

HURON UNIVERSITY COLLEGE  
Undergraduate Course Outline 2018–2019

## HistSci2200E: The History of Scientific Thought

Fall/Winter Term 2018–2019  
Fridays, 8:30–11:30am  
Room: V208 (Huron)

Instructor: Emerson Doyle  
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Office Hours: Fridays, 11:30–1:00, Benson Rm. 1

### 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. 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.
- 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 2018 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 2019 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 07)

#### **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 14)

#### **Plato’s Heaven & The Mathematical 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 21)

#### **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 (Sept 28)

#### **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 5 (Oct 05)

#### **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 5th — 10%**

Week ☹ (Oct 12)

#### **Fall Reading Week (Whew!)**

Week 7 (Oct 19)

#### **Atoms and Ataraxia and Alexander (Oh My!)**

- Lindberg, Chp. 4 “Hellenistic Natural Philosophy”
- PhilSci, §1.11 “The Explanatory Power of Atomism”

Week 8 (Oct 26)

#### **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”

**Essay Feedback due October 26th**

Week 9 (Nov 2)

#### **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)
- Celsus, selections from *De Medicina* (on OWL)

Week 10 (Nov 09)

### Science Travels 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 November 9th — 5%

Week 11 (Nov 16)

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

- Lindberg, Chp. 9 “The Revival of Learning in the West”
- Lindberg, Chp. 10 “The Recovery and Assimilation...”
- Bacon, selection from *Opus Maius*

Week 12 (Nov 23)

### 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 13 (Nov 30)

*Full-Year Course*  
*Drop Week*

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

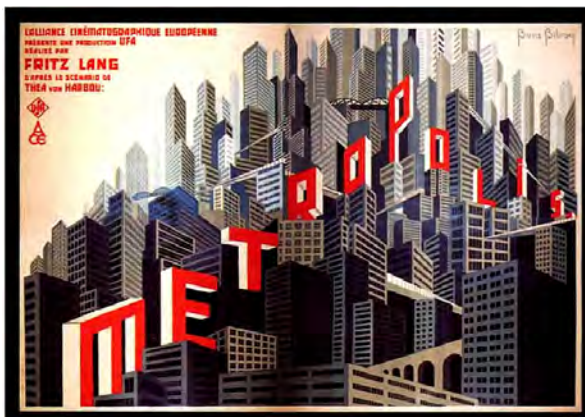
- Lindberg, Chp. 12 “The Physics of the Sublunar...” (pp. 295–313)
- PhilSci, §1.14 “Projectile Motion”
- PhilSci, §1.15 “Free Fall”
- PhilSci, §1.17 “Impetus and its Applications”

Week 14 (Dec 07)

### Overflow, Exam Prep., & Review

Essay the Second due December 7th — 10%

Mid-Year Exam during Fall Exam Period — 15%



## Winter Term

\*Reading list is still tentative.

Week 15 (Jan 11)

### **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 16 (Jan 18)

### **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 17 (Jan 25)

### **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”

**Research Question due January 25th**

Week 18 (Feb 01)

### **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 19 (Feb 08)

### **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 15)

### **I Am Not an Animal! Then You’re Either a Machine or a Witch!**

- Lindberg, Chp. 13 “Medieval... and Natural History” (pp. 351–357)
- Gribbin, “Renaissance Men” & “Science Finds its Feet” (on OWL)
- Broad, “Cavendish & Glanvill: Science, Religion, & Witchcraft” (on OWL)

Week ☹ (Feb 22)

### **No Class — Reading Week!! (whew!)**

Week 22 (Mar 01)

### **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 1st — 5%**

Week 23 (Mar 08)

### **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 15)

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

- PhilSci, §3.8 “The Nature of Cause and Effect”
- Bowler & Morus, “The Conservation of Energy” (on OWL)

**Substantive Comments due March 15th — 5%**

Week 25 (Mar 22)

**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”

Week 26 (Mar 29)

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

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

Week 27 (Apr 05)

**Overflow, Exam Prep., & Review**

**Research Paper due April 5th — 20%**

**Final Exam during Winter Exam Period — 20%**

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Ruining Everything Since 1543



The Appendix to Course Outlines is posted on the OWL course site.