

MHB/AGRON/RURSOC/PHIL 565: The Ethics of Modern Biotechnology
Syllabus, Fall 2011
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A. Administrative Information

Instructor: Professor Robert Streiffer

Class: 3355 Engineering Hall, Thursday, 2:25-4:55 (15 minute break at 3:30)

Office Hours: Tuesday, 3:00-4:00 in 1411 Medical Sciences Center and by appointment

Bioethics Office: 1411 Medical Sciences Center; 262-7490

Philosophy Office: 5123 Helen C. White Hall; 263-9479

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B. Course Description

This course is for graduate students and upper-level undergraduates. It is an in-depth study of a selection of ethical issues arising from the application of modern biotechnology to microorganisms, plants, and non-human animals. In contrast to much of the public, academic, and industry discussion on these issues, we will aim at a discussion that is informed both by scientific research and by work done in ethical theory, political philosophy, and other relevant disciplines, and whose character is rigorous, clear, nuanced, and unbiased. I do not consider myself either generally for or generally against biotechnology. As a philosopher, however, I am against bad arguments wherever they are found.

C. Materials:

- The reading packet will be distributed electronically; instructions will be provided in class.
- Handouts and news articles distributed in class
- Because the debate is very polarized, you should be very careful about relying on the web for information about modern biotechnology. While recognizing UW-Madison's own interest in promoting agricultural biotechnology, a good places to start is: nonetheless <http://www.library.wisc.edu/guides/Biology/gmo.htm>.

D. Objectives

There are two overall goals of the course:

1. To improve your familiarity with the facts, concepts, theories, and arguments from the relevant scientific, ethical, and political literature.
2. To improve your ability to think about and discuss the ethical issues in this area.

More specifically, I expect you to be able to do the following by the end of the semester:

3. Be more appreciative of opposing viewpoints on controversial ethical questions.
4. Be clearer about your own views on these matters.
5. Define relevant scientific concepts.
6. Define relevant ethical concepts.
7. List the main applications of biotechnology which have raised ethical concerns.

8. Explain how recombinant DNA techniques are used in those applications.
9. List the main ethical arguments for and against each of those applications.
10. Analyze the main arguments from the literature, pro and con, for each of those applications.
11. Assess the reasonableness of the scientific claims made in those arguments.
12. Assess the reasonableness of the ethical claims made in those arguments.
13. Integrate the discussion of science, ethics, and political philosophy to formulate a positive argument for or against applications of biotechnology.

E. Grading Plan:

I use the following grading scale, with your final numerical grade rounded to the nearest letter grade:

Letter Grade	Numerical Equivalent
A	4
AB	3.5
B	3
BC	2.5
C	2
D	1
F	0

F. Requirements:

- Before the class for which they are assigned, read all of the assignments, read them carefully, and read them critically. Come to class ready to discuss the material. The contribution that each person makes to the discussion is important.
- Attend all the classes.
- Several short, in-class, unannounced quizzes, cumulatively worth 20% of your grade. These will be on the readings assigned for that day, and possibly include short-answer, multiple choice, fill-in-the-blank, and true/false questions. If you have an excused absence, your grade will be computed as if the quiz you missed did not occur. If you have an unexcused absence, you will get a zero. No make-up quizzes will be given. The grade for the quizzes will be determined as follows:

$$\% = \frac{\text{total \# of correct answers on all the quizzes}}{\text{total \# of questions on all the quizzes}}$$
 (“Select all that apply” questions can count as more than one answer);

Grade	A	AB	B	BC	C	D	F
%	100-93	92.9-87	86.9-81	80.9-75	74.9-69	68.9-60	0-59.9

- Undergraduate papers: one shorter paper and two longer papers, per the schedule below.
- Graduate student papers: one shorter paper, and a choice between two longer papers or one term paper in two drafts. By “draft” I mean a draft of a complete paper, not a partial paper. For the two longer papers or the term paper, you may choose your own topic so long as you discuss it with me beforehand.

