**University of Guelph, School of Environmental Sciences ENVS\*2210 [0.50 credits]**

**Apiculture and Honey Bee Biology**

**Fall 2016**

# General Information

**Course Code:** ENVS\*2210

## Course Description:

The teaching approach is to combine lectures, field activities, and a written assignment. The course will be composed of 20 lectures, 2 field sessions, 1 review session, 2 midterms and 1 final exam. Students will be provided with outlines for most of the lectures, and will be given reading assignments. Exams will consist of multiple choice questions, short answer or essay questions and diagrams to label. If you feel that your mark on a midterm exam does not accurately graded you or does not reflect your understanding of the lectures covered, please see Dr. Guzman for corrections or options to improve your mark (eg. optional written paper). The following tips will help you succeed in this course: a) read the information assigned in advance of each lecture (from the textbook), b) attend all lectures and pay attention during lectures, c) do not hesitate to ask questions during or after lectures, d) participate in field sessions, e) comply with your written assignment according to topic and specific instructions (that will be provided to you), f) study for midterm and final exams.

**Class Schedule and Location:** LA 204; M,W,F; 9:30—10:20 AM

Field visits to the Honey Bee Research Centre and Townsend House: 308 Stone Road East

# Instructor Information

Instructor Name: Ernesto Guzman Instructor Email: eguzman@uoguelph.ca

Instructor Phone and Extension: 519-­‐824-­‐4120 Ext. 53609

Office location and office hours: By appointment through e-­‐mail or after lectures

# GTA Information

GTA Names: Hailey Ashbee (hashbee@mail.uoguelph.ca ) and Graham Ansell (gansell@mail.uoguelph.ca)

GTA office location and office hours: Contact Hailey or Graham by e-­‐mail

# Course Content

## Specific Learning Outcomes:

Students will learn:

1. The fundaments and scientific basis of beekeeping
2. Key biological principles using the honey bee as a model organism
3. The importance of honey bees as beneficial insects involved in food production and in ecosystem sustainability
4. Management practices involved in keeping honey bees healthy and productive
5. To search, interpret, discuss and communicate in writing aspects of scientific literature relating to honey bee biology

## Lecture Content:

**Approximate Schedule of Lectures:**

**Lecture Dates Topics Readings: pages in textbook**

|  |  |  |
| --- | --- | --- |
| **Week 1** |  |  |
| *Lectures:* | Introduction to the course |
|  | Why study honey bees? | 9-­‐11, 16-­‐19 |
| **Week 2** |  |  |
| *Lectures:* | Origin and classification of honey bees | 21-­‐25 |
|  | History of beekeeping | 11-­‐17 |
|  | From egg to adult bee | 54-­‐57 |
|  | Functional honey bee morphology | 61-­‐73 |
| **Week 3** |  |  |
| *Lectures:* | Life in the hive (colony cycle) | 57-­‐59 |
|  | Division of labour inside the hive | 49-­‐53 |
|  | Foraging behaviour | 133-­‐145 |
|  | The dance language | 87-­‐97 |
| **Week 4** |  |  |
| *Lectures:* | Swarming and nest finding | 119-­‐126 |
|  | Honey bee lab visit 1 (Sept 28) |  |
|  | Honey bee lab visit 1 (Sept 30) |  |
|  | Mating behaviour | 115-­‐117, 127-­‐131 |
| **Week 5** |  |  |
| *Lectures:* | Species and races of honey bees | 25-­‐31, 34-­‐35 |
|  | Genes, sex determination, and consequences | Refs provided |
|  | Midterm Exam 1 (Oct 7) |  |
| **Week 6** |  |  |
| *Lectures:* | Africanized bees 1 | 31-­‐34 |
|  | Africanized bees 2 | Article provided |

