

HURON UNIVERSITY COLLEGE

Undergraduate Course Outline 2022–2023

HistSci2200E: The History of Scientific Thought

Tues 1:30–2:30, Thurs 12:30–2:30
Classroom: W8 (Huron)
Office: Lucas House Annex

Instructor: Emerson Doyle
email: edoyle9@uwo.ca
Hours: Tues 3:30-4:30, Thurs 2:30-3:30

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 prevalence of various goals for, and attitudes toward, science, and the relationships between science, religion, culture, society, and the individual.

Anti-Requisite(s): Phil2203E.

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), 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 2022 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 2023 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.

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 13/15)

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 20/22)

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 27/29)

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 04/06)

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 11/13)

Of 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 18/20)

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 25/27)

Medieval Medicine, Historiography, and Interpretation

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

Reading Week! (Whew!)

Ptolemaic Astronomy—Teach the Controversy

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

Essay Review Assignment due November 10th

Week 11 (Nov 15/17)

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 18th

Week 12 (Nov 22/24)

“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 (Nov 29/Dec 01) **A Synthesis in Scholasticism**

Full-Year Course
Drop Week

- 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 06/08)

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 08th — 10%

Mid-Year Exam during Fall Exam Period — 15%



Winter Term

*Reading list is still tentative.

Week 15 (Jan 10/12)

Revolutions, Renaissances, and the Continuity Question

- Henry, selections from *A Short History of Scientific Thought* (on OWL)
- Okasha, “Scientific Change and Scientific Revolutions” (on OWL)
- Lindberg, Chp. 14 “The Legacy of Ancient & Medieval Science”

Week 16 (Jan 17/19)

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

- Henry, selections from *A Short History of Scientific Thought* (on OWL)
- Osiander, “The Unsigned Letter” (on OWL)
- Brahe, “The New Star” (on OWL)
- Kepler, “Eight Minutes of Arc” (on OWL)

Week 17 (Jan 24/26)

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 18 (Jan 31/Feb 02)

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)

Preliminary Thesis due February 02nd — 5%

Week 19 (Feb 07/09)

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)

Week 20 (Feb 14/16)

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 ☺ (Feb 21/23)

No Class — Reading Week!! (whew!)

Week 22 (Feb 28/Mar 02)

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 23 (Mar 07/09)

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)

Research Essay Draft due March 09th

Week 24 (Mar 14/16)

The Return of the Invisible (and Indivisible!) Atoms

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

Week 25 (Mar 21/23)

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)

Peer Editing due March 23rd — 5%

Week 26 (Mar 28/30)

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)

Week 27 (Apr 04/06)

Germs, 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)

Research Essay Final due April 06th — 20%

Final Exam during Winter Exam Period — 15%

SCIENCE

Ruining Everything Since 1543

