

HISTORY AND PHILOSOPHY OF SCIENCE PHYS/PHIL378.01 - FALL 2011

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Texts: *A History and Philosophy of Science* (HPS), Paul Morris

Arcadia, Tom Stoppard

Copenhagen, Michael Frayn

The Physicists, Friedrich Dürrenmatt

PLEASE BRING THE ASSIGNED READING MATERIAL TO EACH CLASS!

Attendance: Attendance is expected as is being on time for class. Three absences are permitted (but not encouraged); any subsequent absence must be excused and makeup work will be required and at the discretion of the instructor. The fourth absence, if unexcused, will result in a deduction of five points from the final grade. Each subsequent unexcused absence will result in a lowering of the final grade one letter.

Course

- Objectives:
- 1 To understand the development of the way science is done through theory formation. We begin in 600 BCE with Thales who raises the question of the composition of the universe ('matter'). With Heraclitus, Parmenides, and Zeno the question of how change occurs arises (motion being one form of change). Thus the basics of mechanics, the study of matter in motion, begins. We follow the development of thought concerning mechanics (both celestial and terrestrial) through Plato, Aristotle, Ptolemy, Copernicus, Galileo, Newton, Einstein, and Bohr. This is a classic picture of how the nature of science has evolved to its present state. [Students are required to interpret graphs and some fairly complex mathematical equation, especially in relativity theory.]
 - 2 To understand the mutual impact of science and other disciplines. With the tremendous success of Newtonian physics, many thinkers during the 18th century strove to emulate physics by discovering the 'laws' God intended for other disciplines. We look at the beginnings of the social sciences (including economics and political movements), moral theory, the arts and literature, and religion as examples. In the 20th century we look at three plays and parallel movements in the arts and sciences.
 - 3 To grapple with moral and ethical questions arising from contemporary science and technology. After Hiroshima/Nagasaki, J. Robert Oppenheimer claimed that "Physicists have now tasted sin." Along with questions of who all are complicit in the bombings, we also pursue questions about robotics, nanotechnology, and genetic engineering.
 - 4 To gain an understanding of nature and our place in it and our responsibility for it. Are there limits to what we can do to and in nature as either scientists or non-scientists?

Course

Requirements: The student is expected to read assigned material. At the beginning of each class there may be a short reading quiz. These grades will be combined with a class participation grade and participation grade to form a single grade.

There will be two exams, including the final exam; the final (second) exam is not comprehensive.

There will be three short (800-1000 words) papers, one for each of the three plays; these are not research papers but analytic papers. Format will be discussed at a later time.

Periodically, there will be 250-300 word essays on topics of the days discussion.

The student is expected to maintain proper discipline in class (i.e., no sleeping, carrying on private conversations, etc.) and to contribute to class discussions.

Grades: Your grade will be determined as follows:

2 Exams	40%
3 Short papers	40%
One-page essays and daily quizzes	10%
Class preparation and participation	10%

The grading scale will be

90-100	A	
80-89		B
65-79		C
50-64		D
Below 50		F

DISCIPLINE AND IN-CLASS POLICIES

Conduct in Class: Questions or observations, addressed to the entire class, are encouraged during the class period. If something is unclear, the student should immediately ask for clarification. However, the student is not to be a disruptive influence in the class. The following are the penalties for disturbing the class: The second time she/he is corrected will result in an unexcused absence. The third time she/he is corrected will result in a drop of one letter grade on the final average. The fourth time she/he is corrected will result in dismissal from class with a failing grade.

Cell phones are not to go off in class! Grades will be reduced if they do. As you enter the classroom check to see that your phone is OFF!

Laptops or any other electrical device [other than a calculator] (iPhone, iPod, cell phone, etc.) are not to be in hand, on desk, or otherwise in use in class! If this use is discovered, you will be counted absent or the day.

Cheating: The students in this class are considered to be mature. Any student caught cheating (either receiving help or giving help) on an exam will get a zero on that exam. A second offense will result in a failing grade from the course. Students aware of cheating should let the professor know. Since an exam may be curved, students could be hurting themselves if they allow cheating to go uncorrected. Plagiarism is a 'no-no'!