

## CFAN 2333 - Insects, Microbes, and Plants: Ecology of Pest Management

Fall Semester 2017

3 credits

Fall Semester

Department of Plant Pathology

Department of Entomology

College of Food, Agricultural and Natural Resource Sciences

University of Minnesota

Course Prerequisites: General Biology (BIOL 1009) or equivalent

Instructors: David Andow (Entomology)  
Brett Arenz (Plant Pathology)

*Class Sessions - Note different locations!*

Lectures (495 Hodson Hall)

Time: 11:45 am - 12:35 pm, Mondays and Wednesdays

Discussion (405 Alderman Hall)

Time: 11:45 am - 1:15 pm, Fridays

Class Website: The class website (a Moodle Site) can be accessed through myU.

Contacting Brett Arenz:

- E-mail: [aren0058@umn.edu](mailto:aren0058@umn.edu) - this is generally the fastest way to contact me
- Office: 105A Stakman Hall (if I'm not in my office, check in the Plant Disease Clinic next-door in 105 Stakman)
- Office Hours: Wednesday 1:00 pm to 2:00 pm or by arrangement  
*Wheelchair access to Stakman Hall is gained via Borlaug Hall on Buford Circle*
- Mail Box: located in Plant Pathology main office - 495 Borlaug Hall

Contacting David Andow:

- E-mail: [dandow@umn.edu](mailto:dandow@umn.edu) (best way to contact)
- Office: 232 Hodson Hall
- Office Hours: Monday 1:00 pm to 2:00 pm or by arrangement
- Mail Box: located in Hodson Hall 230

Course Description:

This course uses fundamental concepts of ecology and evolution to illuminate and solve the challenges in managing insects and microbes in today's global context of food and fiber production. Students will learn relevant aspects of insect and microbial biology to be able to situate concrete management problems in an appropriate ecological and evolutionary conceptual framework. Students will apply these concepts and discuss ecological and management controversies, such as what can we learn from natural areas to better manage food and fiber production systems. Case studies, readings and discussion topics will emphasize factors influencing responsible management decisions.

## Student Learning Outcomes:

- Identify and define pest management problems in real-world contexts
- Locate and evaluate relevant information on particular pest management problems
- Relate basic principles of ecology and evolution to managing pests
- Recognize socio-economic constraints to pest management in diverse societies globally
- Understand how technical advancements can complicate or enhance integrated pest management
- Use the principles of ecology and evolution to frame solutions to pest problems
- Improve presentation skills through informal and formal class presentations
- Solve a significant real-world pest management problem

**Student Workload Expectations for CFAN2333.** One credit represents, for the average University undergraduate student, three hours of academic work per week (including lectures, laboratories, recitations, discussion groups, field work, study, and so on), averaged over the semester, in order to complete the work of the course to achieve an average grade. Thus, enrollment for this 3 credit class represents approximately 15 hours of work per week, on average, over the course of the semester or 135 hours total over the course of the semester (3 credits x 3 hours of work per week x 15 weeks in the semester).

**Auditing CFAN2333.** Students auditing CFAN2333 are required to pay full tuition but do not take exams and are not required to do homework. University policy stipulates that students may not sit in on a class without registering for it. A student will be allowed to take a previously audited class for a grade.

**Course Expectations:** You are expected to attend all lectures and discussion sessions, be attentive during class, ask questions if you do not understand something, and participate in class activities and discussions.

If you have questions or problems with the course please talk to your instructor as soon as possible. If at any time during the course you feel we are not covering information you would like to cover or if we are going too fast over material please let your instructor know.

## Policy Statements

### Student Conduct Code:

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University, you are expected adhere to Board of Regents Policy: *Student Conduct Code*. To review the Student Conduct Code, please see: [http://regents.umn.edu/sites/default/files/policies/Student\\_Conduct\\_Code.pdf](http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf).

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Students are reminded that disrupting a class can lead to dismissal from that class period. Students who engage in behavior that disrupts the learning environment for others may also receive a reduced final grade and are potentially subject to disciplinary action.

