

CC602 History of Science
Tuesdays 6:00-8:50 p.m.

Dr. Tim Sansbury

The Catalog Description

This course examines the history of science, technology, and the philosophy of science from Aristotle to the present. The narrative is selected especially as it relates directly or indirectly to the history of the church and theology and reflects/influences broader cultural movements. The focus is on the history and philosophy of science, as well as the philosophy of nature, and does not require any prior scientific knowledge.

Learning Objectives

The student will be able to:

- (1) Describe the Greek origins of the philosophy of nature, prior to Aristotle
- (2) Explain Aristotle's system of nature, especially regarding physics and cosmology, and demonstrate the influence of that system through the Reformation.
- (3) Be able to list major milestones in the development of modern science in the ancient and medieval world.
- (4) Describe the influence of the Arabic translation and scholarship on medieval scholarship
- (5) Be aware of the general timing of major scientific developments through history, especially prior to the Scientific Revolution
- (6) Explain the influence and achievements of Galileo, Descartes, Kepler, Boyle, and Newton in the change from Aristotelian to a modern scientific viewpoint, including the origin of science as a discrete discipline.
- (7) Differentiate the mechanistic worldview of the Scientific Revolution from the preceding, Aristotelian system of nature.
- (8) Differentiate the modern scientific worldview from the mechanistic worldview of the Scientific Revolution.
- (9) Understand the historical fallacy of the supposed conflict between Christianity and Science
- (10) Connect scientific developments to the broader cultural, philosophical, and religious history studied in the MACCS program at Knox Seminary

The Instructor

Tim Sansbury

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Feel free to contact me whenever needed (preferably via email).

Readings

The student is required to read carefully the following texts as assigned (not all will be read in their entirety).

- (1) David Lindberg. *The Beginnings of Western Science*. Second edition preferred
- (2) *The Scientific Background to Modern Philosophy*. ed. Michael Matthews.
- (3) Thomas Kuhn. *The Structure of Scientific Revolutions*. There are a lot of these in print. The later versions have some additions and responses to criticisms you may find interesting, but if you have (or buy used) an older version the core content will be the same.

- (4) Guest lecturer Dr. Ted Davis has made several articles available to you on Robert Boyle, Draper White and the conflict thesis, as well as assorted additional readings. These are available in Moodle.
- (5) It's not a reading, but also please watch the Draper White conflict video produced by the AAAS DoSER group: <https://www.scienceforseminaries.org/resource/science-and-religion-the-draper-white-conflict-thesis/>

Please note that in this course, the *Beginnings of Western Science* text will function as a complement to the lectures, meaning the content will not always overlap. You will get the richest detail on the history of science up to the beginning of the Modern period from that text, while the lectures will focus primarily on scientific developments since that time. As a result, you will find the reading assignments somewhat front-loaded, as I will work to get the foundation for the lectures laid. The first "regular" week of the course will be a reading week, with no mandatory lectures, but with the expectation of significant progress through the main text. (You may certainly begin work on that early.)

Tentative Calendar

Section 1: Guest Lectures and Science Symposium

Jan. 30-31 Guest Lectures, Ted Davis

- Readings in Moodle are to be completed prior to the lectures by Dr. Davis.
- Complete the Science for Seminaries survey, link is in Moodle

Feb. 1 – Knox Symposium on Christianity and Science

- Attendance Required. Participation in the optional essay contest may be used in place of one of the two assigned reflection papers.

Feb. 5 – Reading Week

- *The Beginnings of Western Science* (BoWS) 1-192. Submit reading notes in Moodle

Feb. 12 – Astronomy and Astrology from Aristotle to Kepler

- BoWS 193-285. Submit reading notes in Moodle
- *The Scientific Background to Modern Philosophy* (SBMP) 1-32

Feb. 19 – The End of Aristotle's Universe

- BoWS 286-367. Submit reading notes in Moodle
- SBMP 33-52
- View animation of the Aristotelian Spheres in Moodle

Feb. 26 – The Scientific Revolution, Oversimplified

- SBMP 53-108
- Reflection Paper due: "The biggest surprise..."

