# Undergraduate Course Outline

# Apiculture and Honey Bee Biology (ENVS\*2210), Fall 2017

## General Information

Course Code: **ENVS\*2210**

Course Title: **Apiculture and Honey Bee Biology**

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.

Credit Weight:0.50 credit

Academic Department:School of Environmental Sciences

Campus:Guelph

Semester Offering:Fall 2017

Class Schedule and Location: 9:30-10:20 AM, Mon/Wed/Friday; MacNaughton (MACN) 113

(Opposite the campus bookstore)

## Instructor Information

Instructor Name: Dr. Gard W. Otis

Instructor Email: gotis@uoguelph.ca

Instructor Phone and Extension: 519-824-4120 x52478

Office location: Rm. 2242, E.C. Bovey Bldg. (“ECB”)

Office hours: Tuesday 9:30-12:00; Wednesday 10:30-1200

(Other times by appointment, please)

## GTA Information

GTA Names: Alyssa Gingras and Graham Ansell

GTA Email: agingras@uoguelph.ca; gansell@uoguelph.ca

GTA office location and office hours: To be determined

## Course Content

### Specific Learning Outcomes (and associated activities):

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. Understand how scientists “ask bees questions” in research (i.e., how are hypotheses formulated?). (This will achieved through questions that lectures are based around, through the readings from “Honeybee Democracy”, and by framing the short paper around a question.)
6. Understand current issues surrounding honey bees in the broad sense, including colony collapse disorder, risks posed by Africanized honey bees, illegal trade of honey, and effects of pesticides on bees.
7. Gain experience in observing nature (assignment to observe bees foraging on flowers).

### Lecture Content:

* Individuals vs. groups—life cycles of workers, drones, and queen (including mating) as well as the colony (through colony swarming, supersedure, and queenlessness)
* Honeybee foraging
* Form (morphology) and function (physiology)
* Sex and caste determination: Female vs. male (genetics), queens vs. workers (nutrition)
* Division of labour
* Honey bee species (what is a “species?”) and races (special aspects of Africanized and Cape honeybees)
* Foraging and recruitment of nestmates to food with a complex “dance language”
* Group decisions: special case of decision-making by honeybee swarms
* History of the relationship between humans and honeybees; history of beekeeping
* Fundamentals of beekeeping- basic hive management
* Commercial queen rearing and large-scale commercial beekeeping
* Hive products—honey, beeswax, pollen, propolis, and royal jelly
* Bee venom and hyperallergic reactions to stings; bee venom therapy
* Principles of bee disease; parasitic mites; colony collapse disorder
* Pesticides and bees, and the controversy surrounding neonicitinoid pesticides
* Role of bees in crop pollination; fundamentals of crop pollination
* Role of beekeeping in international development
* Honeybees as depicted in the movies—how are bees managed by film crews?

Labs: None except the visit to the Honey Bee Research Centre, September 18th or 20th.

Seminars: None

### Course Assignments and Tests:

| **Assignment or Test** | **Due Date** | **Contribution to Final Mark (%)** | **Learning Outcomes Assessed** |
| --- | --- | --- | --- |
| Quiz on course outline | Friday, 15 Sept., in class | 5% | --- |
| Bee Observation Assignment | 28 September (Thursday, 11:59 PM, submitted through Courselink Dropbox) | 10% | 1, 7 |
| Web of Science Exercise | 4 October (Wednesday, in class, printed-out paper copy) | 10% | 2, 3 |
| Midterm Exam | 20 October (Friday) | 25% | 1, 4, 5, 6 |
| Written Essay | 12 November (Sunday, 11:59 PM; submitted through Courselink) | 25% | 1, 2, 3, 4, 5 |

Additional Notes:

* **Read this course outline!** There will be a quiz on the contents on the last day of the add-period, Friday 18 September.
* The midterm exam covers material up to and including Monday, 16 October.
* The final exam covers material from 18 October to the end of the semester, plus other review and synthesis questions (to be specified in class).

Final examination date and time: To be determined.

Final exam weighting: 25%

\*Final Examination regulations are detailed at: [Examination Regulations](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-exam.shtml)

## Course Resources

Required Texts: “**Honeybee Democracy**”, by Thomas D. Seeley (~$30 in hardcover, Kindle edition ~$23); available in bookstores on campus. One copy is on library reserve.

Recommended Texts: “**Fruitless Fall: The Collapse of the Honey Bee and the Coming Agricultural Crisis**”, by Rowan Jacobsen. Two copies on reserve for general interest.

