

**MHB/AGRON/CESOC/PHIL 565: The Ethics of Modern Biotechnology**  
**Syllabus, Spring 2016**  
**Robert Streiffer**

**A. Administrative Information**

Instructor: Professor Robert Streiffer  
Class: 1335 Sterling, Tuesday, Thursday 2:30-3:45  
Office Hours: By appointment  
Bioethics Office: 1411 Medical Sciences Center; 262-7490  
Philosophy Office: 5101 Helen C. White Hall  
E-mail: rstreiffer@wisc.edu

**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, non-human animals, and human beings. We will aim at a discussion that is informed both by empirical research and by work done in ethical theory, political philosophy, and other relevant disciplines, and whose character is rigorous, clear, nuanced, and unbiased.

**C. Materials:**

- The readings will be available through Learn@UW.
- Handouts and news articles distributed in class
- Because the debate is very polarized, you should be careful about relying on the web for information about modern biotechnology. While recognizing UW-Madison's own interest in promoting biotechnology, a good places to start is nonetheless <http://researchguides.library.wisc.edu/c.php?g=177819>.

**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 a more responsible consumer of media reports on controversial technologies.
5. Be clearer about your own views on these matters.
6. Define relevant scientific concepts.
7. Define relevant ethical concepts.
8. List the main applications of biotechnology which have raised ethical concerns.
9. Explain how recombinant DNA techniques are used in those applications.
10. List the main ethical arguments for and against each of those applications.
11. Analyze the main arguments from the literature, pro and con, for each of those applications.

12. Assess the reasonableness of the scientific claims made in those arguments.
13. Assess the reasonableness of the ethical claims made in those arguments.
14. 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:

- Attendance: 5%. Attend all the classes. I will be taking attendance, both to grade attendance and to help me learn your names. Any excused absences for reasons other than an emergency must be cleared in advance of the class missed. For all excused absences, you must send me an e-mail stating the date and the reason so that I will have a record of it when it comes time to calculate your final grade. Any unexcused absence will affect your attendance grade as follows:

|            |    |
|------------|----|
| 2 absences | AB |
| 3 absences | B  |
| 4 absences | BC |
| 5 absences | C  |
| 6 absences | D  |
| 7 absences | F  |

- Quizzes: 25%. There will be several short, in-class, unannounced quizzes. These will be on the readings assigned for that day or on concepts or theses that were introduced in a previous class. They will possibly include short-answer, multiple choice, fill-in-the-blank, and true/false questions. If you have an excused absence on a day when there is a quiz, 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 for that quiz. No make-up quizzes will be given. The grade for the quizzes will be determined as follows:

% = total # of correct answers on all the quizzes/total # of questions on all the quizzes (“Select all that apply” questions 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:

|   | Assigned | Due      | Paper Length                | Grade |
|---|----------|----------|-----------------------------|-------|
| 1 | Jan 28   | Feb 4    | 575-625 words (2 pages)     | 10%   |
| 2 | Feb 16   | March 1  | 1,750-1,850 words (6 pages) | 25%   |
| 3 | April 7  | April 21 | 1,750-1,850 words (6 pages) | 35%   |

- Graduate Student Papers:

|   | Assigned | Due      | Paper Length  | Grade   |
|---|----------|----------|---|---------|
| 1 | Jan 28   | Feb 4    | 575-625 words (2 pages)   | 10%     |
| 2 | Feb 16   | March 1  | First draft 2,400-3,000 words (8-10 pages); or<br>2,350-2,450 words (8 pages) | NA/25%  |
| 3 | April 7  | April 21 | Final draft 4,675-4,925 words (16 pages); or<br>2,350-2,450 words (8 pages)   | 60%/35% |

- Late Paper Policy: You must hand in all the papers 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. 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, cheating on an exam, 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. See <http://www.wisc.edu/students/resources/misconduct.htm> for UW's policy. Because you are responsible for proper acknowledgement and citation of other people's ideas, even unintentional plagiarism counts as academic misconduct for the purposes of this course.

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. Arrive on time. Students who walk into the classroom late create a distraction.
2. Refrain from packing up until class is completely over.
3. Refrain 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. Express disagreement with the comments of others in a respectful manner.
6. Remove sunglasses and hats.
7. Stay awake.
8. Refrain from reading any non-course-related material.
9. Turn off any cell phones when entering class. (Parents are exempted, but please turn phones to vibrate.)
10. Refrain from using laptops for anything other than note-taking. Anything else can be very distracting for students sitting around you.

