



Sample Course Syllabus

BI/FS/TOX 435: Genes and Chemicals in Agriculture: Benefit and Risks

NOTE to prospective students: This syllabus is intended to provide students who are considering taking this course an idea of what they will be learning. A more detailed syllabus will be available on the course Blackboard site for enrolled students and may be more current than this sample syllabus.

Credits: 3

Instructors: Steve Strauss, Dave Stone

Instructors' email:

Steve.Strauss@oregonstate.edu

Dave.Stone@oregonstate.edu

Link to website of on-site version of the course:

<http://www.cof.orst.edu/cof/teach/agbio2010/index.htm>

Teaching Assistant name and contact info:

Julia Zhu

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Syllabus effective for term(s): Fall 2010

OSU catalog course description, including pre-requisites/co-requisites:

It is a multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. CROSSLISTED as BI435, TOX 435, FS435. (Bacc Core Course).

Students should have junior, senior or grad student standing, and at least two quarters of introductory biology. Satisfies BCC, Science, Technology & Society

Baccalaureate Core

<http://oregonstate.edu/ap/curriculum/baccore.html>

Successful completion of this course partially fulfills OSU's Baccalaureate Core course requirements in the *Perspectives; Power and Discrimination* under category of

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Science, Technology & Society, by providing comprehensive information such as technology, industry, and regulation on many controversial topics to students.

Measurable student learning outcomes:

At the end of the class, students should be able to critically analyze claims made by companies, scientists, and government agencies about food and environmental safety of new agricultural technologies. Also, they should be able to describe:

- traditional breeding methods, modern biotechnology, and the difference between them
- some basic methods in genetic engineering
- GE organisms in commercial use
- opposing views on GE organisms
- the basics in toxicology, classification in terms of toxicity and nutritional safety, studies and analysis on environmental impacts of chemical use, unintended consequences of chemical use
- modern nanotechnology and its future,
- regulations in GE food and chemicals
- the government regulatory bodies and their requirements
- how GE organisms are tested
- organic industry and certification

Course content and schedule:

Week 1: Introduction / genetic engineering (GE) basics / why controversy?

Lecture 1: Meet the instructors and TA by video (5' each) / Introduction to class mechanics / why this class / status of GE crops in the world

Lecture 2: Basic concepts of plant molecular genetics and genomics / how plant genetic engineering works and where its going

Recitation: Why there is opposition to GE crops: A very negative view from the Sierra Club (reading and discussion)

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Week 2: The context for thinking about GE crops

Lecture 3: Sustainability: A growing concern

Lecture 4: Conventional plant breeding: Radical but accepted everywhere

Recitation: Freezing the footprint of agriculture while feeding 9 billion people

Week 3: Animal genetics and biotechnology

Lecture 5: Animal breeding and genomic advances without GE

Lecture 6: Animal cloning and use of recombinant growth hormone

Recitation: Making medicines in transgenic animals (video, U.C. Davis), Genetically modified salmon (u-tube), discussion of both

Week 4: Issues and novelties

Lecture 7: Gene flow and regulation of GE crops

Lecture 8: Crops as bioreactors: New means for new medicines?

Recitation: Biofortification and developing world issues: The case of Golden Rice

MIDTERM: GENES & BIOTECH (multiple choice, t/f, matching)

Week 5 Basics of Toxicology

Lecture 9: Fundamental of Toxicology

Lecture 10: Natural vs. synthetic chemicals

Recitation: Paracelsus to parascience: the environmental cancer distraction

Week 6 Risk and Regulation in Toxicology

Lecture 11: Risk assessment

Lecture 12: Regulation of chemicals

Recitation: Biomonitoring of environmental chemicals

Week 7

Lecture 13: Benefits of pesticides in society

Lecture 14: Food allergens, mycotoxins, and the saga of Star-Link corn

Recitation: PESTICIDES AND ECOLOGICAL RISK ASSESSMENT (History, Science, and Process)

Week 8

Lecture 15: Nanotechnology and toxicology

Lecture 16: Toxicogenomics and advances in toxicology

Recitation: Getting nanotoxicology right the first time

MIDTERM: TOXICOLOGY (multiple choice, t/f, matching)

Week 9 Brining it all together

Lecture 17: GE and conventional vs. organically certified agriculture: Why the fight?

Lecture 18: Herbicide tolerant crops: An environmental blessing or disaster?

Recitation: Could organic certification be an obstacle on the way to sustainability?

Week 10: Taking actions in an uncertain and complex world: You decide

Lecture 19:

Choose a topic from one of the following topics (first come first serve) and write an essay. The essay from each student will be put online anonymously for discussion. Each student is then required to comment at least on two essays.

Lecture 20: Student contributed U-tubes and discussion, max 5 minutes each (students comment and vote on them; double credit for those voted by students as being above average for technical quality, amusement, or educational value)

Recitation: Risk perception (GE as well as Tox) ; discussion and student ratings of final class essays (students are randomly assigned and rate 5 each; 2 double-spaced pages per essay, max)

Learning resources

Learning materials will be available on Blackboard, including lecture PowerPoint's and required readings.

Class Structure

Each week there will be two lectures, and each lecture has 40 slides PowerPoint's. The recitations will be used primarily for discussion of readings, particularly of the more complex and controversial issues of biotechnology and toxicology. Each lecture and recitation will have a thread discussion board and students can make comments or ask questions on the topic or the readings. The discussion of lecture and recitation is encouraged and will be a primary source of participation grading.

