative.

Fall Term

Week 1 (Sept 13)

In the Beginning: Prehistory & Pre-Socratic Thought

- PhilSci, “Introduction to Part I” (pp. 5–11)
- Lindberg, Chp. 1 “Science Before the Greeks” (pp. 1–12)
- Lindberg, Chp. 2 “The Greeks and the Cosmos” (pp. 21–34)

Week 2 (Sept 20)

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)
- PhilSci, §1.4 “Plato’s Cosmology”

Week 3 (Sept 27)

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)
- PhilSci, §1.5 “The Structure and Motion of the Heavenly Spheres”

Week 4 (Oct 4)

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”

Week ☹ (Oct 11)

Fall Reading Week (Whew!)

Week 6 (Oct 18)

So... Much... Aristotle...

- Lindberg, Chp. 3 “Aristotle’s Philosophy of Nature”
- PhilSci, §1.6 “Change, Natures, and Causes”
- PhilSci, §1.8 “The Cosmos and the Shape and Size of the Earth”

Guided Essay due October 18th — 5%

Week 7 (Oct 25)

Atoms and Ataraxia and Alexander (Oh My!)

- Lindberg, Chp. 4 “Hellenistic Natural Philosophy”
- PhilSci, §1.11 “The Explanatory Power of Atomism”
- *Skim*: Lindberg, Chp. 7 “Roman... Science” (pp. 132–148)

Week 8 (Nov 1)

Science Travells East: Islamic Science

- *Finish*: Lindberg Chp. 7 “Roman... Science” (pp. 132–148)
- 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 Feedback due November 1st — 5%

Week 9 (Nov 8)

Ptolemaic Astronomy—Teach the Controversy

- Lindberg, Chp. 5 “The Mathematical Sciences...” (pp. 95–105)
- PhilSci, §1.12 “The Earth: It’s Size, Shape, and Immobility”
- PhilSci, §1.16 “Against the Reality of Epicycles and Eccentrics”
- PhilSci, §1.18 “The Possibility of a Rotating Earth”

Week 10 (Nov 15)

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

- Lindberg, Chp. 7 “... Early Medieval Science”
- Lindberg, Chp. 9 “The Revival of Learning in the West”
- Lindberg, Chp. 10 “The Recovery and Assimilation...”

Essay the Second Outline due November 15th — 5%

Week 11 (Nov 22)

Wait, How are These Related?? Astrology & Medieval Medicine

- Green, “In Search of an ‘Authentic’ Women’s Medicine” (on OWL)
- Lindberg, Chp. 11 “The Medieval Cosmos” (pp. 270–277)
- Lindberg, Chp. 13 “Medieval Medicine...” (pp. 321–348)

★Week 12 (Nov 29)

**Full-Year Course
Drop Week**

Drop it Like it’s a Rock—Motion Through the Ages

- Lindberg, Chp. 12 “The Physics of the Sublunar...” (pp. 295–313)
- PhilSci, §1.14 “Projectile Motion”
- PhilSci, §1.15 “Free Fall”
- PhilSci, §1.17 “Impetus and its Applications”

Week 13 (Dec 6)

Overflow, Exam Prep., & Review

Essay the Second due December 6th — 10%

Mid-Year Exam during Fall Exam Period — 15%



Winter Term

*Reading list is still tentative.

Week 14 (Jan 10)

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

- PhilSci, §2.2 “The Unsigned Letter”
- PhilSci, §2.4 “The New Star”
- PhilSci, §2.6 “On Arguments About a Moving Earth”
- PhilSci, §2.7 “Eight Minutes of Arc”

Week 15 (Jan 17)

Empiricism v Rationalism II: Rumble in the Renaissance

- PhilSci, §3.1 “The Inductive Method”
- PhilSci, §3.3 “Rationalism and Scientific Method”
- PhilSci, §2.10 “The Ship and the Tower”

Week 16 (Jan 24)

Just Look at It! New Instruments & The Galileo Controversy

- PhilSci, §2.9 “A Moving Earth is More Probable...”
- PhilSci, §2.11 “The Copernican View Vindicated”
- *Begin*: Chang, selections from *Inventing Temperature* (on OWL)

Research Question due January 24th — 5%
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Week 17 (Jan 31)

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

- PhilSci, §2.16 “Four Rules of Reasoning”
- PhilSci, §2.17 “General Scholium”
- PhilSci, §2.18 “The System of the World”

Week 18 (Feb 7)

Newton Strikes Again! Also, Thermometry

- Chang, selections from *Inventing Temperature* (on OWL)
- Spill-over from Weeks 16 and 17

Week ♡ (Feb 14)

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

- Lindberg, Chp. 12 “The Physics of the Sublunar...” (pp. 286–295)
- PhilSci, §2.12 “The ‘Corpuscular’ Philosophy”
- *Skim*: Gribbin, “Chemistry Catches Up” (on OWL)

Week ☹ (Feb 21)

No Class — Reading Week!! (whew!)