## H. 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 <http://www.writing.wisc.edu/>. 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. I am also happy to help you with specific questions, or will review a paragraph for writing style tips.

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.wisc.edu/>

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform me of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. I will work either directly with you or in coordination with the McBurney Center (<http://www.mcburney.wisc.edu/>) to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.

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

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

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

Keep in mind that some of the comments on writing a paper will not always be appropriate for every particular paper topic.

**1. Tuesday, January 19**  
**Introductions; Course Content; Moral Theory and Argumentation**

**I. Recombinant DNA Techniques (6 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 question 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?

**2. Thursday, January 21**  
**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. Tuesday, January 26**  
**Extrinsic Objections I**

- 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).

**4. Thursday, January 28**  
**Extrinsic Objections II**  
**First paper topic handed out**

- a. Stephen P. Stich (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1979), 183-201 (19 pages).

**5. Tuesday, February 2**  
**Principles of Legitimate Legislation I**

- 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. Judith Jarvis Thomson, "Distress and Harm," Ch. 10 in *The Realm of Rights* (Cambridge, Massachusetts: Harvard University Press, 1990), 249-269 (21 pages)

**6. Thursday, February 4****First paper topic due at the beginning of class  
Principles of Legitimate Legislation II**

- a. Robert Streiffer and Thomas Hedemann, 2005, "The Political Import of Intrinsic Objections to Genetically Engineered Food," *The Journal of Agricultural and Environmental Ethics* 18, 191-210 (20 pages).

**7. Tuesday, February 9  
Overflow****II. Plant Biotechnology (5 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.

**8. Thursday, February 11****Regulatory Background on Genetically Engineered Crops**

- a. Alan McHughen and Stuart Smith, "US Regulatory System for Genetically Modified Crop Cultivars," *Plant Biotechnology Journal* 2008(6), 2-12 (11 pages).

**9. Tuesday, February 16****The Ethics of Labeling GE Food  
2<sup>nd</sup> paper topic handed out**

- a. 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).
- b. Alan McHughen, "Uninformation and the Choice Paradox," in *Nature Biotechnology* 18 (October 2000) 1018-1019 (2 pages).
- c. 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)

**10. Thursday, February 18****Environmental Ethics & GE 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).

**11. Tuesday, February 23****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](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](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)

**12. Thursday, February 25  
Overflow****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 particular issues raised by genetic engineering to animals, and at the ethics of creating part-animal, part-human chimeras.

**13. Tuesday, March 1****The Ethics of Using Animals in Biomedical Research I  
2<sup>nd</sup> paper topic due at the beginning of class**

- a. Peter Singer, "All Animals Are Equal," in *Contemporary Moral Problems*, ed. James E. White (Belmont, CA: Wadsworth Publishing Company, 2000), 490-499 (10 pages)
- b. Tom Regan, "Empty Cages: Animal Rights and Vivisection," in *The Ethics of Animal Research: Exploring the Controversy*, ed. Jeremy R. Garrett (Cambridge, MA: The MIT Press, 2012), 107-124 (17 pages).

**14. Thursday, March 3****The Ethics of Using Animals in Biomedical Research II**

- a. Carl Cohen, 1986, "The Case for the Use of Animals in Biomedical Research," *New England Journal of Medicine* 315 (14), 865-870 (6 pages).
- b. Dario Ringach, 2011, "The Use of Nonhuman Animals in Biomedical Research," *The American Journal of the Medical Sciences*, 305-313 (9 pages).

**15. Tuesday, March 8****Human/Animal Chimeras I**

- a. Jason Robert and Francoise Baylis, 2003, "Crossing Species Boundaries," in *The American Journal of Bioethics* 3 (3) 1-13 (13 pages).

- b. Robert Streiffer, 2003, "In Defense of the Moral Relevance of Species Boundaries", in *The American Journal of Bioethics* 3 (3) 37-38 (2 pages).
- c. Robert Streiffer, 2005, "At the Edge of Humanity: Human Stem Cells, Chimeras, and Moral Status," *Kennedy Institute of Ethics Journal* 15(4), 347-370 (24 pages).

