

**DEBATING SCIENCE:
PRACTICAL REASONING AND THE BIOTECHNOLOGY DEBATE**

EVST 495/BIO 495

Instructors:

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Fall 2007

On-line (asynchronous): September 3 to December 14

COURSE PURPOSE

Traditionally there has been little formal effort through coursework to bridge the gap between scientific research and social debates arising from the ethical implications of technological innovations. Consequently, specialists are more comfortable within their area of expertise. But in the case of biotechnology, the forces driving research are so strong and the public's lack of knowledge so great that society needs scientists to cross the gap between scientific discourse and public debate. Scientists need to become productive participants in the arena of ethical deliberation.

It is equally important for scientists to understand that biotechnology is not only a research problem. The articulation of an appropriate biotechnology policy will require negotiation among international participants who have different interests and needs. If the process by which an acceptable policy is reached must be *fair* and *democratic*, then these normative concepts must also play an important role in the process. Because of this, scientists need to understand how scientific findings can appropriately be incorporated into public debate about issues, and must be prepared to situate scientific considerations within a democratic public debate.

This course is designed to help address this need. It entails in-depth study of the international debate over agricultural biotechnology.

COURSE OBJECTIVES AND OUTCOMES

The first expected learning outcome of this course is for students to become better informed about the many scientific, ethical, social and political issues arising from the development of biotechnology. For example, what is the current state of development of agricultural biotechnology? How does the current reality measure up to the promises being made by its most enthusiastic backers? What kind of social impacts will the widespread adoption of genetically modified organisms (GMOs) have? What will be its impact on the global economy? How will these benefits be shared among developed and developing countries? What types of GMOs pose the greatest threats to environmental and biological health? Which developments pose the greatest threat to global political stability? What types of political, economic and social institutions might biotechnology change?

Consequently, the second learning outcome is for students to become adept at engaging in informed, deliberative dialogue on these important issues arising from this new technology. Finally, the third learning outcome is for students to develop the relevant skills of reasoning to arrive at appropriate policy conclusions concerning the development of biotechnology.

COURSE STRUCTURE

This course is structured around a particular model of practical reasoning/deliberative dialogue. Practical reasoning/deliberative dialogue is concerned with making real-life decisions about setting and prioritizing goals and selecting the appropriate means to achieve these goals. There are 5 areas to be considered in this model: (1) Articulating, establishing and prioritizing goals, (2) Identifying the available alternatives and research programs for achieving these goals, (3) Anticipating and evaluating unwanted side effects

that might undermine the pursuit these goals via the various alternatives, (4) Identifying and evaluating major obstacles that might prevent reaching these goals via the various alternatives, (5) Establishing the burden of proof, weighing the presumptive case for each of the alternatives, and coming to a conclusion about policy. In sum, students in this course will be learning how to deliberate together to settle on the right goals to pursue, weighing the various option for achieving these goals, and arriving at the right (moral) and best (most effective and efficient) course of action. Students will spend the last part of the course collaborating on a policy document representing their conclusions about the development of nanotechnologies.

COURSE OUTLINE

- I. Social and Ethical Issues in the Agricultural Biotechnology Debate
- II. Biotechnology and World Hunger
- III. Biotechnology and Sustainability
- IV. Biotechnology and Health and Environmental Risks
- V. Alternatives to Biotechnology
- VI. Weighing the Presumptive Case for Biotechnology

ASSIGNMENTS AND GRADING (Traditional Letter Grade Option)

Course Readings: There will be approximately 40 pages of course readings per week. Course readings will consist of scholarly articles, book chapters and popular essays written by scientists, activists, philosophers, public policy experts, and others who are making significant contributions to this debate. The will be organized around the six areas in the courses outline above.

Quizzes (25% of grade): There will be five quizzes. The quizzes are designed to assess the first objective or learning outcome. They will cover the course reading to evaluate how well informed students are of the major ethical, social and political issues in the debate over biotechnology.

Discussion Boards (25%): There will be asynchronous discussion boards to help students master the course readings. Each discussion board will be given a particular topic taken from the course readings. A one-week time period will be provided for each discussion topic. Evaluation of students' activities on the discussion board will be tied to the second course objective, or learning outcome, for students to become adept at informed, deliberative dialogue on the important scientific, ethical, social and political issues.

Final Policy Document (25%): A major portion of this course will be a group project. It consists of writing a policy document summarizing the course deliberation about biotechnology. This project will be tied to the final learning outcome, for students develop the relevant skills of practical reasoning in relation to social and ethical controversies.

GRADING

The +/- grading system will be used as follows: 93-100 = A; 90-92 = A-; 87-89 = B+; 83-86 = B; 80-82 = B-; 77 - 79 = C+; 73 - 76 = C; 70 - 72 = C-; 67 - 69 = D+; 63 - 66 = D; 60 - 62 = D-; Below 60 = F.