

Philosophy and Classical Physics

Philosophy 251
Dr. Brandon Look
Spring 2000
TR 11:00-12:15
CB 246

I fully agree with you about the significance and educational value of methodology as well as history and philosophy of science. So many people today – and even professional scientists – seem to me like somebody who has seen thousands of trees but has never seen a forest. A knowledge of the historic and philosophical background gives that kind of independence from prejudices of his generation from which most scientists are suffering. This independence created by philosophical insight is – in my opinion – the mark of distinction between a mere artisan or specialist and a real seeker after truth.

–Albert Einstein

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Course Description:

This course has two primary aims: to acquaint students with the history of natural philosophy from antiquity to the beginning of the 20th century and to show some of the philosophical presumptions and problems that lie in the background of the study of physics. We will be concerned with the rise and fall of the mechanical world-view as well as with issues in the philosophy of science, such as realism and anti-realism, the nature of space and time, and the methodology of scientific research.

Required Texts:

- Cushing, James T. *Philosophical Concepts in Physics* (Cambridge: Cambridge University Press, 1998). [On sale at both Kennedy Bookstore and the UK Bookstore.] = **C**
- Huggett, Nick. *Space from Zeno to Einstein* (Cambridge, MA: MIT Press, 1999). [Also on sale at Kennedy's and the UK Bookstore.] = **H**
- Supplementary Primary Texts. A xerox packet on sale at Johnny Print Copy Shop, 547 S. Limestone. = **X**

Course Requirements, Grades, and Grading:

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|---|-----------------|
| (1) One short essay (6-8 pages in length) | 200 points |
| (2) Two mid-term exams | 200 points/exam |
| (3) Final Exam | 400 points |

- A = 934+ points
A- = 900-933
B+ = 867-899
B = 834-866
B- = 800-833
C+ = 767-799
C = 734-766
C- = 700-733
D+ = 667-699
D = 634-666
E = <633

Given that each student is to write one philosophical essay and that the exams will require essay answers (bring blue books please!), each student's final grade will depend upon the quality of his or her written work – or my (our) estimation of the quality of his or her work. Does this mean that the grading is “subjective”? Yes. But it is neither arbitrary nor whimsical. With each paper or essay exam, I (we) ask, (1) How well has the student understood the material? (2) How well has the student argued his or her point? (This question sometimes turns out to be, Does the student have a point at all?) (3) How clearly does the student write? (Remember: (It is the job of the writer to communicate an idea to the reader. If the reader has to re-read a passage several times before he or she can understand the writer's point, the writer could have been clearer. If the reader simply cannot understand the writer's point, the writer has failed.)

Cheating and Plagiarism:

Any student caught cheating on an exam or copying material without citing the original author will be failed in this course and possibly expelled from the university. The University defines plagiarism in the following way: “When students submit work purported to be their own but which in any borrows ideas, organization, wording, or anything else from another source without appropriate acknowledgment, the students are guilty of plagiarism.”

Miscellaneous policies and procedures:

- Unless forced to do so, I do not take attendance. The material that we will cover during the course of the semester is not easy, and, I suspect, students will have some difficulty grasping it alone. It is, therefore, in the interests of students to attend class regularly.
- No late papers will be accepted.
- No incompletes will be given (except in *extraordinary* circumstances).
- All students are expected to have done the assigned reading *prior* to class. Although I shall be lecturing for the most part, I shall also use a benign Socratic method and hope to generate a discussion of the texts that we study.

Schedule:

Date	Topic	Reading
1/13	Introduction	
1/18	Philosophical Issues in the Study of Classical Physics	C 1 and 3; H 1; X 1
1/20	The Pre-Socratics and Plato	
1/25	Zeno	H 3
1/27	Aristotle	H 4; X 2-3
2/1	Aristotle	H 4; X 2-3
2/3	Ancient Astronomy	C 4; X 27
2/8	Ancient Astronomy	C 4
2/10	Copernicus and Kepler	C 5; X 4-6
2/15	Galileo	C 6; X 7-8
2/17	Mid-term I	
2/22	Galileo	C 6; X 7-8
2/24	Descartes	H 6; X 9-10
2/29	Descartes	H 6; X 9-10
3/2	Criticisms of Descartes	X 12-13
3/7	Method and Light	X 11, 14-15
3/9	Newton	C 7-9, 11; H 7; X 16-17
3/14	Spring Break	
3/16	Spring Break	
3/21	Newton	C 7-9, 11; H 7; X 16-17
3/23	Absolute vs. Relative Space	H 8-10; X 18-19
3/28	The Mechanical World-View	C 12
3/30	Mid-term II	
4/4	Kant	H 11; X 20

4/6	Kant	H 12
4/11	18 th and 19 th century physics: The problem of the aether	C 13
4/13	Maxwell and electricity	C 14; X 21-22
4/18	Decline of the Mechanical World-View	C 15
4/20	Modern Conceptions of Space	H 13-14; X 23-26
4/25	Modern Conceptions of Space	H 13-14; X 23-26
4/27	Wrap-up and Review Papers Due	
5/5	Final Exam 1:00 pm	