

Ethical Issues In Physics

PHY 406

Winter 2009

Instructor: Marshall Thomsen 302B Strong 487-8794
jthomsen@emich.edu

Discussion: Tuesday 10:00-10:50 Room 341

Caring Professional Educators for a Diverse and Democratic Society.

The purpose of this course is to acquaint you with ethical issues a career physicist may face and to place these issues in the more general context of the nature of science. We will examine professional scientific ethics and what to do when ethical principles conflict. The case studies we will use come primarily from the physics community. You will have weekly reading assignments, and you will be expected to participate actively in classroom discussion. Reading assignments will either be available on line or outside my office.

GRADING

Participation(15%): You will be awarded 1 point for active participation in classroom discussion during each class session throughout the term.

Quizzes(25%): There will be an unspecified number of unannounced quizzes throughout the term worth ten points each. This portion of your grade will be based on the average of those reading quizzes. The quizzes will cover the reading assignment due for that week and/or the previous week's class discussion. You may consult any notes that you have written, but you may not consult the weekly readings during the quiz. The goal of these quizzes is to encourage familiarity with the material while not requiring large quantities of memorization.

Final Essay(40%): A rough draft of this essay is due on March 31 and is worth 10% of your final grade. The final draft is due on April 14 and is worth 30% of your final grade. The topic will be announced later. Successful completion of this assignment is an essential element in this course; therefore, **in order to pass this class you must receive at least a C (70%) on this assignment.** Students pursuing a teaching degree must submit this essay through LiveText; all others should submit a hard copy.

Panel Discussion(20%): You will participate in one discussion panel.

You will be assigned to a panel of 3-4 people for one of the 3 panel discussions listed on the schedule.

Each member of the panel will need to locate some reading material with content relevant to the topic and of length comparable to our usual reading assignments. Each panel member should select different reading material. Two weeks prior to the discussion date, each member must submit his/her reading selection to me for approval.

On the day of the panel discussion, each member should turn in to me:

- A one page discussion of ethical issues raised in their reading selection
- A photocopy of the selected reading, initialed by me as an indication of its prior approval

During the panel discussion, each member will give a five to ten minute overview of their reading selection and relevant ethical issues. At the conclusion of all of these overviews, panel members will engage in a free form discussion of the issues. The panel discussion will conclude with questions posed by other class members.

Academic dishonesty (such as cheating on a quiz or plagiarizing material) is incompatible with a learning environment and will be treated in accordance with University policy, including sanctions ranging from a zero on the assignment to failure in the course and referral to Student Judicial Services.

The instructor reserves the right to make changes in this syllabus. **YOU ARE RESPONSIBLE FOR ALL CHANGES TO THE SYLLABUS (INCLUDING CHANGE OF DUE DATES) THAT ARE ANNOUNCED IN CLASS.**

GRADING SCALE: A>93>A->90>B+>87>B>83>B->80>C+>77>C>73>C->70>D+>67>D>64>D->60>E

As part of the new College of Education assessment initiative, students taking this course who are pursuing a teaching degree are require to have a LiveText subscription. Discounted subscriptions are available through an EMU website (www.emich.edu/coe/livetext/index.html).

COURSE OUTLINE

Ethics and Ethics Codes

- 1/6 Introduction: Careers in Physics
- 1/13 The Nature of Science and Scientific Ethics (“Science for All Americans. Chapter1: The nature of science.” AAAS. See <http://www.project2061.org/publications/sfaa/online/chap1.htm>)
- 1/20 General Ethical Principles (“Philosophical Foundations of Scientific Ethics” at <http://www.physics.emich.edu/mthomsen/ethtaboc.htm>)
- 1/27 Codes of ethics (Go to <http://www.onlineethics.org/CMS/profpractice/ethcodes/13411.aspx> and link to codes from the American Chemical Society: Academic Professional and Chemical Professional, the American Physical Society, the American Society of Civil Engineers, and Guidelines for Engineers Dissenting on Ethical Grounds.)

Research Issues

- 2/3 General Issues (“Research Misconduct” and “Data Acquisition, Ownership, Management and Sharing” at <http://www.rcr.emich.edu/>)
- 2/10 Publication Issues and Plagiarism (“Publication Practices in Physics” at <http://www.physics.emich.edu/mthomsen/ethtaboc.htm> and “Publication Practices and Responsible Authorship” at <http://www.rcr.emich.edu/>) *Panel I readings due*
- 2/17 Data Analysis: The Millikan Oil Drop Experiment (Segerstrale—not available online)
- 3/3 Panel Discussion I: Misconduct in Physics & Chemistry (e.g., Rusi Taleyarkhan, Victor Ninov, Jan Hendrik Schön, Pattium Chiranjeevi)

Teaching Issues—helping students distinguish science from nonscience

- 3/10 Pathological Science by Langmuir (not available online)
Panel II readings due
- 3/17 The Strange Tale of the Hafnium Bomb: A personal Narrative by Peter D. Zimmerman <http://www.aps.org/publications/apsnews/200706/backpage.cfm>
“Drink at Least Eight Glasses of Water a Day.” Really? By Heinz Valtin. Go to http://dms.dartmouth.edu/news/2002_h2/08aug2002_water.shtml and click on the link at the bottom of the page to download the full 12 page article.
- 3/24 Panel Discussion II: Pseudoscience and just plain wrong science in the popular media

Societal Issues

- 3/31 ESSAY DRAFT DUE
Global Warming (Understanding and Responding to Climate Change—National Academy of Sciences. Use the link in the middle of <http://dels.nas.edu/basc/>. If printer ink is an issue, print it out on draft quality (there are lots of color text boxes and other visual enhancements). If you are looking at this assignment far enough ahead of time, you can email them to request a hard copy.
Panel III readings due
- 4/7 Readings from the Forum on Physics and Society Newsletter:
[A Tutorial on the Basic Physics of Climate Change \(July 2008\)](#)
[Climate Sensitivity Reconsidered \(July 2008\)](#)
[Editor's Comments \(October 2008\)](#)
[Concern About Monckton Article \(October 2008\)](#)
[Congratulation on Climate Issue](#)
Panel III, IV readings due
- 4/14 ESSAY DUE Classroom discussion of case studies
- 4/21 (final exam day) Panel Discussion III: Physics research and energy issues
Panel Discussion IV: The role of physicists in the Manhattan Project