Mar. 4 – When Science Became Religion

- SBMP 109-158
- *The Structure of Scientific Revolutions* (SSR) chs. 1-3

Mar. 11 – Spring Break

- SSR chs. 4-7
- Paul Dirac Essay on Mathematical Beauty (in Moodle)

Mar. 18 – Modern Science and the End of Mechanism

- SSR chs. 8-11
- Reflection Paper #2, “I could not have understood...”

Mar. 25 – Final Assignments Due

- Final Papers due (see below)
- Submit the Reading Completion Survey
- Complete the Science for Seminaries Survey (link is in Moodle)

The Assignments

Reading

Reading must be completed before the class in which it is to be discussed. Class discussions will focus on readings, so you must be prepared to talk. Read carefully. Read charitably. Read with others. Read with the expectation that you will learn from others, even when you disagree with their main point. Read even when a text is dense and difficult, for you will learn perseverance and fortitude here. Read that which seems trite and obvious, asking how others might object or criticize. Most importantly, read because God was willing to reveal himself in written words, and because you will be called on to witness to God’s grace with words of your own.

Reading Notes, where assigned, may be in whatever format works best for your own use, but should demonstrate care not note important dates, names, and more importantly, central themes and progressions.

Reflection Papers

Two reflections papers, on prompts to be provided, should engage with the content of the lectures and the readings and the student’s prior impressions of the nature and history of science compared to the content of the course.

Class Discussions

Each student will be required to participate in class discussions during the semester. This simply involves prompting and engaging in discussion by raising pertinent questions related to the reading. All students will have brought their reading notes and, thus, be ready to engage in lively and helpful conversation.

Note: a particularly helpful way to further discussion may be to pose devil’s advocate sort of questions: “what would you say if someone asked this?” or “how would you respond to this objection?”

Final Paper (2500 word limit) (Learning Objectives 1,3,4,10)

Write a final paper on one of the two subjects below:

Option 1: Topical... Choose one development of historical science or philosophy of nature which either (a) helped you to understand historical theology, or (2) helped you to understand historical literature that is the subject of another class in the MACCS program. In your essay, you should accurately describe the historical scientific theory, explain how a modern scientific worldview makes the theological or literary text difficult to understand, and explain/translate the text you have selected for a modern audience by means of understanding the historical scientific position. (For example, you could show why Calvin is not a bizarre pagan for accepting some aspects of astrology; this would take some research but would be a good topic if you picked it).

Option 2: Literary... Choose a piece of classical literature that is also a science fiction text. Some options include *Frankenstein*, *Arrowsmith*, or *Connecticut Yankee in King Arthur's Court*, and write a critical literary analysis of the text revealing such issues as the underlying scientific worldview, the attitude towards science and/or scientists being taken, and/or the purpose behind the author's use of fictionalized science. Connection to Christian and/or theological issues is preferred, but is not necessary for full credit.

The paper should be 2000-2500 words in length. A strong paper will demonstrate a clear thesis and appropriate research on the topic selected (including primary sources).

- Stay within the word count (2000-2500 words).
- Check and double-check your paper for proper spelling, grammar, and formatting (Footnotes and citations will conform to Kate L. Turabian, *A Manual for Writers of Term Papers, Theses, and Dissertations*. 8th ed. (Chicago: University of Chicago Press, 2013). Primary guidelines may be found online via the Online Turabian Quick Guide (http://www.press.uchicago.edu/books/turabian/turabian_citationguide.html)
- Papers will be composed in MS Word (.doc or .docx) format only (NO PDF's).
- Papers should be double-spaced, in 12 pt. font, Times New Roman or similar.
- Make sure you have done appropriate research, especially in primary sources. Document not only quotations but data and ideas well to ensure there is neither the reality nor the appearance of plagiarism.

Grading Distribution

Grades are apportioned as follows:

Participation	15%
Reading completion and Reading Notes	20%
Reflection Papers	30%
Final Paper	35%

Grades may be adjusted based on attendance and participation in class.