Week 21 (Feb 28)

I Am Not an Animal! Fine, You’re a Machine

- Lindberg, Chp. 13 “Medieval... and Natural History” (pp. 351–357)
- Gribbin, “Renaissance Men” & “Science Finds its Feet” (on OWL)
- La Mettrie, selections from *L’homme Machine* (on OWL)

Week 22 (Mar 7)

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

- *Finish*: Gribbin, “Chemistry Catches Up” (on OWL)
- PhilSci, §4.1 “The Nature of Scientific Explanation”
- Smeaton, “Monsieur & Madame Lavoisier in 1789” (on OWL)

Research Paper Draft due March 7th — 5%
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Week 23 (Mar 14)

The Return of the Invisible (and Indivisible!) Atoms

- Gribbin, “Atoms and Molecules” (on OWL)
- PhilSci, §6.7 “The Ontological Status of Theoretical Entities” (on OWL)

Week 24 (Mar 21)

Seriously Folks, We're Animals—The Darwinian Revolution

- Bowler & Morus, “The Darwinian Revolution” (on OWL)
- PhilSci, §4.7 “Catastrophist Geology”
- PhilSci, §4.8 “Uniformitarian Geology”
- PhilSci, §4.9 “The Explanatory Scope of the Evolutionary Hypothesis”

Substantive Comments due March 21st — 5%

Week 25 (Mar 28)

Germes, eh... So You're Saying I Should Wash My Hands?

- Manger, selections from *A History of Infectious Diseases...* (on OWL)

Week 26 (Apr 4)

There's “Infinity”, and There's *Infinity*. What About Infinity + 1?

- Hahn, “Is There an Infinity?” (on OWL)
- Russell, selections from *Introduction to Mathematical Philosophy* (on OWL)

Week 27 (Apr 11)

Overflow, Exam Prep., & Review

Research Paper due April 11th — 15%

Final Exam during Winter Exam Period — 20%

SCIENCE
Ruining Everything Since 1543





Appendix to Course Outlines

Prerequisite Information

Students are responsible for ensuring that they have successfully completed all course prerequisites. Unless you have either the requisites for this course or written special permission from your Provost and Dean to enrol 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.

Conduct of Students in Classes, Lectures, and Seminars

Membership in the community of Huron University College and the University of Western Ontario 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. The academic and social privileges granted to each student are conditional upon the fulfillment of these responsibilities.

In the classroom, students are expected to behave in a manner that supports the learning environment of others. Students can avoid any unnecessary disruption of the class by arriving in sufficient time to be seated and ready for the start of the class, by remaining silent while the professor is speaking or another student has the floor, and by taking care of personal needs prior to the start of class. If a student is late, or knows that he/she will have to leave class early, be courteous: sit in an aisle seat and enter and leave quietly.

Please see the *Code of Student Rights and Responsibilities* at:

<http://www.huronuc.ca/CurrentStudents/StudentLifeandSupportServices/StudentDiscipline>

Technology

It is not appropriate to use technology (such as, but not limited to, laptops, cell phones) in the classroom for non-classroom activities. Such activity is disruptive and is 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.

Academic Accommodation for Medical/Non-Medical Grounds

Students who require special accommodation for tests and/or other course components must make the appropriate arrangements with the Student Development Centre (SDC). Further details concerning policies and procedures may be found at:

http://www.sdc.uwo.ca/ssd/?requesting_acc

(a) Medical Grounds for assignments worth 10% or more of final grade: Go Directly to Academic Advising

University Senate policy, which can be found at

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf,

requires that all student requests for accommodation on medical grounds for assignments worth 10% or more of the final grade be made directly to the academic advising office of the home faculty (for Huron students, the "home faculty" is Huron), with supporting documentation in the form (minimally) of the

Senate-approved Student Medical Certificate found at:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform_15JUN.pdf.

The documentation is submitted in confidence and will not be shown to instructors. 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. The instructor will not normally deny accommodation where appropriate medical documentation is in place and where the duration it describes aligns with the due date(s) of assignment(s). Before denying a request for accommodation on medical grounds, the instructor will consult with the Provost and Dean. The instructor's decision is appealable to the Provost and Dean.