- **Late Paper Policy:** You must hand in all the papers in order to pass this course. You may not elect to opt out of a paper and receive an F on it. Papers are due at the beginning of class on the due date. Papers handed in during class but after the beginning of class (= 10 minutes into class) will be bumped to the next letter grade or half-letter grade down (e.g., from an A to an AB, from a C to a D.) After that, the penalty is one full letter grade per 24 hours. Any non-emergency extensions must be requested prior to the due date, and will be granted only in rare circumstances. Although you are encouraged to discuss your papers with friends and classmates, no group work is allowed.
- **Incompletes:** I think incompletes are almost invariably a bad idea both for the student and the professor, and they will only be granted in rare cases of truly extenuating circumstances. An incomplete will only be granted after the student and I have come to an agreement about when the work for the course will be completed. If the work is not completed by the agreed-upon date, the Incomplete will be changed to an F.

G. Undergraduate Paper Dates:

	Assigned	Due	Paper Length	Grade
1	Sept. 15	Sept. 22	575-625 words (2 pages)	10%
2	Oct. 13	Oct. 27	1,750-1,850 words (6 pages)	35%
3	Nov. 10	Dec. 1	1,750-1,850 words (6 pages)	35%

H. Graduate Student Paper Dates:

	Assigned	Due	Paper Length	Grade
1	Sept. 15	Sept. 22	575-625 words (2 pages)	10%
2	Oct. 13	Oct. 27	First draft 2,400-3,000 words (8-10 pages); or 2,350-2,450 words (8 pages)	NA/35%
3	Nov. 10	Dec. 1	Final draft 4,675-4,925 words (16 pages); or 2,350-2,450 words (8 pages)	70%/35%

I. Additional Class Policies

Academic misconduct: Please note that the imposition of any penalty for any kind of academic misconduct (e.g., plagiarism, trying to get credit for a class you didn't attend, etc.) results in a permanent note that goes into your academic file, and that UW will disclose the fact that you were penalized for academic misconduct to interested parties who request that information.

Exceptions to the rules: I will not grant anyone an exception to the rules outlined in this syllabus unless that exception is granted to everyone. This means, for example, that since I can't commit to allowing everyone the option of rewriting their paper, I can't allow anyone the option of rewriting their paper.

Classroom Etiquette: You are expected to behave in ways that are appropriate and respectful to the professor and the other students. This includes, but is not limited to

1. Arriving on time. Students who walk into the classroom late create a distraction.
2. Refraining from packing up until class is completely over.
3. Refraining from private conversations with classmates during lecture or discussion.

4. Being patient and courteous to other students when they ask a question or make a comment.
5. Expressing disagreement with the comments of others in a respectful manner.
6. Removing sunglasses and hats.
7. Staying awake.
8. Refraining from reading any non-course-related material.
9. Turn any cell phones off when entering class. (Parents are exempted, but please turn phones to vibrate.)

J. Outside Resources for Help

The Writing Center has several classes and numerous handouts on academic writing. They will also provide individual writing instruction. Appointments can be made by stopping in at 6171 Helen C. White or calling 263-1992. Their web site is www.wisc.edu/writing. They can be much more effective if you approach them early in the writing process. Strunk and White's classic *Elements of Style* is a good general guide to writing, and Anthony Weston's *Rulebook for Arguments* is a good guide to philosophical writing.

Study Skills: UW, as well as many other universities, have on-line materials available on how to improve your study skills as an undergraduate, and I encourage you to take a look at the URLs below and try to benefit from them.

http://guts.studentorg.wisc.edu/resources_ss.htm?page=resources_ss

Students with disabilities should notify me by the end of the second week of the semester so that appropriate accommodations can be made. Please bring your documentation from the McBurney Center (<http://www.mcburney.wisc.edu/>).

Jim Pryor has a very helpful page on how to read philosophy papers at

<http://www.jimpryor.net/teaching/guidelines/reading.html>

K. Course Schedule

I. Recombinant DNA Techniques (4 Meetings)

I will go over administrative details, provide an overview of the content and requirements of the course, and provide a brief history of biotechnology. After an introduction to the basics of recombinant DNA technology, we will evaluate some of the ethical arguments people were making in the early 1970s both for and against the use of recombinant DNA techniques. Although rDNA techniques are now known to be quite safe, the arguments are interesting both because they provide a historical context to the current debate, and because many of the current arguments are similar in form to the ones given originally. We will explore such questions as the following. Is all genetic engineering unnatural, and if it is, does that make it intrinsically wrong? What does it mean to say that an activity is unnatural, anyway? How should decisions be made under conditions of uncertainty? What grounds the state's right to restrict certain kinds of activities? Is the fact that a group finds a kind of activity offensive a legitimate reason for the state to restrict that activity?

