

PHIL/ 237 Philosophy and Classical
STV Physics
TTh 2:00-3:15
DeBartolo 202

Fall 1999

Prof. Don Howard
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Office Hours: TTh 1:00-2:00

Texts: I.B. Cohen. *The Birth of a New Physics*, rev. ed. New York: W.W. Norton, 1985.
David C. Lindberg. *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, 600 B.C. to A.D. 1450*. Chicago: University of Chicago Press, 1992.
Michael R. Matthews, ed. *The Scientific Background to Modern Philosophy: Selected Readings*. Indianapolis: Hackett, 1989.
Robert D. Purrington. *Physics in the Nineteenth Century*. New Brunswick, NJ: Rutgers University Press, 1997.
Richard S. Westfall. *The Construction of Modern Science: Mechanisms and Mechanics*. Cambridge: Cambridge University Press, 1978.

Requirements: There will be five components in the computation of your final grade for the course:

(1) **Examinations** (35 %). At mid-term and during final examination week, there will be in-class, essay examinations, each counting for 17.5% of the final grade. One week before each examination, a list of study questions will be distributed to assist you in preparing for the examination.

(2) **Term Papers** (35 %). Each student will be required to submit a final term paper, of a minimum of ten pages, on a topic to be worked out in consultation with the instructor.

(3) **Journals** (20 %). You will be required to keep a journal to be used primarily to record your critical reactions to the assigned readings. At a minimum, you should write a one-page (minimum 300 words) critical response to each reading assignment, though you are encouraged to write more, taking advantage of this opportunity to record your thoughts on any topic related to the course and the readings. Journal entries will be collected on a random, unannounced basis several times over the course of the semester. In addition, the entire journal will be collected at the time of the mid-term and final examinations so that I can check to be sure that all required entries are included. To facilitate the collection of journal entries, you will be asked to keep the journal in some kind of loose-leaf or ring binder. Also, you should get in the habit of bringing the journal with you to class every day, so that you will be ready with your journal entry on the days when I collect journal entries. You will be graded rigorously on the extent to which you use your journal, the minimum of one page (300 words) per reading being strictly enforced. But it will be the quality of thinking manifest in your journal that will chiefly determine your grade.

(4) **Class Participation** (10 %). The remaining ten percent of your final grade will be determined on the basis of the quality and extent of your enthusiastic participation in the class.

One-minute Papers: Every class session (excepting the day of the mid-term examination) will end a few minutes early to permit you to write a so-called "one-minute paper," in which you will write no more than two- or three-sentence answers to two questions: (a) What was the most important point covered in today's class? (b) What issue or question was left most unclear in your mind at the end of today's class? These one-minute papers will be required of every student at the end of every class session and will be collected at the end of class, but they will not be graded.

Attendance: No more than two unexcused absences will be permitted during the semester; for every additional unexcused absence, the student's final course grade will be reduced by one step on a plus/minus basis. Thus, for example, for a student with three unexcused absences, a final grade of B+ becomes a B, and

for a student with four unexcused absences, a final grade of B becomes a C+. A student more than fifteen minutes late for class is assumed to be absent. If you must miss a class for any reason, be sure to let me know beforehand, or as soon after the fact as possible, so as to enable me to determine whether or not to excuse the absence. I promise to be generous in allowing excused absences for legitimate purposes.

Schedule:

Date:	Topic:	Readings:
24 Aug.	Introductory Lecture	
26 Aug.	Science in Antiquity: Pythagoreans, Eleatics, and Platonists	Lindberg, 1-45.
31 Aug.	Aristotle	Lindberg, 47-68; Cohen, 3-23.
2 Sep.	"	Matthews, 5-32.
7 Sep.	Hellenistic Natural Philosophy	Lindberg, 69-83.
9 Sep.	Euclid, Ptolemy, and the Sciences after Aristotle	Lindberg, 85-110; Cohen 25-35.
14 Sep.	Early Christian Thinkers; Early Middle Ages; Islamic Science and Philosophy	Lindberg, 133-182.
16 Sep.	9th–12th Centuries: Neo-platonism and the Age of Translation	Lindberg, 183-213.
21 Sep.	13th Century: Scholasticism and the Revival of Aristotelianism	Lindberg, 215-244.
23 Sep.	Cosmology in the Later Middle Ages	Lindberg, 245-280.
28 Sep.	The Physics of Motion in the Later Middle Ages	Lindberg, 281-315.
30 Sep.	Neo-Platonism, Mathematics, and Theories of Scientific Method in the Renaissance	
5 Oct.	The New Astronomy: Copernicus, Brahe, Kepler, and Galileo	Cohen, 35-80, 127-147.
7 Oct.	" " " " " " "	Matthews, 33-44, 53-81.

12 Oct.	Galileo, Descartes, and the Mechanical Philosophy	Westfall, 3-42; Cohen, 81-126; Matthews, 81-86, 87-108.
14 Oct.	Mid-term Examination	
19 Oct.	Fall Break	
21 Oct.	Fall Break	
26 Oct.	Boyle, Huygens, and Mechanical Science	Westfall, 43-104, 120-138.
28 Oct.	" " " " " " "	Matthews, 109-132.
2 Nov.	The Ideology and Institutions of the New Science	Westfall, 105-119; Matthews, 45-52.
4 Nov.	Newton on Mechanics and Celestial Dynamics	Westfall, 139-159; Cohen, 148-184; Matthews, 133-153.
9 Nov.	Newton on Natural Philosophy and Scientific Method	Matthews, 153-158.
11 Nov.	Newton as a Theologian	
16 Nov.	19 th -Century Science in Context	Purrington, 1-31.
18 Nov.	Electromagnetism	Purrington, 32-74.
23 Nov.	Heat and Thermodynamics	Purrington, 75-101.
25 Nov.	Thanksgiving	
30 Nov.	Energy and the Energy Principle; Atomism	Purrington, 102-131.
2 Dec.	The Kinetic Theory of Gases and Statistical Mechanics	Purrington, 132-147.
7 Dec.	Fin de Siècle	Purrington 148-174.
13 Dec.	Term Papers Due (Mon., 12:00 noon)	
16 Dec.	Final Examination (Thur. 10:30-12:30)	