

## ENTO 401- Principles of Integrated Pest Management

### SYLLABUS

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110 Biological Control Building

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**Course Description:** An introduction to Integrated Pest Management (IPM): Concepts, principles, development and application of IPM. IPM constitutes a series of pest control tactics and strategies toward more sustainable agriculture, natural resources, and urban and rural health and well-being.

**Number of credit hours:** Three (3) (2 for the lecture, 1 for the lab)

**Days and times of lectures:** Tuesday and Thursday 11:10-12:25

**Days and Times of Labs:** Monday 1:50- 4:40

**Room:** 205 Heep Center (HPCT) (Lectures and Labs)

**Office hours:** by appointment;

**Class website:** <http://insects.tamu.edu/students/undergrad/ento401/>

**Teaching Assistant:**

TBA

**Prerequisite:** ENTO201 or equivalent

**Text:** Koul, O., Dhaliwal, G.S., and Cuperus, G.W., 2004, Integrated Pest Management: Potential, Constraints and Challenges, CABI Publishing.

This book is also available online at NetLibrary (<http://www.netlibrary.com>). However, electronic access may be limited depending on server use. This course has been created collecting information from many sources (e.g. book chapters and journal articles). The accompanying readings for each lecture are indicated in between parentheses after each lecture title in this syllabus. All the readings are available on reserve in the west campus library. And most required readings will be posted as PDFs in the course website.

**Course Format:** Information will be presented by lectures supplemented with computer presentations. Readings associated with the lectures will enforce lecture materials and provide supplemental information. Students are STRONGLY encouraged to read the material associated with each lecture.

**Course Rationale:** As concerns about environmental safety increase worldwide, ways to control agricultural pests with the least possible environmental impact are actively being pursued. Integrated Pest Management (IPM) is a relatively new practice that combines an array of strategies to combat pests in an effective yet environmentally friendly manner. The present course will define IPM and its main components and discuss the ecological underpinnings behind it.

**Course Objective and Learning Outcomes:**

The main goal of this course is that students understand how sound IPM practices rely on an understanding of ecological interactions among crops, pests and their natural enemies and to breach the illusionary gap between applied and basic research.

After taking this course, students are expected to:

- Define the IPM concept and its components
- Recognize the importance of ecological and evolutionary knowledge in IPM success
- Orally summarize and present information effectively to stakeholders

**Teaching Assessment:**

We will assess the fulfillment of the course goals and learning outcomes by using exams, quizzes, a written assignment (i.e., a laboratory report), a debate and a 10-minute oral presentation. Participation in classroom and laboratory discussions is strongly encouraged – students will occasionally be called upon in class and asked to work together in groups.

**Laboratory**

This course is complemented by a laboratory session.

**Grading:**

- A = 315 – 350 points
- B = 280 – 314 points
- C = 245 – 279 points
- D = 210 – 244 points
- F = 0 – 209 points

**Lecture** = 70% of total grade (245)

- Exam 1 = 60 points
- Exam 2 = 60 points
- Exam 3 = 60 points
- Exam 4 = 60 points
- Participation = 5 Points

**Laboratory** = 30% of total grade (105)

- Quizzes = 30 points
- Lab Report = 50 points
- Presentation = 20 points
- Participation = 5 points

## **Attendance**

Since my lectures are based on several sources, in order to succeed in this class it is strongly recommended you attend all lectures. Attendance to laboratories is mandatory.

**Lecture Exams:** Exam dates are annotated on the syllabus. Please note there is no exam during finals week.

**Laboratory Quizzes:** Quiz dates are annotated on the syllabus. Laboratory quizzes will cover material from the previous laboratory, plus material for that day's laboratory exercise (the latter is to encourage you to read the lab manual prior to class).

**Laboratory Report:** There will be one laboratory report, which is meant to mimic a short communication in a scientific journal. This communication will include an introduction with your hypotheses, methods, results, discussion and literature cited sections.

**Make-up Exams and quizzes:** Make-up exams and quizzes will only be given for valid excuses. Missing exams or quizzes without valid excuses will be graded as zeroes. Valid excuses consist of doctor notes or any document that could attest the validity of your excused absence. Religious holiday absentees or any other kind of conflicting commitment should be notified to me at least a week in advance.

**Americans with Disabilities Act (ADA) Policy Statement:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe that you have a disability requiring accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Cain Hall or call 845-1637.

**Laboratory Safety:** The Department of Entomology is committed to the safety of all students and employees participating in teaching laboratories. To ensure that a safe environment is maintained in our teaching laboratories, it is expected that all students will adhere to general safety guidelines and emergency procedures, as well as course-specific and activity-specific safety instructions provided by faculty and teaching assistants. Laboratory safety and emergency procedures will be reviewed during the first class period and on a regular basis thereafter.