Lab Manual: None

### Other Resources:

### Word outlines and Powerpoint files related to lectures will be posted to CourseLink, generally in the afternoon or evening preceding each class. Links to videos shown in class will be posted to CourseLink after lectures. CourseLink will be used to post notices about the course, questions to consider before attending lectures, reminders of deadlines, updates about our visit to the bee lab, and additional information related to course content. Please get in the habit of checking CourseLink every few days, preferably before each lecture.

### Field Trips:

A visit the Honey Bee Research Centre on Stone Road East (between East Ring Road and Victoria Road) will replace lecture on Monday, 18 September (with a rain date of Wednesday, 20 September). On whichever day we hold the “bee lab tour”, there will be no lecture.

Students can bike or walk to the bee lab for one of four sessions throughout the day, starting at 9:30 AM, 11:30 AM, 1:30 PM, and 3:30 PM. Driving to the “bee lab” 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.

Your visit will be divided between indoor and outdoor experiences. Indoors, U of G apiary manager Paul Kelley or one of his assistants will guide you through the process of extracting honey from combs. Outdoors, Dr. Otis will help you 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.

Additional Costs: None

## Course Policies

### Grading Policies:

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

The “Bee Observation Assignment” is to be submitted through the CourseLink drop-box **as a Word file** no later than 11:59 PM on Thursday, 28 September.

The Web of Science assignment is due as a **hard copy (printout on paper)** during class or to my office before 4:30 PM, Wednesday, 4 October.

The Written Essay is to be submitted through CourseLink **as a Word file** no later than 11:59 PM on Sunday, 15 November.

Late submissions of all assignments will incur a 2% 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.

Course Policy on Group Work: Not relevant to this course.

### 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. Cell phones of repeat offenders will be kept by the instructor until the end of the day. 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.

### Use of “Turnitin”

In this course, your instructor may use Turnitin, a program that is integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration, or copying. This is a component of the ongoing efforts to maintain academic integrity at the University of Guelph.

All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you may have improperly referenced the outside sources and materials in your assignments.

## University Policies

E-mail Communication:

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

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 in writing, with your name, id#, and e-mail contact.

### 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. Students who find themselves in a difficult personal situation should meet with their professor, academic advisor, and/or program counsellor, and should consider applying for 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](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml).

### 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](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml).

Additional comments from Dr. Otis:

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 must use it verbatim), those words must be placed within “quotation marks” and the source must be indicated (author, year, and page number).

Most information that you obtain from other sources must be referenced. Failure to provide a source suggests that the facts and opinions you have used are your own; if they are not your own, then that constitutes plagiarism. Copying words exactly, even just a few phrases (which is very easy to do from digital journal articles and websites), without using quotation marks is a form of plagiarism. The exception is very basic information that is assumed to be common knowledge. For example, for this sentence, “Honeybees have six legs, two pairs of wings, and long mouthparts used to obtain nectar from flowers”, no reference would be needed as this information is so basic as to fall within the realm of general knowledge.

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

### 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/).

### 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](https://courseeval.uoguelph.ca/) **for more information.**

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.

### 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](https://www.uoguelph.ca/registrar/calendars/). During the Fall 2017 semester, this date is Friday, 3 November.

Information about Dropping Courses can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml).

## Additional Course Information

From Professor Gard Otis:

In 1975 my advisor in grad school received a grant and convinced me that I should switch from studying butterflies to African “killer bees” that has been introduced to South America. After a year and a half of researching honeybee swarming biology in French Guiana, finishing my PhD degree, and a year studying comparative mating biology of African and European honey bees in Venezuela, I joined the University of Guelph. That was 35 years ago, in 1982.

As a professor, I have been involved in both basic research (ecology, behaviour, diversity, and speciation of honeybees) and applied research (benefits of feeding pollen to colonies in spring and fall; management of parasitic mites through chemical treatments; and selective breeding). I have also led beekeeping development projects in Panama, Costa Rica, Indonesia, and Vietnam. Through my work with bees I have travelled to all 10 Canadian provinces, 18 states of the USA, and 27 different countries; become friends with wonderful people all over the world; worked with amazing students who have gone on to interesting careers that involve bees and other insects; had my eyes swollen shut for several days from bee stings; been featured in *Rolling Stone* magazine; gotten sick with amoebic dysentery—twice!; driven some of the roughest roads imaginable; eaten foods memorable for being both wonderful (amazing fruits in Asia, such as mangosteens and dukus) and bizarre (e.g., a tie for the worst: fresh goat’s blood with peanuts in Vietnam and fruit bats stewed in hot chilis in Indonesia). Honeybees have helped me to see the world around me more clearly as I have sought ways to understand them and the problems they face more clearly.

Do I like bees? Emphatically **YES**! **I love them**!

I hope you enjoy my course, and that you too will find a place in your heart for honeybees.

Gard Otis