1. **Thursday, September 8**
Course Introduction, Moral Argumentation, and Logic Terminology
2. **Thursday, September 15**
First paper topic handed out
The Basics of Recombinant DNA Techniques; Intrinsic Objections
 - a. Michael J. Reiss and Roger Straughan, "The Practicalities of Genetic Engineering," Ch. 2 in *Improving Nature?* (Cambridge: Cambridge University Press, 1996), 11-42 (32 pages)
 - b. Michael J. Reiss and Roger Straughan, "Extrinsic and Intrinsic Concerns," in *Improving Nature?* (Cambridge: Cambridge University Press, 1996), 49-50 (2 pages)
 - c. Michael J. Reiss and Roger Straughan, "Intrinsic Concerns about Unnaturalness," in *Improving Nature?* (Cambridge: Cambridge University Press, 1996), 59-64 (7 pages)
3. **Thursday, September 22**
First paper topic due
Extrinsic Objections
 - a. Paul Berg, D. Baltimore, and H. W. Boyer, "Potential Biohazards of Recombinant DNA Molecules," *Science* 185 (1974), 303 (1 page)
 - b. Sinsheimer, Robert L., "Two Lectures on Recombinant DNA Research," in *The Recombinant DNA Debate*, ed. by David A. Jackson and Stephen P. Stich (Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1979), 85-98 (14 pages)
 - c. Stephen Stich, "The Recombinant DNA Debate: Some Philosophical Considerations," in *The Recombinant DNA Debate*, ed. by David A. Jackson and Stephen P. Stich (Englewood Cliffs, New Jersey: Prentice-Hall, Inc, 1979), 183-201 (19 pages)
4. **Thursday, September 29**
Principles of Legitimate Regulation
 - a. Joel Feinberg, Selections from "General Introduction," in *Harm to Others*, by Joel Feinberg (New York: Oxford University Press, 1984), 3-27 (13 pages)
 - b. Joel Feinberg, "The Offense Principle," in *Social and Political Philosophy*, edited by George Sher and Baruch A. Brody (Fort Worth: Harcourt Brace College Publishers, 1996), 84-96 (13 pages)
 - c. Judith Jarvis Thomson, "Distress and Harm," Ch. 10 in *The Realm of Rights* (Cambridge, Massachusetts: Harvard University Press, 1990), 249-269 (21 pages)

II. **Plant Biotechnology (3 Meetings)**

In this section, we will explore various theories regarding the duties we have to plants, species, and the environment, we will familiarize ourselves with the current applications and regulations of plant biotechnology, and we will explore views about the role of experts and of public opinion in a democracy. With that framework as background, we will then examine issues regarding environmental risk, labeling, and humanitarian uses of agricultural biotechnology.

5. **Thursday, October 6**
Regulatory Background on Genetically Engineered Crops; Scientific Expertise and Public Preferences in a Democracy
 - a. CAST, "Evaluation of the U.S. Regulatory Process for Crops Developed through Biotechnology," *CAST Issues Papers* 19 (October 2001) (14 pages)

- b. U. S. Food and Drug Administration, "Guidance for Industry: Voluntary Labeling Indicating Whether Foods Have or Have Not Been Developed Using Bioengineering," Draft of January 2001 (4 pages)
- c. Alan McHughen, "Uninformation and the Choice Paradox," in *Nature Biotechnology* 18 (October 2000) 1018-1019 (2 pages)
- d. Robert Streiffer and Alan Rubel, "Democratic Principles and Mandatory Labeling of GE Food," in *Public Affairs Quarterly* Volume 13, Number 3 (2004), 223-248 (26 pages)

