

**Course Objectives:**

The goal of this three-credit lecture course is to introduce students to the science and techniques underlying the modification of plants via crop biotechnology. This class will be divided into four parts. 1) An overview of plant physiology and development. Breeding approaches to improve crop production. 2) DNA cloning, manipulation and strategies for genetic modification of plants. 3) Case studies of genetically modified plants. Myths and real concerns regarding genetically modified crops. 4) Student presentations (oral and written).

**Instructors**

Dr. Michael Neff, Department of Crop and Soil Sciences, 371 Johnson Hall, 335-7705, [mmneff@wsu.edu](mailto:mmneff@wsu.edu)

Dr. Asaph Cousins, School of Biological Sciences, 367 Eastlick Hall, 335-7218, [acousins@wsu.edu](mailto:acousins@wsu.edu)

Office hours: To be determined

**Class time**

Lecture: Tuesdays and Thursdays 10:35 am to 11:50 noon, VPBS 31

**Pre-requisites**

Introductory biology

**Required text book**

"Plants, Genes, and Crop Biotechnology" 2<sup>nd</sup> Edition by Maarten J. Chrispeels & David E. Sadava

**Desired Outcomes:**

Upon completion of this course, students should have an understanding of the current status of plant biotechnology. They should be able to critically evaluate criticisms and claims regarding genetic modification of crops. They should be able to express the scientific background of crop biotechnology as well as their opinions on genetic modification of plants via both written and oral communication to the general public.

**Grades***Lecture*

- |   |                   |
|---|-------------------|
| ▪ First Midterm   | 100 points        |
| ▪ Second Midterm  | 100 points        |
| ▪ Student Presentation (oral = 50 pts and written = 50 pts) | 100 points        |
| ▪ Student write up on Biotech Podcast                       | 50 points         |
| ▪ Final exam  | <u>150 points</u> |

Total = 500 points

**Expectations** – The finalized lecture topics and assigned chapters or other reading material will be listed in the syllabus handed out in class. You should read the indicated chapter(s) before coming to class so you can participate in the class discussion and get more out of the lectures.

*Hourly exams and quizzes cannot be made up if missed (See policy below on approved absences).*

**Attendance is expected and may sometimes be recorded** - Attendance and participation in class sessions will be encouraged and may influence the course final grade. Absences because of illness, personal and/or family crises, mandated court appearances, university approved events, or similar reasons will be accommodated as long as such absences are not excessive and notification is provided to the instructor *in advance*. Excused absences should be arranged prior to any known or planned event. Required University activities will be excused absences if an official Class Absence Request form signed by the sponsoring faculty or organization is given to the instructor before the event.

NO.	DATE	LECTURE TOPIC [Note: topics and their order may change]
1	Jan. 12	Course overview, requirements, fill out questionnaire Intro to issues in crop biotechnology
2	Jan. 14	Overview of Plant Life Cycle and Development
3	Jan. 19	Plant Development: Cell wall
4	Jan. 21	Plant Development: Cell wall continued, chloroplasts and plastids
5	Jan. 26	Plant Development: Root, shoot and floral meristems, movement in plants
6	Jan. 28	Plant Development: Monocot vs dicot, seed germination
7	Feb. 2	Plant Development: Resource allocation, photosynthesis
8	Feb. 4	Plant Development: Carbon uptake, nitrogen use, biofuels
	Feb. 9	<b>First Midterm Exam (Covering Lectures 1-8) [Deadline for dropping course without record.]</b>
9	Feb. 11	Plant Development: Tissue culture, hormonal regulation of development
10	Feb. 16	Plant Genes: Review of DNA basics, plasmids, gene structure/regulation <b>[Midterm course evaluations submitted to Profs. Neff and Cousins]</b>
11	Feb. 18	Plant Genes: Molecular markers and linkage. Mutant screens, gene isolation
12	Feb. 23	Plant Genes: Gene isolation, map-based cloning, libraries, tagging genes,
13	Feb. 25	Plant Genes: Cutting and pasting DNA, Generation of transgenic plants.