#### **Use of Personal Electronic Devices in the Classroom:**

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom.

Laptops are allowed in the classroom for certain uses, though students may be directed to turn off any personal electronic devices if the device is not being used for class purposes.

For complete information, please reference:

<http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>.

#### **Scholastic Dishonesty:**

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code:

[http://regents.umn.edu/sites/default/files/policies/Student\\_Conduct\\_Code.pdf](http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf))

If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: <http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html>.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty:

<http://www1.umn.edu/oscai/integrity/student/index.html>.

If you have additional questions, please clarify with your instructor. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Students in CFAN 2333 are expected to do their own work, even though group activities and discussion among students is strongly encouraged.

Scholastic dishonesty, including plagiarism, will not be tolerated in CFAN 2333.

Plagiarism means representing the words, creative work, or ideas of another person as one's own without providing proper documentation of source. Examples include, but are not limited to:

- Copying information word for word from a source without using quotation marks and giving proper acknowledgement by way of footnote, endnote, or in-text citation;
- Representing the words, ideas, or data of another person as one's own without providing proper attribution to the author through quotation, reference, in-text citation, or footnote;
- producing, without proper attribution, any form of work originated by another person such as a musical phrase, a proof, a speech, an image, experimental data, laboratory report, graphic design, or computer code;
- paraphrasing, without sufficient acknowledgment, ideas taken from another person that the reader might reasonably mistake as the author's; and
- borrowing various words, ideas, phrases, or data from original sources and blending them with one's own without acknowledging the sources.

#### **Makeup Work for Legitimate Absences:**

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. *If you know you may need to miss a class be sure to consult an instructor beforehand to make sure the absence is excusable!* For complete information, please see: <http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html>.

#### **Appropriate Student Use of Class Notes and Course Materials:**

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: <http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>.

#### **Sexual Harassment**

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy:

<http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf>

#### **Equity, Diversity, Equal Opportunity, and Affirmative Action:**

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: [http://regents.umn.edu/sites/default/files/policies/Equity\\_Diversity\\_EO\\_AA.pdf](http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf).

#### **Disability Accommodations:**

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. Disability Services (DS) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DS at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations. If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course. For more information, please see the Disability Services website, <https://diversity.umn.edu/disability/>.

Further information is available from Disabilities Services (McNamara Alumni Center, 200 Oak Street SE, Suite 180, Minneapolis Campus. Phone: 612-626-1333 (V/TTY).

If you have a disability that requires accommodation in this course, please see me as soon as possible. I am happy to make appropriate accommodations, provided timely notice is received.

#### **Mental Health and Stress Management:**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: <http://www.mentalhealth.umn.edu>.

#### **Academic Freedom and Responsibility:**

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.\*

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost. *[Customize with names and contact information as appropriate for the course/college/campus.]*

*\* Language adapted from the American Association of University Professors "Joint Statement on Rights and Freedoms of Students".*

**Assessment:**

Student assessment will be determined as follows:  
2 Mid-Semester Exams (10%) and Final Exam (15%) - 35%  
Class Participation/Activities - 20%  
Homework assignments - 20%  
Class Project (Full Semester) - 25%  
TOTAL - 100%

**Participation in Lecture and Discussion Classes:**

Attendance is not taken for lecture sessions (M & W). However, attendance (and participation) is tracked for the Friday discussion sessions. Unexcused absences in discussion sections automatically result in no points for that day's participation (see below).

**Discussion:** Attendance in discussion sections is especially important as discussion is your main opportunity to apply concepts from lecture to real world problems- a crucial component of this course. Additionally, many discussions require cooperating with peers making your presence in discussion critical to the success of your group. If you must miss a discussion you are required to let us and your group know beforehand. To get credit for a missed (and excused!) discussion absence you must document that you've contributed to your group project for that week. You would be expected to complete an additional homework assignment as provided by the instructors.

**Homework Assignments:** Each week (including the first week) you can expect to have a homework assignment that will be due at the beginning of the Friday discussion. Some of these will be assignments that will be due online through the Moodle website and some will be assignments you hand in at the start of the discussion. These are meant to help you prepare to participate in the discussion.

**Assigned Readings:** There is no required textbook for this class, readings for every class will be provided online via the Moodle website. You are expected to have done the reading before coming to class so that you are able to understand lecture material and effectively participate in any discussions.

**Class Project:** This group project will take part in the 2<sup>nd</sup> half of the semester and will consist of each group choosing an international cropping system in which to research and design a pest control strategy that takes into account both microbial and insect pests as well as other ecological components such as natural predators and mutualists. Each group will produce both a poster depicting their plan and also a formal oral presentation to the rest of the class at the end of the semester. More information and rubrics will be provided as we get closer in the semester to this project.

## Grades:

Letter grades will be calculated by the following formula:

**A** - represents achievement that is outstanding relative to the level necessary to meet course requirements.

A	93.00 and above
A-	90.00 - 92.99

**B** - represents achievement that is significantly above the level necessary to meet course requirements.

B+	87.00 - 89.99
B	83.00 - 86.99
B-	80.00 - 82.99

**C** - represents achievement that meets the course requirements in every respect.

C+	77.00 - 79.99
C	73.00 - 76.99
C-	70.00 - 72.99

**D** - represents achievement that is worthy of credit even though it fails to meet fully the course requirements.

D+	65.00 - 69.99
D	60.00 - 64.99

**F** - represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an "I" (see also I).

F	59.99 and below
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**I** - Assigned at the discretion of the instructor. This grade can only be given when, due to extraordinary circumstances (e.g., hospitalization) a student who has successfully completed a substantial portion of the course's work with a passing grade was prevented from completing the work of the course on time. This grade requires a written agreement between instructor and student specifying the time and manner in which the student will complete the course requirements. In no event may any such written agreement allow a period of longer than one year to complete the course requirements.

For additional information, please refer to:

<http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html>.

## Exam Policy:

You are required to take the final exam at the time shown in the University of Minnesota calendar. If you have an exam conflicting with the final exam or three final exams within a 16-hour period, you may request a time adjustment by contacting your college office and your instructor. Such a request must be presented at least two weeks before the examination period begins.

### *If you are unable to take an exam:*

If a student is unable to take a scheduled examination for medical or other adverse reasons, she/he can and should apply for a special examination. Applications made on medical grounds should be accompanied by a medical certificate; those on other grounds must be supported by a personal declaration stating the facts on which the application relies. Students should contact their instructor at least 1 week prior to the scheduled exam time to request consideration for a special examination.

The following would generally be considered acceptable grounds to approve a special examination:

- (a) illness or a serious health problem;
- (b) serious personal or emotional trauma;

In cases of chronic illness and/or disability likely to affect study and examination performance, the student should, as soon as possible, make contact with the Disability Services who can assist in various aspects of the student's academic work, including assessment where appropriate.

*If you miss an exam:*

Contact your instructor (preferably by email) immediately, or as soon as the situation allows, if you miss an exam for any reason. Students missing exams for valid (e.g., medical, bereavement) reasons must notify the instructor in advance, where possible, and provide documentation if requested.

### **Grade Disputes:**

Students who feel an assignment or exam question has been graded unfairly should submit a written explanation with supporting evidence (for example, Why was your response valid given the concepts of the course?) within one week of the return of the assignment or exam. We will respond to such concerns within a week of receiving them either in writing or in a discussion with you.

The Student Conflict Resolution Center in 254 Appleby Hall, 128 Pleasant Street SE, U of MN, East Bank Campus (612-624-7272) provides assistance for students with campus-based concerns. In addition to handling individual cases, the majority of which are grading and instructional complaints, the office also functions in a proactive way to prevent problems in this area.