6. Thursday, October 13

Second Paper Topics Handed Out

The Humanitarian Argument for Agricultural Biotechnology

- a. Peter Singer, "Famine, Affluence, and Morality," in *Philosophy and Public Affairs* 1 (Spring 1972), 229-243 (15 pages)
- b. Ingo Potrykus, "The 'Golden-Rice' Tale" (16 pages)
- c. Greenpeace, "Golden Rice is Fool's Gold," http://www.biotech-info.net/fools_gold.html (1 page)
- d. Vandana Shiva, "Genetically Engineered Vitamin 'A' Rice: A Blind Approach to Blindness Prevention," http://www.biotech-info.net/blind_rice.html (4 pages)
- e. Martin Enserink, "Tough Lessons from Golden Rice," *Science* 230 (25 April 2008), 468-471 (4 pages)
- f. Alexander Stein, H. P. S. Sachdev, and Matin Qaim, "Potential Impact and Cost Effectiveness of Golden Rice," *Nature Biotechnology* 24 (October 2006): 1200-1201 (2 pages)
- g. Krawinkel, "What We Know and Don't Know about Golden Rice," *Nature Biotechnology* 25 (June 2007): 623 (1 page)
- h. Alexander Stein, H. P. S. Sachdev, and Matin Qaim, "Response to Krawinkel," *Nature Biotechnology* 25 (June 2007): 624 (1 page)

7. Thursday, October 20

Environmental Ethics and Genetically Engineered Crops

- a. J. Baird Callicott, "The Search for an Environmental Ethic," Ch. 10 in *Matters of Life and Death*, edited by Tom Regan (New York: Random House, 1986), 381-420 (40 pages)
- b. Philip Dale, Belinda Clarke, and Eliana Fontes, "Potential for the Environmental Impact of Transgenic Crops," *Nature Biotechnology* 20 (June 2002): 567-574 (8 pages).
- c. John Losey, "Transgenic Pollen Harms Monarch Larvae" in *Nature* 399 (20 May 1999), 214 (1 page)
- d. Eric Niiler, "GM Corn Poses Little Threat to Monarchs" in *Nature Biotechnology* 17 (December 1999), 1154 (1 page)
- e. Carol Yoon, "No Consensus on Effect of Genetically Altered Corn on Butterflies," *New York Times* (4 Nov 1999), A20 (2 pages)
- f. Quist and Chapela, "Transgenic DNA Introgressed into Traditional Maize Landraces in Oaxaca, Mexico," *Nature* 414 (29 Nov 2001), 541-543 (3 pages)
- g. Paul Gepts, "Introduction of Transgenic crops in Centers of Origin and Domestication," in *Controversies in Science and Technology: From Maize to Menopause* ed. Daniel Kleinman, Abby Kinchy, and Jo Handelsman (Madison, Wisconsin: University of Wisconsin Press, 2005): 119-134 (16 pages)

- h. Matthew Metz and Johannes Fütterer, "Suspect Evidence of Transgenic Contamination," *Nature* 116 (11 April 2002), 600-601 (2 pages)
- i. Nature, "Editorial Note," *Nature* 116 (11 April 2002), 600 (1 page)
- j. Nick Kaplinsky, David Braun, Damon Lisch, Angela Hay, Sarah Hake, and Michael Freeling, "Maize Transgene Results in Mexico are Artefacts," *Nature* 116 (11 April 2002), 600 (1 page)
- k. David Quist and Ignacio Chapela, "Quist and Chapela Reply," *Nature* 116 (11 April 2002), 602 (1 page)
- l. Kenneth Worthy, Richard Strohmman, Paul Billings, and the Berkeley Biotechnology Working Group, "Agricultural Biotechnology Science Compromised: The Case of Quist and Chapela," in *Controversies in Science and Technology: From Maize to Menopause* ed. Daniel Kleinman, Abby Kinchy, and Jo Handelsman (Madison, Wisconsin: University of Wisconsin Press, 2005): 135-149 (15 pages)

III. Animal Biotechnology (3 Meetings)

In this section, we will survey the techniques and uses of animal biotechnology, and evaluate some of the concerns that have been expressed about them. We will look at arguments about the moral status of animals, the ethical justifiability of their use as food or in medical experimentation, the ethical justifiability of using genetic engineering to change an animal's nature to better suit our needs, perhaps at the expense of the animal's own welfare, and at the use of biotechnology to create part animal, part human chimeras.

