

BIOTECHNOLOGY: 303-22010

Instructor: Jean Hardwick

Office: CNS 168

Office Hours: M 2-3 pm, F 10-11am, or by appointment

(if I am not in my office, I am probably in my lab, CNS 169)

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This class will focus on the science underlying current advances in biotechnology, and then examine the impacts of these technologies on various aspects of society such as economics, politics, and ethics. The rationale behind this course is that you cannot accurately evaluate the potential benefits or costs of a new technology unless you have a thorough understanding of the underlying science.

Text:

Required text: Bourgaize, Jewell, and Buiser (2000). *Biotechnology: Demystifying the concepts.*

Additional readings are available on WebCT. The syllabus indicates when these readings will be covered in class and a listing of all the articles is included in the syllabus. The majority of these readings are editorial or ethical discussions concerning recent technologies and were published in either national newspapers or widely disseminated scientific journals. The WebCT site will also include review sheets for exams, and links to potentially useful websites for information on biotechnology.

Grading:

Exams	30%
Quizzes	15%
Class discussion	10%
Paper	15%
Oral Presentation	10%
Congressional Budget	
Presentation	10%
Report	10%

Exams:

There will be two exams, as indicated on the syllabus. The exams will be 50% in-class and 50% take home analysis and discussion of a relevant issue in biotechnology for that section of material.

Quizzes:

There will be 3 short quizzes as indicated on the schedule. The quizzes will be short answer and are meant to be sure you understand the scientific material presented in class. They should take no more than 15 min to complete.

Class discussion:

A significant portion of the grade will be dependent on participation in class discussions. This includes news item presentations (see below), debates, and other forms of class discussion.

News items:

Each student will present two short (5-10 min) discussions of a current news item related to biotechnology during the semester. These news items can come from newspapers, magazines, or other media forms. The purpose is to illustrate the variety and volume of ongoing advances in biotechnology over a mere 3 month period. Students are always welcome to contribute other relevant news items on non-scheduled days.

Paper and Oral Presentation:

Each student will write a paper on some biotechnological issue of interest to them. Potential topics are listed on the last page of the syllabus. This paper will include a thorough discussion of the **both** the positive and negative aspects of the issue in as neutral a presentation as possible. The goal is to act as an “impartial analyst” of a current topic. Students will then give a presentation on their topic in class (~15 min) and lead a discussion of that topic. You may choose from the topics listed, or develop a topic of your own. These topics will be integrated into appropriate places within the course syllabus. This means that specific topics (both paper and presentation) will be due at different times throughout the semester. In either case, the papers will be due at least one week **before** the class presentation.

Congressional Budget Subcommittee:

The class will be divided into 4-5 groups. Each group will “be” a congressional subcommittee charged with the task of developing a budget for biotechnology research. A common practice in these budgets is to earmark funds for specific purposes. Your committee will be responsible for designating how to spend 100 million dollars in funds for health-related biotechnology research. Since you will need to justify your budget to the rest of the Congressional Appropriations Committee, you need to have facts to support your budget. Each committee will prepare a report of their budgetary decision, including a full rationale for these choices. The “subcommittees” will present their budgets to the rest of “Congress” during our scheduled final exam period and we will vote on the budget proposal to be adopted. Each group will also submit a summary report for their budget presentation. These summary reports are due on **December 20th by 2 pm**. Further details on this assignment will be provided later in the semester.

Additional Readings for Biotechnology
(available as PDFs on WebCT)

1. Check, E. and Cyranoski, D. (2005) Korean scandal will have global fallout. *Nature* **438**: 1056-1057
2. Bell, J. (2005). When fear of backlash enters the laboratory. *Baltimore Sun* Feb 11, 2005.
3. Service, R.F. (2005). Going from genome to pill. *Science* **308**: 1858-1860.
4. Brown, K. (2001). Genetically Modified Foods: Are they safe? *Scientific American* **xx**: 51-57.
5. Vogel, G. (2005). Ready or Not? Human ES cells head toward the clinic. *Science* **308**: 1534-1538.
6. Kline, R. (2001). Whose blood is it, anyway? *Scientific American* **xx**: 42-49.
7. Stoize, C. and Hall, C.T. (2005). Trials for stem-cell treatment of brain disease. *SFGate* Oct. 21, 2005
8. McNeil, D.G. Jr. (2005). Better bananas, nicer mosquitos. *New York Times* Dec 6, 2005.
9. Cohen, J. (2005). Prevention Cocktails: Combining tools to stop HIV's spread. *Science* **309**: 1002-1005.
10. Zivin, J. (2000). Understanding Clinical Trials. *Scientific American* **xx**: 69-75.
11. Cohen, J. (2005). High hopes and dilemmas for a cervical cancer vaccine. *Science* **308**: 618-621.
12. Kaiser, J. (2005). An earlier look at baby's genes. *Science* **309**: 1476-1478.
13. Check, E. (2005). Screen test. *Nature* **438**: 733-734.
14. Parens, E. (2002). How far will the treatment/enhancement distinction get us as we grapple with new ways to shape ourselves? In *Neuroethics: Mapping the Field*, conference proceedings, 152-158.

Suggested Topics for Papers/Presentations

Genetic Applications

- Transgenic animals in research
- Genetic screening in medicine

Genetic Engineering

- Genetically engineered plants
- Genetically engineered livestock
- Bioremediation (genetically engineered organisms)

Gene Therapy

- Gene therapy in terminally-ill patients
- Germ cell versus stem cell alteration

Genetics and Industry

- Gene patents
- Human Genome Project – pharmaceutical applications

Cloning

- Human cloning
- Cloning of endangered species

Medical Research

- Animal/human organ transplants
- Pharmaceutical development in environmentally endangered areas

Stem Cells

- Adult stem cells versus embryonic stem cells
- Medical applications

Cancer Research

- Anti-cancer vaccines

Performance Enhancement

- Cognitive enhancement to improve performance
- Athletic performance enhancements

AIDS

- Vaccine development
- Drug therapy development/accessibility

Other??

- If you have an idea of your own, please let me know and we can determine where in the syllabus it is most appropriate to discuss this issue.

For all topics, the papers are due **one week** prior to the oral presentation. The dates for the oral presentations are listed in the syllabus. There will be one to two presentation per class period – each lasting 15-20 minutes. The next 15-20 minutes will be a class discussion based on the presentation. You should plan both the content of the presentation and what type of discussion you want to follow the presentation.

Visit the [Biology](#) home page.

Go to the [Ithaca College](#) home page.

Page maintained and updated by [Jean Hardwick](#) and [Nancy Pierce](#).

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