1 Course Details

1.1 Calendar Description

This course is designed to acquaint the student with the broad field of beekeeping. It will include honey bee biology and behaviour, management for honey production, products of the hive, pests and enemies and the value of bees as pollinators of agricultural crops.

Equates: ENVB*2210

1.2 Course Description

This course is designed to acquaint the student with the broad field of beekeeping. It will include honey bee biology and behaviour, management for honey production, products of the hive, pests and enemies and the value of bees as pollinators of agricultural crops.

1.3 Timetable

Class Schedule and Location: LA 204; M,W,F; 12:30—13:20 PM

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

Timetable is subject to change. Please see WebAdvisor for the latest information

1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.
2 Instructional Support

2.1 Instructional Support Team

Instructor: Ernesto Guzman
Email: eguzman@uoguelph.ca
Telephone: +1-519-824-4120 x53609
Office: 3240 Bovey
Office Hours: By appointment.

2.2 Teaching Assistants

Teaching Assistant: Ayesha Jabeen
Email: jabeena@uoguelph.ca
Office Hours: By appointment

Teaching Assistant: Emily Agar
Email: agare@uoguelph.ca
Office Hours: By appointment

3 Learning Resources

3.1 Required Resources

Honey Bee Biology and Beekeeping (Textbook)
Honey Bee Biology and Beekeeping by Dewey M. Caron, 2013 edition. Do not buy the earlier edition, Available in bookstores on campus. Two copies are on library reserve.

3.2 Additional Resources

Other Resources (Notes)
Word outlines related to lectures will be posted to CourseLink. Links to videos will be posted to CourseLink. CourseLink will be used to post notices about the course, reminders of deadlines, updates about our visit to the Honey Bee Research Centre, and additional information related to course content. Please get in the habit of checking CourseLink every few days, preferably before each lecture.

Lab Manual (Lab Manual)
No lab manual required.

Additional costs (Other)
No additional costs.

3.3 Field Trips
Two visits to the Honey Bee Research Centre (HBRC) on Stone Road East (between East Ring Road and Victoria Road) will replace lectures on Wednesday, 18 and Wednesday 25 of September.

Students can bike or walk to the HBRC for one of three sessions throughout the morning, starting at 11:30 AM, 12:15 PM, and 13:00 PM. Driving to the HBRC is discouraged because parking space is limited, but it is possible for those who must do so. There is no cost associated with the visit. Honey from the university’s bee hives will be available for purchase on the day of the trip. Detailed guidelines, directions and costs of honey will be provided in class and on Courselink prior to the field trip.

During your visit you will be able to visualize the organization of a bee colony through the examination of 1-2 bee hives. Within the hives you will see the cells and adults of all three castes of bees (note: sometimes queen bees are difficult to find during a short inspection). You will see honey bee brood (eggs, larvae, and pupae), pollen, nectar, and honey, and their organization within the hive.

The bees are generally not defensive, but for those who wish to feel more secure, bee veils will be available to protect your head and face. You should wear appropriate shoes for uneven lawn surfaces and non-fuzzy clothes (smooth cotton, nylon, etc.). Avoid perfumes that day.

4 Learning Outcomes

Specific Learning Outcomes (and associated activities):

4.1 Course Learning Outcomes

By the end of this course, you should be able to:
1. Discover relationships between honeybees and humans, other animals, plants, pests and diseases, and their environment. (Attending lectures; participating during class; observing bees foraging on flowers; visiting the honeybee lab, synthesizing info for exams.)
2. Employ the Web of Science to search for references (Web of Science assignment)
3. Demonstrate the ability to critically evaluate information from scientific journal articles and other sources (Web of Science assignment and short paper.)
4. Effectively communicate ideas and information related to bees in written formats.
(Demonstrated on exams and written paper.)

## 5 Teaching and Learning Activities

Specific topics (in approximate sequential order) and required readings from textbook:

<table>
<thead>
<tr>
<th>Lecture Dates</th>
<th>Topics</th>
<th>Readings: pages in</th>
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<tbody>
<tr>
<td><strong>Week 1</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Lectures:</strong></td>
<td>Introduction to the course</td>
<td></td>
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<tr>
<td></td>
<td>Why study honey bees?</td>
<td>9-11, 16-19</td>
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<td><strong>Week 2</strong></td>
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<td></td>
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<tr>
<td><strong>Lectures:</strong></td>
<td>Origin and classification of honey bees</td>
<td>21-25</td>
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<tr>
<td></td>
<td>History of beekeeping</td>
<td>11-17</td>
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<tr>
<td></td>
<td>From egg to adult bee</td>
<td>54-57</td>
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<tr>
<td></td>
<td>Functional honey bee morphology</td>
<td>61-73</td>
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<tr>
<td><strong>Week 3</strong></td>
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</tbody>
</table>
Lectures: Life in the hive (colony cycle) 57-59