Evaluation of student performance

Student grades will be determined according to the following breakdown:

- 15% = Participation (7%) / attendance (8%)
- 25% = Essays including written work for first essay of self-introduction 10%, second essay of argument 10% and comments 5%.
- 5 % = U-tube video contribution and explanation of why you chose it and the lesson it provides)
- 25% = Mid-term exam
- 30% = Final exam

Participation will be graded as 50% of the total maximum score (little to no class participation in discussions or questioning of the lecturers), 100% for average level of interaction, and 150% for strong participation. Grades are based on overall impression of the instructors at the end of the term.

For the first essay (a maximum of one single-spaced page):

use this as an opportunity to introduce yourself as it relates to the class (education, work, home background) and **please insert a photo** to help us know who you are, state why you have taken this class, summarize your general familiarity with DNA, biotechnology, chemicals, toxicology state what issues related to the course most interest you, and state your hopes/goals for learning-i.e., what questions you have, or what knowledge you most hope to obtain via the class to help in your life, career, etc. No references required.

For the second essay(A minimum of 2, with a maximum of 3, double-spaced pages.), choose one of the 4 topics provided, write an essay and also make comments of two other people's essays. The requirement of the second essay is:

- A summary of the general and technical aspects of the issue that cites and summarizes at least two (but no more than five) published references in addition to the course readings, including high quality web pages from scholarly institutions, governments, scientifically credible NGOs, or high quality news outlets (no blogs, Wikipedia, myspace, etc). This should be about 2/3rds of the essay.
- Your own insights/views/critique of the issue or reference(s) you have chosen to focus on. This should be about 1/3 of the essay. Use of subheadings to help organize and communicate the logical flow of the essay is highly encouraged. The scoring of comments will be based on the content.
- The comments for the second essay should not be simple compliments and not less than 100 words. The scoring of comments will be based on the content.

The grading of the essays is on content and structure and not on grammar and language. However a proof reading of spelling mistakes before submitting it is suggested.

For the YouTube video and discussion session on week 9:

Please identify one short video clip available on the web, either pro-biotech or anti-biotech (or pro- or anti-chemical), or just informative and related to the class themes. Send the URLs and a short description (subject, length) to Strauss by 5 PM on May 11th. Choose one that you can show most of (or a part of) in less than about 2 minutes. Please avoid any graphic images or language that might offend others. You may wish to team up with one other student to show something longer (up to 4 minutes). After showing it, you will be asked to explain in about 100 words why you chose it and its value or lesson. Funny or nutty videos accepted, if they have a goal or make a point.

Extra bonus 2 points will be added to your grades if the video you choose exceed others in one of these 3 aspects: Informative, Humor, or Thoughtful.

Course Policies

See the lecture schedule for essay due dates. Essays will only be accepted up to one week after the deadline date, but their value for class credit will be reduced by 50% if late.

Exam Policies

The exams are available in a two day period. Students should avoid communication of any information related to the course during that time. Once you begin the test, the timing is on. It doesn't force you to quit at the end of 2 hour exam time. However, you will have the score reduction every 15 minutes of extra time.

Incompletes

Take this course only if you plan to finish it in a timely manner (during this term). I assign an "I" or incomplete only when there is a strong and compelling case for doing so (e.g., health reasons, military commitment).

Respect for differing perspectives on biotechnology

Biotechnologies mean very different things to different people. How people react depends on their religious beliefs, philosophical perspectives, and level of familiarity with the science and technology. People hold diverse and often spiritual views toward food, environment, and the biological world. Discussions can therefore easily become heated and personal.

In this class, all perspectives are to be welcomed and respected. The focus of this class is on the science and ethics underlying genetic and chemical biotechnologies, however, our personal views will color how we interpret technical information, as well as the degree of uncertainty we are willing to accept when making decisions about food and environmental safety. Science delivers information, but never certainty. There will often be disagreement about regulatory decisions and the adequacy of science underlying new technology. Let's listen carefully and respectfully to other's views, and try to understand motivation as well as logic, before stating our own views. In all cases a civil and respectful tone during discussions will be required. In all cases, a civil and respectful tone in discussion will be required.

Contacting the instructors and the TA

When you have questions regarding course material or have problems or suggestions with course structure, send an email to the teaching assistant, and cc it to instructors. You can also post anonymously on the discussion board.

Class policy on plagiarism

We will follow OSU policy when considering actions on detected plagiarism. See <http://oregonstate.edu/studentconduct/regulations/index.php#acdis> for discussion of what is and what is not considered plagiarism, including examples and punitive actions sanctioned by OSU. For the sake of this course, plagiarism will be defined as the inclusion of the majority of a single sentence, or additional written material, from a published source such as a book, article, or web site, without direct attribution and identification of the material (usually using quotation marks) as coming from that source.

Blackboard

This course will be delivered via Blackboard, your online learning community, where you will interact with your classmates and with me. Within the course Blackboard site you will access the learning materials, tutorials, and syllabus; discuss issues; submit assignments; take quizzes; email other students and the instructor; participate in online activities; and display your projects. To preview how an online course works, visit the [Ecampus Course Demo](#). For technical assistance, Blackboard and otherwise, see <http://ecampus.oregonstate.edu/services/technical-help.htm>.

Conduct in this online classroom

Student conduct is governed by the university's policies, as explained in the [Office of Student Conduct: information and regulations](#).

Statement Regarding Students with Disabilities:

Accommodations are collaborative efforts between students, faculty and [Disability Access Services \(DAS\)](#) with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

OSU Student Evaluation of Teaching

We encourage you to engage in the course evaluation process each term – online, of course. The evaluation form will be available toward the end of each term, and you will be sent instructions by Ecampus. You will login to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.