## **Academic Integrity Statements: AGGIE HONOR CODE**

*"An Aggie does not lie, cheat, or steal or tolerate those who do".*

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information, please visit [www.tamu.edu/aggiehonor/](http://www.tamu.edu/aggiehonor/)

## Course Content

**Recommended readings appear in between parentheses. “Text” = our textbook. Numbers correspond to the book number in the bibliography list (look at the end of the syllabus for the bibliography list). **Book Chapters in red (or bold italics in the colorless printout) are required readings.****

- week 1. (08/26) *Lab: No Lab*  
 (08/27) Lecture 1 Introduction  
 (08/29) Lecture 2 Pest management. Definition and History (Text: Chp 1)
- week2 . (09/02) *Lab: Lab description/Introductions/Rules of the game*  
 (09/03) Lecture 3 When should IPM be implemented? Sampling and yield lost (4: Chp 8)  
 (09/05) Lecture 4 An ecological foundation for IPM (4: Chp 2)
- week 3. (09/09) *Lab: Identifying our friends and foes*  
 (09/10) Lecture 5 Autoecological research on pests and natural enemies (**6: Chp 9**)  
 (09/12) Lecture 6 Biological Control Principles (1: Chp 2)
- week 4. (09/16) *Field: Insect Sampling. Comparing insect diversity in cultivated vs wild vegetation. Quiz 1.*  
 (09/17) Lecture 7 Biological Control Strategies (1: Chp 3).  
**(9/19) Exam 1 (until Lecture 6. Including it) 60pt.**
- week5. (09/23) *Lab: Analyzing samples from field trip. T-test and Chi-2. Quiz 2.*  
 (09/24) Lecture 8 Biological Control Strategies II (1: Chp 4)  
 (09/26) Lecture 9 Biological Control Strategies III (1: Chp 5)
- week 6 (09/30) *Lab: How are economic thresholds established?(Suhas Vyavhare)*  
 (10/01) Lecture 10 Safe Biological Control (**1: Chp 18**).  
 (10/03) Lecture 11 Insecticides (3: Chp 4)
- week 7 (10/07) *Lab: Lab IPM in the real world (Dr. Granovsky). Quiz 3.*  
 (10/08) Lecture 12 Insecticide Resistance and Eco-toxicology (3: Chp 4)  
**(10/10) Exam 2 (until Lecture 11. Including it) 60pt.**
- week 8. (10/14) *Lab: Microbial symbionts and their potential in IPM (Josephine Antwi). Lab report Due.*  
 (10/15) Lecture 13 The pesticide paradox in IPM. Risk-benefit analysis (**Text: Chp 8**)  
 (10/17) Lecture 14 Host-plant resistance (3: Chp 5)
- week 9 (10/21) *Lab: Graduate Student Presentations. Quiz 4.*  
 (10/22) Lecture 15 Genetically modified organisms: Challenges and Opportunities (**Text: Chp 6**)  
 (10/24) Lecture 16 Behavior modifying chemicals. Prospects and Constrains (Text: Chp 5)
- week 10 (10/28) *Lab: The transgenic crops controversy (Debate).*  
 (10/29) Lecture 17 Manipulation of host-finding and acceptance behaviors in insects (Text: Chp 9)  
**(10/31) Exam 3 (until Lecture 16. Including it)**
- week 11 (11/04) *Lab: Pest Risk Forecast. Quiz 5.*  
 (11/05) Lecture 18 Cultural and Interference Methods (Text: Chp 2)  
 (11/07) Lecture 19 Understanding species in an IPM context (6: Chp 6)

- week12 (11/11) *Lab: Groups prepare for their case study presentations*  
(11/12) Lecture 20 Microevolution and IPM Part 1 (*Huffbauer and Roderick 2005*)  
(11/14) Lecture 21 Microevolution and IPM Part 2 (*Huffbauer and Roderick 2005*)
- week 13 (11/18) *Lab: IPM case studies (student presentations). Quiz 6.*  
(11/19) Lecture 22 Manipulation of Tri-Trophic interactions for IPM (*Text: Chp 4*)  
(11/21) Lecture 23 Consumer response to IPM and the future of IPM (*Text: Chp 11*)
- week 14 (11/25) *Lab: Organic agriculture (in class movie).*  
(11/26) **Exam 4 (until Lecture 23. Including it).**  
(11/28) *Thanksgiving break*

## Bibliography and Suggested readings

### 1.Natural Enemies: An Introduction to Biological Control

by Ann E Hajek Cambridge University Press. Library Call Number: SB933.3.H37 2004.

### 2.Integrated Pest Management: Potential, Constraints and Challenges (Text)

edited by Opende Koul, G S Dhaliwal, G W Cuperus CABI Publishing. Library Call Number: SB950.I4577 2004.

### 3.Insect Pest Management

by David Dent - CABI Publishing. Library Call Number: SB931.D46 1991.

### 4.Introduction to Insect Pest Management

edited by Robert L. Metcalf, William H. Luckmann - Wiley-IEEE. Library Call Number: SB931. M48 1975

### 5.Insect Pest Management: Techniques for Environmental Protection

by Jack E Rechcigl, Nancy A Rechcigl CRC Press. Library Call Number: SB933.3.I53 2000

### 6.Insect Pest Management and Ecological Research

by Gimme H Walter - Cambridge University Press. Library Call Number: SB931.W25 2003

If this class has motivated you into knowing more about IPM, you should also read:

Larry P. Pedigo, Entomology and Pest Management.

Dr. Edward (Ted) Radcliffe. The IPM World Textbook. <http://ipmworld.umn.edu/ipmchap.htm>