#### **IV. Human Biotechnology (4 Meetings)**

In this section, we will look at the application of biotechnology to human beings. In particular, we will look at human enhancement and human cloning.

#### **16. Thursday, March 10 Overflow**

#### **17. Tuesday, March 15 Overflow**

#### **18. Thursday, March 17 Human Enhancement I**

- a. Michael Sandel, "The Case Against Perfection: What's Wrong with Designer Children, Bionic Athletes, and Genetic Engineering," in *Human Enhancement* ed. Julian Savulescu and Nick Bostrom (Oxford: Oxford University Press, 2009), 71-90 (20 pages).

**Tuesday, March 22 & Thursday, March 24: Spring Break**

**Tuesday, March 29 & Thursday, March 31: Will Be Rescheduled for Livestock Lab Tour and Biotech Center Tour**

#### **19. Tuesday, April 5 Human Enhancement II**

- a. Frances Kamm, "What Is and Is Not Wrong with Enhancement," in *Human Enhancement* ed. Julian Savulescu and Nick Bostrom (Oxford: Oxford University Press, 2009), 91-130 (40 pages).

#### **20. Thursday, April 7 Human Cloning 3<sup>rd</sup> Paper Topic Handed Out**

- a. Leon Kass, 1998, "The Wisdom of Repugnance," *Valparaiso University Law Review* 32(2), 679-705 (27 pages).
- b. Bonnie Steinbock, 2006, "Reproductive Cloning: Another Look" *University of Chicago Legal Forum*, 87-111 (25 pages)

#### **21. Tuesday, April 12 CRISPR**

- a. Jef Akst, "Designer Livestock," *The Scientist Magazine*, June 1, 2014. URL = <http://www.the-scientist.com//?articles.view/articleNo/40081/title/Designer-Livestock/>.
- b. David Cyranoski and Sara Reardon, "Chinese Scientists Genetically Modify Human Embryos," *Nature News* (22 April 2015).

- c. Sheila Jasanoff, J. Benjamin Hurlbut, and Krishanu Saha, “Human Genetic Engineering Demands More than a Moratorium,” *The Guardian*, April 7, 2015. URL = <http://www.theguardian.com/science/political-science/2015/apr/07/human-genetic-engineering-demands-more-than-a-moratorium>.
- d. Baltimore et al., “A Prudent Path Forward for Genomic Engineering and Germline Gene Modification,” *Science* vo. 348, No. 6230 (April 2015): 36 – 38.
- e. Daniel Sarewitz, “Science Can’t Solve It,” *Nature* Vol. 522 (25 June 2015): 413 – 414.
- f. Jennifer Kahn, “The Crispr Quandary,” *The New York Times*, Nov. 9, 2015.
- g. Jennifer Doudna, “My Whirlwind Year with CRISPR,” *Nature*, Vol. 528 (24/31 December 2015): 469 – 471.
- h. Alta Charo and Henry Greely, “CRISPR Critters and CRISPR Cracks,” *The American Journal of Bioethics*, 15(12): 11 – 17.

## V. Biotechnology Patenting (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? Does allowing life patents encourage harm or fail to show proper respect to the environment or traditional cultures?

### 22. Thursday, April 14

#### Ethical Evaluation of Patents on Living Organisms

- a. Ned Hettinger, “Patenting Life,” *Environmental Affairs Law Review* 22 (1995): 267-305 (40 pages).

### 23. Tuesday, April 19

#### Biotechnology Patents and Academic Freedom

- a. Robert Streiffer, “Academic Freedom and Academic-Industry Relationships in Biotechnology,” in *The Kennedy Institute of Ethics Journal* 16(2), 129-149 (21 pages)

### 24. Thursday, April 21

#### Biotechnology Patents and Academic Freedom

#### 3<sup>rd</sup> paper topic due

#### Overflow

## VI. Ethics Debates (4 Meetings)

In this section, we will do two in-class debates.

### 25. Tuesday, April 26

#### First debate prep

### 26. Thursday, April 28

#### Monarch butterfly debate

- a. Materials to be distributed

- 27. Tuesday, May 3**  
**Second Debate Prep**
  - a. Materials to be distributed
  
- 28. Thursday, May 5**  
**Second Debate**