|  |  |
| --- | --- |
| **Week 7** |  |
| *Lectures:* | Getting started in beekeeping | 159-­‐161 |
|  | Beekeeping equipment | 82-­‐85, 161-­‐165 |
|  | Establishing an apiary | 165-­‐176 |
| **Week 8** |  |  |
| *Lectures:* | The basics of management | 177-­‐183, 189-­‐196 |
|  | Seasonal management 1 | 205-­‐236 |
|  | Commercial beekeeping | No outline provided |
| **Week 9** |  |  |
| *Lectures:* | Honey: from the flowers to the table | 237-­‐260 |
|  | Other hive products | 260-­‐266 |
|  | Queen honey bees and queen rearing | 271-­‐284 |
| **Week 10** |  |  |
| *Lectures:* | Pollination of crops | 289-­‐307 |
|  | Honey bee diseases 1 | 331-­‐345 |
|  | Midterm Exam 2 (Nov 11) |  |
| **Week 11** |  |  |
| *Lectures:* | Honey bee diseases 2 | 309-­‐320 |
|  | Honey bee diseases 3 | 322-­‐325 |
| **Week 12** |  |  |
| *Lectures:* | Honey bee pests | 345-­‐352 |
|  | Honey bees and pesticides | 352-­‐356 |
|  | Venom and allergies | 184-­‐189 |
| **Week 13** |  |  |
| *Lectures:* | Bees into the future | No outline provided |
|  | Review session (Dec 2) |  |

**Labs:** No labs, but two visits to the Honey Bee Research Centre are required (scheduled above) **Course Assignments and Tests:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assignment or Test** | **Due Date** | **Contribution to Final Mark (%)** | **Learning Outcomes Assessed** |
| Midterm exam 1 | Oct 7 | 25 | 1 -­‐ 3 |
| Midterm exam 2 | Nov 11 | 25 | 1 -­‐ 4 |
| Written assignment | Oct 31 | 10 | 5 |
| Visits to HBRC | Sept 28, 30 | 5 | 1, 4 |
| Final exam | Dec 14 | 35 | 1 -­‐ 5 |

**Written Assignment:** This is an individual assignment. The format should be: 2 pages double-­‐ spaced excluding title page and references. No figures allowed. 12 pt. font, 1" margins on all sides, page number in top centre of page. October 31 is the last day to hand in the hard copy of the assignment.

**Final examination date and time:** December 14, 2016, 7:00-­‐9:00 PM, Room TBA

# Course Resources

**Required Textbook:** Dewey M. Caron. Honey Bee Biology and Beekeeping (2013 edition) **Textbook on reserve:** Two copies available on library reserve

# Course Policies

## Grading Policies:

Late assignments will be penalized 20% of the final mark for each day of delay in handing them to the instructor

## Course Policy on Group Work:

Group work is not allowed; all assignments must be completed individually

## Course Policy regarding use of electronic devices and recording of lectures:

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the written permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

# University Policies

## Academic Consideration:

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.

## Academic Misconduct:

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Detailed information regarding the Academic Misconduct policy is available in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.

## Accessibility:

The University of Guelph is committed to creating a barrier-­‐free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-­‐term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-­‐824-­‐4120 ext. 56208 or email sas@uoguelph.ca or visit the Student Accessibility Services website ([http://www.uoguelph.ca/csd/).](http://www.uoguelph.ca/csd/%29)

## Course Evaluation Information:

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the Course and Instructor Evaluation Website for more information.

## Drop period:

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in Section III (Schedule of Dates) of the Undergraduate Calendar.

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar.

# Additional Course Information

## About the Instructor:

Dr. Ernesto Guzman is a Professor and Director of the Honey Bee Research Centre in the School of Environmental Sciences at the University of Guelph since 2004. Dr. Guzman was born and raised in Mexico, where he started to keep bees in 1978. He got a DVM degree in 1982 and obtained M.Sc. and Ph.D. degrees in Entomology from the University of California at Davis in 1989 and 1992, respectively. Before accepting a position at the University of Guelph, he had worked for several institutions, including the University of California, Purdue University, the Mexican Ministry of Agriculture, and the National University of Mexico. Dr. Guzman has ample academic and research experience. He has taught courses in Apiculture and Genetics and has conducted multiple research projects. During the course of his career he has graduated more than 50 D.V.M., M.Sc. and Ph.D. students. His research has focused on the genetics, behaviour, and parasitic mites of honey bees. His studies have contributed to the understanding of foraging behaviour, defensive behaviour, and the mechanisms that confer resistance to honey bees against parasitic mites, which is a critical area that addresses the most serious problem beekeepers face worldwide. Dr. Guzman also developed selective breeding methodologies with which three strains of bees were developed. Ernesto Guzman is author and co-­‐author of more than 300 publications, including scientific and trade journal articles, as well as books, book chapters and summaries in conference proceedings. Dr. Guzman has received numerous honors and awards.