Honey bee lab visit 1 (Sept 18)

Division of labour inside the hive 49-53

Week 4

Lectures: Foraging behaviour 133-

The dance language 87-97

Swarming and nest finding 119-126

Honey bee lab visit 2 (Sept 25)

Mating behaviour 115-117, 127-131

Week 5

Lectures: Species and races of honey bees 25-31,

Genes, sex determination, and consequences Refs
Week 6

Lectures: Africanized bees 1 31-34

provided

Africanized bees 2 Article

Midterm Exam 1 (Oct 11)

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
Week 9

Lectures: Honey: from the flowers to the table
260

Lectures: Other hive products
266

Lectures: Queen honey bees and queen rearing
284

Week 10

Lectures: Pollination of crops
307

Lectures: Honey bee diseases 1
331-345

Week 11

Lectures: Midterm Exam 2 (Nov 11)
Honey bee diseases 2
309-320

Honey bee diseases 3
322-325

Week 12

Lectures: Honey bee pests
352

Honey bees and pesticides
356

Venom and allergies
184-189

Week 13

Lectures: Bees into the future
No

outline provided

Review session

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

5.1 Seminar

None
Topics: No seminars.

5.2 Lab
Sept 26 and 28th

Topics: None except the visits to the Honey Bee Research Centre, September 18th and 25th.

5.3 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 60 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.

6 Assessments

6.1 Marking Schemes & Distributions

<table>
<thead>
<tr>
<th>Name</th>
<th>Scheme A (%)</th>
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<tbody>
<tr>
<td>Midterm Exam - 1</td>
<td>25</td>
</tr>
<tr>
<td>Name</td>
<td>Scheme A (%)</td>
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<tr>
<td>-------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Midterm Exam - 2</td>
<td>25</td>
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<tr>
<td>Written Assignment</td>
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<td>Visits to the HBRC</td>
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<td>Final Exam</td>
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<tr>
<td>Total</td>
<td>100</td>
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6.2 Assessment Details

Web of Science Written Assignment (10%)
Date: , Nov 1st
Due by 1st of November (Friday, in class, printed-out paper copy). Students will receive specific instructions for this assignment

Midterm Exam 1 (25%)
Date: 11 October

Midterm - 2 (25%)
Date: 11 November

Final Exam (35%)
Date: December 10, location TBA

6.3 Additional Notes

- Read this course outline!
- The final exam covers material from all of the semester

7 Course Statements

7.1 Grading Policies

The dates of the midterm exams and final exam are fixed. Accommodations for an alternative exam will be considered for personal health or compassionate reasons, with appropriate supporting documentation.

The Web of Science assignment is due as a hard copy (printout on paper) during class or to my office before 4:30 PM, the due date.
Late submissions of all assignments will incur a 5% penalty for each day (Saturday and Sunday included) after the due date. If you do not normally work in Word, please plan ahead to be able to submit your work in an appropriate format at the library or by other means before the deadline. **Pdf files will not be accepted.**

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

During class, students are to be engaged in learning activities, not texting or interfacing with the internet (i.e., shopping on-line, watching non-relevant videos, etc.). Cell phones are to be turned off during class. Any student using their cell phone during lecture will have it taken by the instructor and returned at the end of class. Laptop computers may be used during class to take notes and view course-related material (unless instructed otherwise by the instructor).

Electronic recording of classes is expressly forbidden without consent of the instructor. When recording of lectures is permitted, they are solely for the use of the authorized student and may not be reproduced or transmitted to others without the express written consent of the instructor.

7.3 Course Policy on Group Work

Not relevant to this course.

7.4 Additional comments from the instructor

One of the situations in which you could inadvertently commit academic misconduct is in writing the short paper. If you “borrow” (i.e., “take”) an idea from someone else, you must paraphrase it (restate it in your own words) and cite the source of your information (i.e., author[s], year of publication). In contrast, if you include the exact wording from a source (which is only encouraged when the original wording is so good you feel you need to quote them exactly as they appear in the source material) those words must be placed within “quotation marks” and the source must be indicated (author, year, and page number).

In fairness to you and to other students, academic misconduct will not be tolerated and will be dealt with firmly.

8 University Statements

8.1 Email Communication
As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-regchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.
Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
https://www.uoguelph.ca/sas

8.6 Academic Integrity

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 encourages academic integrity. 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.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

8.7 Recording of Materials

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

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph’s procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars