

Proposed Freshman Seminar Syllabus
Ethics and Biomedical Science
One credit; Letter Grade (A, B, C, D, E)

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Course Meeting: Friday's 3:30-4:30 pm

Place: Vet Med Campus: room TBD

Office Hours: by appointment

GOAL: The goal of this course is to show how science and ethics are inextricably linked at the individual, organizational, and societal levels and to demonstrate strategies for thinking through ethical dilemmas that are created by advances in biomedical science.

COURSE CONTENT: This course will use readings from fiction and nonfiction to explore the norms and values that characterize the practice of modern science. These readings will be used to explore questions such as: Are there things that scientists shouldn't do? Are there things that scientists shouldn't know? Are there things that scientists shouldn't tell? Who should decide and how? Carmen will be used to deliver brief weekly assignments in the form of surveys (anonymous responses) or quizzes (identified responses).

WEEKLY TOPIC OUTLINE and ASSIGNMENTS:

Assignment to be completed before the first class: Read [1-3] and respond to a brief class survey.¹

Week One: "Science" vs. "Ethics"

- What is "science"?
- How does it work?
- Who does it?
- Who pays for it?
- Who "regulates" it, how and why?
- Who should regulate it?
- What is "ethics"?
- What is the relationship between "science" and "ethics?"

¹ This assignment will not count towards course completion credit, but rather will serve as a way for the students to test their ability to use Carmen, in addition to facilitating the first class discussion.

Assignment: Read: [4] Search on-line and find codes of ethics for biomedical scientists (hints/strategies for locating documents to be given).

Week Two: How does modern science “work”? Who does it and how?
(visit a biochemistry laboratory and speak with graduate students)

- What are the characteristics of a good scientist?
- Where do scientists work and under what expectations/provisions/regulations?
- How should scientists behave?
- Who has a say in regulating the behavior of scientists?
- How does information become knowledge?
- What features make “science” a successful strategy for producing knowledge?
- How do scientists communicate with each other?
- What role does scientific communication play in the scientific process?

Assignment: Read: [5] and think about the following quote:
“Science is a conversation about evidence found and meaning abstracted” pg. 395 of The Second Tree

Week Three: What is disciplinary expertise and how does it advance knowledge?

- What kinds of scientific expertise are discussed in this article?
- What does this article reveal about the advancement of science and the creation of knowledge?
- Can scientists predict how the results of their experiments will be interpreted or used?
- How do scientists create “meaning” out of “data”?
- What are legitimate vs. illegitimate sources of disagreement among scientists?

Assignment: Read: [6] and the handout on making judgments (to be prepared by LEO)

Week Four: What strategies can you use to think through ethical dilemmas created by advances in biomedical knowledge?

- What is judgment?
- What makes scientific judgment valid?
- What makes ethical judgment valid?
- What are some techniques for making valid judgments and deciding on courses of action?

Assignment: Read: [7] and write a brief ending to the story, explaining what Professor Castor was going to do and why.

Week Five: How can the characteristics of individuals impact the practice of science?

- What is Castor’s Dilemma?
- What should he do?

- Use one of the techniques discussed in Week Four to generate actions could he or Stafford could have taken that might have avoided the dilemma.
- Would the codes of ethics that you located have helped Castor and/or Stafford avoid or resolve the dilemma? How?

Assignment: Read: [8]

Week Six: How can the characteristics of institutions can impact science?

- What features of “good” science were bypassed in this recounting of the Cold Fusion debacle?
- Why was Congress interested?
- What is the role of government in encouraging, supporting or managing science?
- What should be the role of government in encouraging, supporting or managing science?

Assignment: Read: [9]

Week Seven: How can the knowledge gained through the biomedical research impact individuals and society?

- What can you assume about the state of biomedical knowledge that preceded the founding of Mendelia?
- What was the intended goal when establishing a society that utilized the available knowledge (presumably) gained from biomedical research and resulting technological advances?
- What led to the “failure” of the system that was created on Mendelia to meet that intended goal?
- Was it human error, system error, philosophical error, scientific error?
- How could the bad outcome have been avoided or a good outcome have been assured?

Assignment: Read [10] and use the code of ethics that you obtained in Week Two and one of the techniques discussed in Week Four to draft an argument that supports one of the following consequents, which are based on the premise that science is value-neutral:

“It is ethical to use pre-implantation genetic diagnosis (PGD) to create a perfect donor for children suffering from Fanconi Anemia.”

“It is unethical to use PGD to create a perfect donor for children suffering from Fanconi Anemia.”

Please note that you do not need to articulate or justify your own personal belief. You may choose either consequent (whether you believe it or not) and any methodology discussed in Week Four to craft your argument.

Week Eight: How can advances in science raise ethical questions for individuals, institutions, society, and government?

- Was the code of ethics that you located for the Week Two assignment helpful in crafting your argument? Why or why not?

- What role did the personal ethics of the scientists (Drs. Wagner, Hughes, and Strom) play in their decisions?
- What role did the values and norms of science; i.e. professional ethics, play in their decisions?
- What role did the institutions (medical school, National Institutes of Health) play in their decisions?
- What role did the federal government play in their decisions?

Assignment: Read [11, 12] and prepare for the role-playing exercise in which you will argue on behalf of an individual scientist, a congressman, or a citizen in the publishing debate.

Week Nine: What are the roles of individuals, scientific societies, and the government in managing ethical issues created by advances in biomedical research? Review the role that scientific communication plays in the scientific process.

- Should scientists be forbidden from doing certain experiments?
- Should scientists be forbidden from publishing the results of certain experiments?
- Which ones and why?
- Who should decide and how?

Assignment: List the three most important things that you learned in this course and come to class prepared to share your list and why you think that what you learned is important. Think about what you would like to study further.

Week Ten: Recap the major themes explored in this course and discuss courses that might be helpful to students interested in continue to learn about science, ethics, and how they are linked.

GRADING

A = 90 – 100%	(360 – 400 points)
B = 80 – 89%	(320 – 359 points)
C = 70 – 79%	(280 – 319 points)
D = 60 – 69%	(240 – 279 points)
E = 0 – 68%	(0 – 278 points)

Attendance: 100 points possible; graded 0 or 10 (10 points deducted for each unexcused absence)

Assignments: 20 points each: graded 0, 10 or 20 (180 points possible)

Class Participation: 60 points student graded (0, 30 or 60)

60 points instructor graded (0, 30 or 60) (100 points possible)

READING LIST

1. *The Nature of Science*, AAAS.

2. Grinnell, F., *The Practice of Science at the Edge of Knowledge*, in *The Chronicle of Higher Education*. 2000. p. B11.
3. Ziman, J. (1999) Rules of the game of doing science. *Nature*, **400**: p. 721.
4. Asimov, I., (1989), Alas, All Human in. *Asimov on Science*. Doubleday: New York. p. 252-264.
5. Specter, M., (2002), Rethinking the Brain in, M. Ridley, Editor. *The Best American Science Writing 2002*. Harper Collins Publishing. p. 151-170.
6. Green, T.F., (1971), Judging in. *Activities of Teaching*.
7. Djerassi, C. (1989) Castor's Dilemma. *The Hudson Review*, **39**(3): p. 405-418.
8. Park, R.L., (2000), Chapter Five: There ought to be a Law: In which Congress seeks to Repeal the Laws of Thermodynamics in. *VooDoo Science. The Road from Foolishness to Fraud*. Oxford University Press: New York. p. 92-110.
9. Sawyer, R.J., (1997), The Hand You're Dealt in. *Free Space*. Tor Books. p. 221-239.
10. Belkin, L., (2002), The Made-to-Order Savior in, M. Ridley, Editor. *The Best American Science Writing 2002*. Harper Collins Publishing. p. 34-53.
11. Monastersky, R., *Publish and Perish? As the Nation fights Terrorists, Scientists Weigh the Risks of Releasing Sensitive Information*, in *The Chronicle of Higher Education*. 2002.
12. Atlas, R. (2003) Science Publishing in the Age of Bioterrorism. *Academe*, **89**(5).

ACADEMIC MISCONDUCT

The Committee on Academic Misconduct is responsible for establishing and implementing procedures for investigating all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever the misconduct is committed. "Academic misconduct" includes, but is not limited to, plagiarism and dishonest practices in connection with examinations. In keeping with Faculty Rule 3335-5-487, instructors must report all instances of alleged academic misconduct to the Committee on Academic Misconduct. For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp).

DISABILITY SERVICES

Students with disabilities that have been certified by the Office of Disability Services will be accommodated appropriately and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; phone: 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu>.

About the Instructor:

Lynne E. Olson received the PhD in Physiology from Michigan State University and completed a post-doctoral fellowship in Thoracic Diseases Research at the Mayo Clinic before joining the faculty of The Ohio State University College of Veterinary Medicine. She maintained an active research program investigating the comparative biomechanics of mammalian lungs for many years before becoming increasingly interested in professional and ethical issues associated with biomedical research. Her current scholarship focuses on evaluating educational programs designed to enhance the integrity of biomedical research and understanding individual and organizational factors that can contribute to scientific misconduct. She won the University Faculty Distinguished Service Award in 2006 for her contributions to the development of university policies dealing with the Responsible Conduct of Research. At present, Dr. Olson teaches physiology and research ethics in the graduate and professional curricula.