**(b) Accommodation on Medical Grounds for assignments worth less than 10% of final grade:
Consult Instructor Directly**

When seeking accommodation on medical grounds for assignments worth less than 10% of the final course grade, 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. 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. The instructor will not normally deny accommodation where appropriate medical documentation is in place and where the duration it describes aligns with the due date(s) of assignment(s). Before denying a request for accommodation on medical grounds, the instructor will consult with the Provost and Dean. The instructor's decision is appealable to the Provost and Dean.

(c) Non-medical Grounds: Consult Instructor Directly

Where the grounds for seeking accommodation are not medical, the student should contact the instructor directly. Late penalties may apply at the discretion of the instructor. Apart from the exception noted below, academic advisors will not be involved in the process of accommodation for non-medical reasons.

Where a student seeks accommodation on non-medical grounds where confidentiality is a concern, the student should approach an academic advisor with any documentation available. The advisors will contact the instructor after the student's request is received, and will outline the severity and duration of the challenge without breaching confidence. The student will be informed that the instructor has been notified that significant circumstances are affecting or have affected the student's ability to complete work, and the student will be instructed to work as quickly as possible with the instructor on an agreement for accommodation. Before denying a request for accommodation where documentation has been submitted to an academic advisor, the instructor will consult with the Provost and Dean. The instructor's decision is appealable to the Provost and Dean.

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 Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Statement on Academic Integrity

The International Centre for Academic Integrity defines academic integrity as "a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect, and responsibility. From these values flow principles of behaviour that enable academic communities to translate ideals to action." (CAI Fundamental Values Project, 1999).

A lack of academic integrity is indicated by such behaviours as the following:

- Cheating on tests;
- Fraudulent submissions online;
- Plagiarism in papers submitted (including failure to cite and piecing together unattributed sources);
- Unauthorized resubmission of course work to a different course;
- Helping someone else cheat;
- Unauthorized collaboration;
- Fabrication of results or sources;
- Purchasing work and representing it as one's own.

Academic Integrity: Importance and Impact

Being at university means engaging with a variety of communities in the pursuit and sharing of knowledge and understanding in ways that are clear, respectful, efficient, and productive. University communities have established norms of academic integrity to ensure responsible, honest, and ethical behavior in the academic work of the university, which is best done when sources of ideas are properly and fully acknowledged and when responsibility for ideas is fully and accurately represented.

In the academic sphere, unacknowledged use of another's work or ideas is not only an offence against the community of scholars and an obstacle to academic productivity. It may also be understood as fraud and may constitute an infringement of legal copyright.

A university is a place for fulfilling one's potential and challenging oneself, and this means rising to challenges rather than finding ways around them. The achievements in an individual's university studies can only be fairly evaluated quantitatively through true and honest representation of the actual learning done by the student. Equity in assessment for all students is ensured through fair representation of the efforts by each.

Acting with integrity at university constitutes a good set of practices for maintaining integrity in later life. Offences against academic integrity are therefore taken very seriously as part of the university's work in preparing students to serve, lead, and innovate in the world at large.

A university degree is a significant investment of an individual's, and the public's, time, energies, and resources in the future, and habits of academic integrity protect that investment by preserving the university's reputation and ensuring public confidence in higher education.

Students found guilty of plagiarism will suffer consequences ranging from a grade reduction to failure in the course to expulsion from the university. In addition, a formal letter documenting the offence will be filed in the Provost and Dean's Office, and this record of the offence will be retained in the Provost and Dean's Office for the duration of the student's academic career at Huron University College.

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.

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

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.

Policy on Special Needs

Students who require special accommodation for tests and/or other course components must make the appropriate arrangements with the Student Development Centre (SDC). Further details concerning policies and procedures may be found at:

http://www.sdc.uwo.ca/ssd/?requesting_acc

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 Provost and 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 Provost and Dean of that Faculty, the student will be debarred from taking the regular examination in the course. The Provost and Dean of the Faculty offering the course will communicate that decision to the Provost and Dean of the Faculty of registration.

Class Cancellations

In the event of a cancellation of class, every effort will be made to post that information on the Huron website, <http://www.huronuc.ca/AccessibilityInfo> (“Class Cancellations”).

Mental Health @ Western

Students who are in emotional/mental distress should refer to Mental Health @ Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

Academic Advising

For advice on course selections, degree requirements, and for assistance with requests for medical accommodation [see above], students should contact an Academic Advisor in Huron’s Student Support Services (huronsss@uwo.ca). An outline of the range of services offered is found on the Huron website at: <http://www.huronuc.ca/CurrentStudents/AcademicAdvisorsandServices>

Department Chairs and Program Directors and Coordinators are also able to answer questions about their individual programs. Their contact information can be found on the Huron website at:

<http://www.huronuc.ca/Academics/FacultyofArtsandSocialScience>