8. Thursday, October 27

Second Paper Topics Due at the Beginning of Class

Uses and Techniques of Animal Biotechnology, Moral Status of Animals

- a. John Gluck and Mark Holdsworth, 2008, "FDA Released Draft Guidance on Regulation of Genetically Engineered Animals," *Kennedy Institute of Ethics Journal* 18(4): 392-402 (11 pages)
- b. Peter Singer, "All Animals Are Equal," in *Contemporary Moral Problems*, ed. James E. White (Belmont, CA: Wadsworth Publishing Company, 2000), 490-499 (10 pages)
- c. Tom Regan, "The Case for Animal Rights," in *Contemporary Moral Problems*, ed. James E. White (Belmont, CA: Wadsworth Publishing Company, 2000), 500-508 (9 pages)
- d. Richard Frey, "Medicine, Animal Experimentation, and Unfortunate Humans," in *Scientific Innovation, Philosophy, and Public Policy*, ed. Ellen Paul, Fred Miller, Jr., and Jeffrey Paul (Cambridge: Cambridge University Press, 1996): 181-211 (31 pages).

9. Thursday, November 3

Beyond Animal Welfare and Animal Rights

- a. David E. Cooper, "Intervention, Humility, and Animal Integrity," Ch. 11 in *Animal Biotechnology and Ethics*, ed. Alan Holland and Andrew Johnson (London: Chapman and Hall, 1998), 145-155 (11 pages)
- b. Bernard E. Rollin, "On Telos and Genetic Engineering," Ch. 12 in *Animal Biotechnology and Ethics*, ed. Alan Holland and Andrew Johnson (London: Chapman and Hall, 1998), 156-171 (16 pages)

10. Thursday, November 10
Third Paper Topics Handed Out
Human/Animal Chimeras

- a. Jason Robert and Francoise Baylis, "Crossing Species Boundaries," in *The American Journal of Bioethics* 3 (3) 1-13 (13 pages).
- b. Robert Streiffer, "In Defense of the Moral Relevance of Species Boundaries", in *The American Journal of Bioethics* 3 (3) 37-38 (2 pages)
- c. Robert Streiffer, "At the Edge of Humanity: Human Stem Cells, Chimeras, and Moral Status," *Kennedy Institute of Ethics Journal* 15(4), 347-370 (24 pages)

IV. Biotechnology, Intellectual Property, and Academic-Industry Relationships (3 Meetings)

In this section, we will look at the patent law system and the main court cases involving biotechnology. We will address such questions as the following. What, if anything, ethically justifies the patent law system? How do academic-industry relationships in biotechnology affect academic freedom? What rights do developing countries have to compensation for the use of their plant genetic resources? Does allowing life patents encourage harm to the environment or show improper respect for life?

11. Thursday, November 17
Introduction to Biotechnology Patenting

- a. Robert Merges, "Patentable Subject Matter," Ch. 2 §A in *Patent Law and Policy* (Charlottesville, Virginia: Michie Law Publishers, 1997), 51-61 (11 pages)
- b. Robert Merges, "Natural Substances and Living Things," Ch. 2 §D Subsections 1-3, in *Patent Law and Policy* (Charlottesville, Virginia: Michie Law Publishers, 1997), 157-180 (24 pages)

Thursday, November 24: Thanksgiving Holiday

12. Thursday, December 1
Third Paper Topics Due at the Beginning of Class
Ethical Evaluation of Patents and Academic-Industry Relationships

- a. Ned Hettinger, "Patenting Life," *Environmental Affairs Law Review* 22 (1995): 267-305 (40 pages).
- b. Robert Streiffer, "Academic Freedom and Academic-Industry Relationships in Biotechnology," in *The Kennedy Institute of Ethics Journal* 16(2), 129-149 (21 pages).

13. Thursday, December 8
Intellectual Property and Traditional Cultures

- a. Hope Shand, "There is a Conflict Between Intellectual Property Rights and the Rights of Farmers in Developing Countries," in *The Journal of Agricultural and Environmental Ethics*: 1991 131-142 (12 pages)
- b. Sidney B. Williams, Jr., "There is Not a Conflict Between Intellectual Property Rights and the Rights of Farmers in Developing Countries," in *The Journal of Agricultural and Environmental Ethics*: 1991, 143-150 (8 pages)

- a. Robert Streiffer, "An Ethical Analysis of Ojibway Objections to Genetics and Genomics Research on Wild Rice," *Philosophy in the Contemporary World* Volume 12, Number 2 (Summer 2005), 37-45 (9 pages)

14. Thursday, December 15
Overflow / Review