

BIOLOGY/APBI 4650 FA – ISSUES IN FOOD BIOTECHNOLOGY

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NOTE: (DR. MALEK WON'T BE TEACHING THIS COURSE ANY LONGER)

Course objectives: to introduce technological, ethical and regulatory issues surrounding various aspects of biotechnology related to food production, with emphasis on plants. Microbial, aquatic and animal biotechnology will be included, but NOT medical/veterinary applications. Oral communication of controversial topics will be practiced in the context of community service learning.

TEXTBOOK:

Susan R. Barnum, Biotechnology, An Introduction, 2nd Ed. 2005, Brooks/Cole, Belmont, USA

SUPPLEMENTARY MATERIALS:

"Biotechnology, A textbook of Industrial Microbiology", 2nd Ed. W. Crueger, A. Crueger, Sinauer, Sunderland, MA, 1990.

"DNA technology, the awesome skill", IE Alcamo, WCM Brown Publishers, 1996

Microbial Biotechnology AN Glazer and H Nikaido, Freeman Publishing, 1995

Nature Biotechnology (ask Dr. Malek)

Primary literature searches

Lecture sequence and content:

1. Webcasts of "How to give a lecture", and "Presenting controversial material" Stanford University Centre for Learning and Teaching.
2. Course organization and History of recombinant DNA – read Chapters 1. to 3. in Barnum
3. Fermentation processes Chapter 5
4. Potential escape and outcrossing of GM crops
5. Bioremediation Ch. 5 and waste disposal in relation to food quality
6. Plant tissue culture Ch. 6 and pollen toxicity to monarch butterfly larvae
7. Golden rice, cassava – food quality improvement by biotechnology
8. Biotech in developing countries (global food production/ world hunger)
9. Plant biotech in our back yard – community attitudes (farm community and organic farming movement)
10. Algal/aquatic biotechnology (natural products and medicinals) Ch. 8
11. Marker assisted breeding
12. Natural health products and approval process, controversy with patents and biotech
13. Molecular pharming Ch. 6
14. Cheese production and use of GM rennet
15. Single cell protein
16. Animal biotech gene transfer (Ch. 7),
17. Animal/fish product food quality
18. Animal cloning – methods, promise and controversy
19. Risk assessment
20. Summary and conclusions

Course deliverables (4650):

- (1) You will be expected to deliver, as a group, one 1hr lecture presenting the pros and cons of your selected topic. This will be followed by a 1 hour discussion (including prepared and researched questions/topics as below) of each controversial topic, led by your group.

Presentation evaluation will be peer-based, using an evaluation form (30% of grade). The lectures will be open to the public.

- (2) Preparation for each class in which you are not presenting will consist of at least 3 written questions or points for discussion, dealing with the issue at hand, and outlining possible solutions. These questions/points should be based on PRIMARY literature sources. Bring TWO copies, one to hand in at the beginning of class, the other to use in the discussion (30% of grade).
- (3) Community service learning component – research project consisting of a survey of community attitudes toward food biotechnology (local interest groups, Belluz farms, Thunder Oak Cheese, Thunder Bay Agricultural Association,

In this preparatory material I want brevity and focus, one page at the most.

Use the textbook and the web to get a general sense of the topic.

Concentrate on three specific points relevant to the discussion topic (no matter how broad it seems - you narrow it down). The points should be trying to provide answers or potential answers to specific question. The points should be concrete and based on PRIMARY research, i.e. one or two articles relevant to the topic. If your background is not in science, the primary articles may be from social science journals (ethics, sociology, etc.).

Critically evaluate the quality and reliability of the data presented.

To summarize the above into a submission FORMAT, do the following:

1. Research article attempts to answer the following question: _____
 2. Answer provided by the research is _____ .
 3. My view / interpretation of evidence / critical evaluation of evidence is _____.
- Reference citation

Even if you don't manage to wedge your points into the discussion, you will get points for preparation.

Participation in discussion and overall contribution to the class (20% of final grade).

Graduate course deliverables (5650): paper on a topic of choice, preparation of one lecture and leading the discussion of one topic. Grade breakdown will be: Presentation and discussion (30%), prepared questions (30%), paper (20%), leadership and participation in class (20%). Your lectures should be based on book chapters, BUT supported and ENHANCED in a significant way by additional primary information (web is OK, but scientific articles are much better).

Some basic information (copy of the chapter, relevant paper, outline of your talk) should be made available to the class participants for study ONE WEEK BEFORE your class.

Presentations should be informative (and if possible provocative) lectures, about 50 minutes long, followed by 15 minute break and the discussion of about 40 minutes.

I just looked through your submissions on the monarch butterfly issue. All of you presented valid points and obviously are learning new information, but all of you neglected to include your own perspective on each point. In that respect, I gave everyone 4/5 and suggest the following improvements for this Friday:

1. Concentrate on the DISCUSSION part of the lecture (i.e. not on plant tissue culture in previous lecture, and NOT molecular pharming this Friday - only the golden rice issue)
2. Be brief in your submission of each point: Question, answer and YOUR critical evaluation of the point. Each point should be related directly to a primary article(s) reference. (You may write

additional notes on your own copy, which may be useful contribution to general discussion).

3. STAY AWAY from generalizations, speculations and platitudes - although these may be stated as the original departure point for detailed scientific analysis.

4. Use correct referencing, and the textbook is NOT a valid source for this exercise - only serves as a general guide to the topic at hand.

Biology 4650 presentation and discussion evaluation

Name of evaluator:

Names of presenters:

Main point of the presentation:

Were useful preliminary materials distributed prior to class, in a timely fashion? (/10)

CONSTRUCTIVE evaluation of presentation:

Organization, timing and clarity (/10)

Research, technical correctness, conversely, errors made (/10)

Clarity of arguments and the "take-home" lesson (/10)

Critical evaluation of evidence (/10)

Delivery, mannerisms (/10)

CONSTRUCTIVE evaluation of controversial discussion:

Were both sides of the argument presented? (/10)

Was the tone empathetic? Were boundaries and definitions set to avoid mis-specification?
(/10)

Was the tone constructive, or were there put downs, negative body language, emotions used?
(/10)

Was there a clear neutral "moderator", main points summarized? (/10)

TOTAL (/100)

Additional comments: