

# Syllabus

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## PREPRINT: An explanation of the philosophy and requirements of a 3 credit course in insect ecology (*ENT 470/670*)

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*Abstract.* In this course you will learn about the fundamental concepts of ecology as they relate to insects. We will emphasize how these ecological principles help inform applied and basic research with insects. To do this we will use the current entomological and ecological literature and we will draw on examples from a broad range of natural and managed systems.

*Key words:* communities, ecology, entomology, graduate instruction, insect ecology, organisms, populations, undergraduate instruction.

### INTRODUCTION

Humans affect their environment while also being an important part of it (Cain et al. 2014). If we are to effectively manage and support this global environment, we must understand how natural systems work, and to do that we have to study and understand “ecology, the scientific study of how organisms affect-and are affected by-other organisms and their environment” (Cain et al. 2014).

Insects have a number of features that make them remarkable, including how they react to the environment and other organisms (Price et al. 2011). Moreover, there are important relationships between many insects, the natural environment and humans’ use of that environment (Price et al. 2011). Therefore studying the ecology of insects plays a fundamental role in understanding the basic structure of natural systems while helping solve practical problems posed by insects (Price et al. 2011).

In studying insect ecology in this course, 1) you will identify fundamental ecological concepts and apply them to applied and basic research; 2) you will perpetuate your own knowledge of insect ecology while working as a group to understand, apply, and analyze this knowledge; 3) you will be locate and

critically evaluate information from the peer-reviewed literature; and 4) you will improve your ability to effectively create, synthesize, and communicate information.

### MATERIALS AND METHODS

#### *Method of instruction*

To learn about insect ecology and meet the stated course objectives, the class will meet from 0930-1045 Tuesdays and Thursdays in 272 Hultz Hall. Additional office hours are available from 1045-1200 Tuesdays and Thursdays and by appointment.

We will follow a “flipped classroom” model. That means there will be no lectures during class. Students will be responsible for gaining knowledge about content before class, primarily by reading source materials. Class time will be devoted to interactively engaging in discussions and activities so students better understand and can apply the content. Before many classes there will be a quiz and/or a pre-class assignment related to that day’s reading. These will help focus your reading and prepare you for discussion. They will also be a major component of your homework grade.

The subjects we will study are available in Box 1. The assessment of student grades for this course will be decided by the following factors and combined to give the outcomes presented in the results.

Syllabus created 2011; revised 2013 & 2015. For a “traditionally formatted” version of this syllabus see BlackBoard or ask the instructor.

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### *Absences from class*

You may have three unexcused absences from classes without losing points from your participation grade (see Grading). Informing the instructor that you will be gone will not automatically warrant an excused absence. Excused absences must be discussed and agreed upon before class. Students are still responsible for material, quizzes and homework from all absences.

### *Homework*

Several types of homework will be used to tie-in aspects of the class.

**Article summary assignment** – to practice critical reading and evaluation skills of scientific literature.

**Quizzes and Pre-class assignments** – to focus reading and prepare for classroom discussions.

**T.A.N. briefings** – As we will discuss in class, there are crucial connections between theory (T), application (A), and natural history (N), and it is those connections that help build insect ecology and its uses. Since our class is a mixture of students with strengths and weaknesses in each of these areas, I want to make sure that students gain exposure to all of these areas while also understanding how to explore these areas for themselves.

### *Exams*

Instead of standard exams, we will be using take-home essays. Each essay will emphasize your understanding of the material discussed in the most recent unit while also combining the material you explored for the homework (*T.A.N. briefings*). There will be 5 essay exams, one for each of the 5 units we cover. You must take and complete the first 4 exams. However, the fifth exam will be optional; if you take the fifth exam I will throw out the lowest score you received from all 5 of your exams (thus it can only benefit your grade to take the fifth exam).

### *Graduate student grant writing exercise*

Graduate students will write an additional paper in the format of a research grant. The purpose is to give practice in writing papers (grants) while developing researchable ideas in insect ecology. Each student will think of a researchable idea and justify their choice. These justifications must include how the idea addresses a fundamental issue in insect ecology (theory) and its application. Please make an appointment with me to discuss your choice of a topic. To proceed with this assignment, you need my approval of the topic.

### *Late work*

Any assignment turned in after the due date/time will be marked down 10%. For every week the assignment is late, another 10% will be marked off the grade given to the assignment. Any assignment not turned in by May 15, 2015 will be given a zero.

## RESULTS

The relative weight of class participation, homework, essay exams, and the grant project (for graduate students) is given for undergraduates (Fig. 1A) and graduate students (Fig. 1B). Final grades are given based on achieving the following proportion of points overall: A  $\geq$  90%; B = 80% - 89%; C = 70% - 79%; D = 60% - 69%; F < 60%.

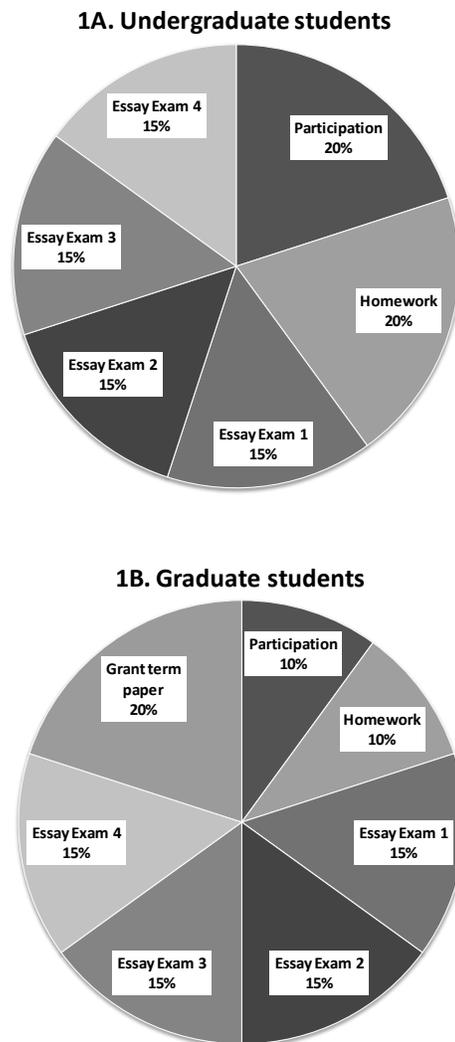


Fig. 1. Relative contribution of data sets in determining the final grades for A) undergraduate students and B) graduate students.

Box 1. **Class schedule:** I reserve the right to modify this list as best serves the needs of the class.

Introduction

1/13 Syllabus and introduction

1/15 Scientific process and peer-reviewed articles

UNIT ONE: Insects as Organisms

1/20 & 1/22 Individual response to abiotic conditions

1/27 & 1/29 Behavioral ecology

2/3 & 2/5 Acquiring resources



UNIT TWO: Insect Populations

2/10 & 2/12 Using resources

2/17 & 2/19 Population structure

2/24 & 2/26 Population dynamics



UNIT THREE: Trophic Interactions

3/3 & 3/5 Herbivory

3/10 & 3/12 Predation

**3/17 & 3/19 No class – Spring break**

3/24 & 3/26 Parasites and parasitoids



UNIT FOUR: More Species Interactions

3/31 & 4/2 Competition and lateral interactions

4/7 & 4/9 Mutualisms

4/14 & 4/16 Multispecies interactions



UNIT FIVE: Insects in Communities and Ecosystems

4/21 & 4/23 Community structure & dynamics

4/28 & 4/30 Species diversity

5/5 & 5/7 Insects in ecosystem function

DISCUSSION

**Veterans and military personnel:** Veterans or military personnel with special circumstances or who are activated are encouraged to notify the instructor as early as possible.

**Students with special requirements:** Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor as soon as possible. The instructor may ask for verification and that, plus other assistance, can be requested from Disability Services in Wallman Wellness Center 170 (231-8463). <http://www.ndsu.edu/disabilityservices/>.

**Academic Honesty:** All students taking any course in the College of Agriculture, Food Systems, and Natural Resources are under the Honor System (<http://www.ag.ndsu.edu/academics/honor-system-1>). The Honor System is a system that is governed by the students and operates on the premise that most students are honest and work best when their honesty, and the honesty of others, is not in question. It functions to prevent cheating as well as penalize those who are dishonest. It is the responsibility of the students to report any violations of the honor pledge to the instructor, honor commission or the Dean of the College of Agriculture, Food Systems, and Natural Resources.

All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (<http://www.ndsu.edu/fileadmin/policy/335.pdf>).

**Plagiarism.** Plagiarism is a very serious issue in the classroom and something that is equally important issue in scientific research. To put it bluntly, scientists throw away their entire careers by plagiarizing. It is ultimately your responsibility to make sure that you understand what plagiarism is and make sure you avoid it. However, *if you are ever confused or unsure about whether something constitutes plagiarism ASK!* Other resources include:

<http://plagiarism.org/> <http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml> <https://owl.english.purdue.edu/owl/resource/589/01/>

If I believe plagiarism has occurred on an assignment you will have a chance to meet about it, but if I believe the plagiarism was deliberate or extensive you will receive no points for the assignment and a Student Academic Misconduct Tracking Form will be filed as per NDSU policy 335. Excessive instances of plagiarism and/or multiple offenses will receive additional harsher punishments up to and including moving to have the student expelled.

ACKNOWLEDGMENTS

I thank JA White, I Kaplan and other insect ecology instructors for advice and guidance. More importantly, I thank you, the student for taking this course, giving your best effort and ultimately helping you and your fellow students to get as much as possible out of this experience.

LITERATURE CITED

Cain, M. L., W. D. Bowman, and S. D. Hacker. 2014. Ecology, Third Edition. Sinaur Associates, Incorporated, Sunderland, MA. ISBN-13: 978-0878939084. *Recommended text.*

*Companion website:* <http://www.sinauer.com/ecology/>

Price, P. W., R. F. Denno, M. D. Eubanks, D. L. Finke, and I. Kaplan. 2011. Insect Ecology: Behavior, Populations and Communities. Cambridge University Press, Cambridge. ISBN: 978-0-521-54260-9. *Required text*