- 14 Mar. 2 Plant Genes: Generation of transgenic plants continued
- 15 Mar. 4 Plant Genes: Characterization of transgenic plants and gene flow,
- 16 Mar. 9 Plant Genes: Genomics, intellectual property rights
- Mar. 11 **Second Midterm Exam (Cumulative, emphasis on Lectures 9-16)**  
**[Deadline to use a regular withdrawal from a course is tomorrow.]**
- Mar. 15 - 19 Spring Break*
- 17 Mar. 23 Case Study: Seed biology and “terminator gene technology”, intellectual property rights, communication with the public
- 18 Mar. 25 Case Study: Starlink Corn, transgene escape and isolation issues.
- 19 Mar. 30 Case Study: Disease resistance strategies
- 20 April 1 Case Study: Insect resistance strategies  
**[Student presentation topics chosen by today]**
- 21 April 6 Case Study: Weed control strategies
- 22 April 8 Case Study: Plants as chemical plants, pharming pharmaceuticals
- 23 April 13 Case Study: Greener agriculture, national energy issues and GM plants  
**[Last day to hand in presentation outlines for instructor feedback]**
- 24 April 15 Urban myths and real concerns about GM plants  
**[Instructor feedback on presentations due back to students]**
- 25 April 20 Non-GM approaches to crop biotechnology
- 26 April 22 Student Presentations  
**[Deadline for all written presentations. Due at beginning of class]**
- 27 April 27 Student Presentations
- 28 April 29 Student Presentations

**A final exam study session will be arranged based on student availability.**  
**Final Exam Thursday May 6<sup>th</sup> from 10:10 am to 12:10 pm**  
**Cumulative with an emphasis on key subjects or those not covered in earlier exams.**

**Grades must be submitted by Tuesday, May 11<sup>th</sup> at 5 pm.**

**Disability statement**

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I am committed to providing assistance to help you be successful in this course. Reasonable accommodations are available for students with a documented disability. Please go to the Disability Resource Center (DRC) during the first two weeks of every semester to seek information or to qualify for accommodations. All accommodations MUST be approved through the DRC, located in the Administration Annex Bldg, Room 205. To make an appointment with a disability counselor, please call 335-3417.

**Cheating (WAC 504-25-310)**

Cheating is the intentional use of, or attempt to use, unauthorized material, information, or study aids in any academic activity to gain advantage. Cheating includes, but is not limited to, communicating improperly with others, especially other students, during tests or the preparation of assignments for classes; copying from books, notes, or other sources during a test when this is not permitted; copying from another student's work (reports, laboratory work, computer programs, files, etc.); making improper use of calculators or other devices during a test; illegitimately procuring or using copies of current examinations; allowing a substitute to take an examination or write a paper for oneself.

**Plagiarism (WAC 504-25-310)**

Plagiarism is knowingly representing the work of another as one's own, without proper acknowledgment of the source. The only exceptions to the requirement that sources be acknowledged occur when the information, ideas, etc., are common knowledge. Plagiarism includes, but is not limited to, submitting as one's own work the work of a "ghost writer" or work obtained from a commercial writing service; quoting directly or paraphrasing closely from a source without giving proper credit; using figures, graphs, charts, or other such material without identifying the sources.

**Academic Integrity Processes (WAC 504-25-315)**

Every act of academic dishonesty affects academic evaluation of the student and also is a violation of the University's standards of conduct. Responsible instructors retain the authority and responsibility to assign grades to students, considering from an academic standpoint the nature of the student's action. This is the case even when the case is referred to the University Academic Integrity Process. Students have recourse to appealing the responsible instructor's assignment of grades according to usual academic policy. See Academic Regulation 104.

All clear instances of academic dishonesty shall be reported to the Office of Student Conduct as outlined in 504-35-335(2). The first reported instance at WSU of academic dishonesty by a student will be treated as purely an academic matter unless, in the judgment of the responsible instructor, more serious action should be taken through the disciplinary process. Any allegation of subsequent academic dishonesty will be treated as a matter to be referred to the Office of Student Conduct.

**Reports of Academic Dishonesty (WAC 504-35-320)**

Any member of the University community who witnesses an apparent act of academic dishonesty shall report the act either to the instructor responsible for the course or activity or to the Office of Student Conduct.