

Scientific Revolutions

COURSE INSTRUCTOR Dr. Steven Walton, Rm. 315 Victoria College
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 Office Hours: Thursday 3-5pm, or by appointment.

TEACHING ASSISTANTS

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COURSE MEETING TIMES

		<u>place</u>	<u>TA</u>
Lecture:	Wed. 6-8PM	EM001	—
Tutorials:	Wed. 5-6PM	NF007J.Foster	
	Wed. 5-6PM	EM108	B.Eadie
	Wed. 8-9PM	PR316 J.Foster	
	Wed. 8-9PM	NF235 B.Eadie	

COURSE DESCRIPTION

This course will examine the history of science in the western tradition through a study of some of its most revolutionary achievements. The course treats science as a historically significant product of nature, technology, and society within the wider cultural framework of the European tradition. It is designed for both students from the humanities and from the sciences so there are no prerequisites. It is NOT a science course, although a familiarity with the sciences will be beneficial. It will provide students in the sciences an understanding of how science has affected and been affected by the times in which it was developed and it will provide students in the humanities an understanding of humanity's major scientific achievements and their impact on the world which we have inherited.

The principle material for the course will be covered in lectures, which are designed to complement the assigned readings. Tutorials (for which attendance is REQUIRED) allow you to discuss those readings, which are largely the words and thoughts of the scientists themselves, in greater detail. You will get out of this course what you put into it, but if nothing else, you will hopefully understand the origin of the modern scientific worldview.

GRADING

The course mark is based on 2 short papers, 1 midterm at the end of fall term, and a cumulative final at the end of spring term. Tutorial participation also counts towards your final grade.

Tutorial	—	10%
Paper #1	due 17 November*	15%
Paper #2	due 15 March*	15%
Midterm	December exam period (TBA)	20%
Final	April exam period (TBA)	40%

* Late papers are penalized 2% per *business* day of lateness and will not be accepted after the on-time papers are returned to the students (2 weeks). Late papers are to be submitted to the Instructor, TAs, or the IHPST office, room 316 Old Vic (there is a drop-box and log book outside the office if you are submitting your paper after-hours).

Required Texts — All texts available at the Victoria College Bookstore —

- Brian Baigrie (ed.), *Scientific Revolutions: The Primary Texts* (Canadian Scholar's Press, 1999)
- Richard S. Westfall, *The Construction of Modern Science* (New York: Cambridge, 1977)
- I. Bernard Cohen, *The Birth of a New Physics* (New York: Norton, 1961)
- Stillman Drake (ed.), *Discoveries and Opinions of Galileo* (New York: Doubleday Anchor, 1957)
- James Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA* (NY: Penguin, 1968) **note:** not available until spring term

Weekly Topics**Fall Term 1999**

<u>Date</u>	<u>Topic</u>	<u>Readings</u>
15 Sept.	Introduction, what is science, and introduction to the ancients.	
22 Sept.	Aristotle: peripatetic nature	Baigrie (Aristotle) Cohen, ch. 1 and 2
29 Sept.	Ptolemy and the origins of astronomy	Baigrie (Ptolemy) Cohen, ch. 3
6 Oct.	Medieval & Arabic Science: Transmissions and mutations	<i>Film:</i> "The Medieval Universe"
13 Oct.	Copernicus challenges the status quo	Baigrie (Copernicus) Westfall, ch. I
20 Oct.	Brahe & Kepler up the ante	Baigrie (Brahe) Cohen, ch. 6 and 5
27 Oct.	Galileo, the cosmos, and the Church	Cohen, ch. 4 Drake, pp. 21-58 and 173-216
3 Nov.	The Rediscovery of the Body: Vesalius	Baigrie (Vesalius)
10 Nov.	Harvey and the circulation of the blood	<i>Film:</i> "Circulation of the Blood" Baigrie (Harvey) Westfall, ch. V
17 Nov.	Descartes & Mechanism	Baigrie (Descartes) Westfall, ch. II
24 Nov.	The Rise of Societies	Baigrie (Galileo) Westfall, ch. VI
1 Dec.	Experimental science: Boyle, Gassendi, and the rest...	Baigrie (Boyle, Toricelli)
8 Dec.	The Microscope and Leeuwenhoek	Baigrie (Leeuwenhoek)

Winter Term 2000

<u>Date</u>	<u>Topic</u>	<u>Readings</u>
5 Jan.	Recap and intro to “modern science”	Baigrie (Cavendish)
12 Jan.	Isaac Newton: gravity and Restoration England	Baigrie (Newton #1) Westfall, ch. VII and VIII Cohen, ch. 7
19 Jan.	Newtonian Optics	<i>Film</i> : “Newton’s Argument for Universal Gravitation”
26 Jan.	Chemistry: Alchemy & Paracelcius	Baigrie (Newton #2, Paracelcuis) Westfall, ch. IV
2 Feb.	Chemistry: Phlogiston and Lavoisier	Baigrie (Priestley, Lavoisier)
9 Feb.	Chemistry: Lavoisier and Mendeleev	Baigrie (Gay Lussac, Mendeleev, Dalton)
16 Feb.	READING WEEK	
23 Feb.	Science Applied?: Thermodynamics and Electricity	Baigrie (Avogadro, Volta, Ersted)
1 Mar.	The rise of Geology: Hutton, Lyell, Cuvier	Baigrie (Hutton, Lyell, Cuvier)
8 Mar.	Darwin, Lamarck and Evolution	Baigrie (Linnaeus, Lamarck, Darwin)
15 Mar.	Mendel: the discovery of genetics and their application	Baigrie (Mendel)
22 Mar.	DNA: The Double Helix	Watson (complete)
29 Mar.	Inside the Atom: X-Rays and Radiation	Baigrie (Röntgen, Thomson)
5 Apr.	Outside the Atom: Quantum Physics, Relativity, and the Bomb.	Baigrie (Rutherford)