Schedule of Lectures, Discussions, Exams, and important project dates

<u>Date of Classes</u>	<u>Class Session #</u>	<u>Class Topic</u>	<u>Brett /David</u>	<u>Assignments</u>
Sep 6	Lect 1	Intro to Class, Global Crop Losses	B/D	
Sep 8	Disc 1	Food Security and the Future	B	Pre-Discussion 1 Assignment
Sep 11	Lect 2	Meet the Insects	D	
Sep 13	Lect 3	Overview of Decision Analysis	D	
Sep 15	Disc 2	Handling Uncertainty: Decision Trees (Maize in Mexico 1)	D	Pre-Discussion 2 Assignment
Sep 18	Lect 4	Meet the Microbes	B	
Sep 20	Lect 5	Decision Aids – Insects 1	D	
Sep 22	Disc 3	Handling Uncertainty: Influence Diagrams (Maize in Mexico 2)	D	Pre-Discussion 3 Assignment
Sep 25	Lect 6	Decision Aids – Insects 2	D	
Sep 27	Lect 7	Decision Aids – Pathogens 1	B	
Sep 29	Disc 4	Considering Management Options (Maize in Mexico 3)	B	Pre-Discussion 4 Assignment
Oct 2	Lect 8	Decision Aids – Pathogens 2	B	
Oct 4	Lect 9	Insect Injury and Damage	D	
Oct 6	Disc 5	Managing Multiple Pests/Diseases (Maize in Mexico 4)	D	Pre-Discussion 5 Assignment
Oct 9	Lect 10	Pathogen Infection and Yield Loss	B	
Oct 11	Lect 11	Exam 1		TEST
Oct 13	Disc 6	Presentation of Maize Decision Aid Introduction to Final Project	D	Pre-Discussion 6 Assignment
Oct 16	Lect 12	Fixed Plant Defenses	B	
Oct 18	Lect 13	Induced Plant Defenses	B	
Oct 20	Disc 7	Plant Defense	B	(1 <sup>st</sup> Final Project Milestone Due)
Oct 23	Lect 14	Microbial Pathogen Antagonists	B	
Oct 25	Lect 15	Suppressive Soils & Competitors	B	
Oct 27	Disc 8	Final Project Decision Context	B	Pre-Discussion 8 Assignment
Oct 30	Lect 16	Natural Enemies of Insect Pests 1	D	
Nov 1	Lect 17	Natural Enemies of Insect Pests 2	D	
Nov 3	Disc 9	Biological Control of Insect Pests	D	(2 <sup>nd</sup> Final Project Milestone Due)
Nov 6	Lect 18	Plant-Microbe-Insect Interactions	B	

<u>Date of Classes</u>	<u>Class Session #</u>	<u>Class Topic</u>	<u>Brett /David</u>	<u>Assignments</u>
Nov 8	Lect 19	Plant Diversity and Pathogens	B	
Nov 10	Disc 10	GMOs in Pest Management	D	Pre-Discussion 10 Assignment
Nov 13	Lect 20	Plant Diversity and Insects	D	
Nov 15	Lect 21	Insect Pesticide Resistance Evolution	D	
Nov 17	Disc 11	George Heimpel lecture on Insect Biocontrol		(3rd Final Project Milestone Due)
Nov 20	Lect 22	Exam 2		TEST
Nov 22	Lect 23	Microbial Mutualists lecture		
Nov 24	No Class!	Thanksgiving		
Nov 27	Lect 24	Ian Lane lecture on Pollinators		
Nov 29	Lect 25	Linda Kinkel lecture on Pathogen biocontrol		
Dec 1	Disc 12	Final Project discussion	B	Pre-Discussion 12 Assignment (4 <sup>th</sup> Final Project Milestone Due)
Dec 4	Lect 26	Group Poster Construction		
Dec 6	Lect 27	Invasive Species	B	
Dec 8	Disc 13	<i>Final Project Poster Session</i>		Final Project Posters due at start of session
Dec 11	Lect 28	<i>Student Presentations (Formal to whole class)</i>		
Dec 13	Lect 29	<i>Student Presentations (Formal to whole class)</i>		
Dec 20	Final Exam (Cumulative) Wednesday: 1:30 p.m.-3:30 p.m.			

*Note: The schedule may be modified during the semester. You will be notified in lectures and/or by email of any substantial changes to the schedule above.*