

**ENY 6934**  
**Apiculture I**  
**Summer 2020**  
**3 credits**

\*This course is co-taught with ENY 4573 Beekeeping I.

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**Special Note on Contact via Email:** Due to UF privacy laws, you must use your GatorLink account or the Canvas mail system when emailing the Instructor or TA. Emails sent from other accounts (gmail, hotmail, etc.) will not be answered by the Instructor or TA.

**Office Hours:** By appointment.

**Course Description:** The biology of honey bees and the craft of apiculture will be examined by exploring the life cycle of honey bees, biogeography and evolution of beekeeping. Equipment, techniques, management practices, pollination ecology, economic practices and current issues within beekeeping will be discussed.

**Course Learning Objectives:**

1. Identify the different members of a honey bee colony and discuss their different roles within the honey bee nest.
2. Summarize the innovations through history that have shaped our modern beekeeping practices.
3. Recognize the essential pieces of equipment in beekeeping and explain their uses.
4. Discuss the basic management practices used throughout the year and relate how these practices achieve the goals of the beekeeper.
5. Compare honey bees to other pollinators and summarize their economic importance.
6. Identify the valuable and dangerous honey plants of Florida.
7. Discuss the impacts of common stressors to honey bee colonies and describe how to manage them.
8. Communicate the importance of bees or beekeeping best management practices to a non-technical audience.

**Required Readings:**

1. Textbook: Caron, D.W. 2013 (revised from 1999). Honey Bee Biology and Beekeeping. Wicwas Press. Cheshire, CT, 368 pp.
2. American Bee Journal articles written by Dr. Jamie Ellis which are appropriate for the content of this course.

3. Kaspar, R., C. Cook, and M. D. Breed. 2018. *Animal Behaviour* 142: 69-76.
4. Melicher, D. et al. 2019. Long-Distance Transportation Causes Temperature Stress in the Honey Bee, *Apis mellifera* (Hymenoptera: Apidae). *Environmental Entomology* 48: 691–701.
5. Hendriksma, H. P., A. L. Toth, and S. Shafir. 2019. Individual and Colony Level Foraging Decisions of Bumble Bees and Honey Bees in Relation to Balancing of Nutrient Needs. *Frontiers in Ecology and Evolution* 7: 177.
6. Steinhauer, N. et al. 2018. Drivers of Colony Loss. *Current Opinion in Insect Science* 26: 142-148.

**Lectures:** This is a fully online, Canvas-based course. The website for the syllabus, all lectures, reading materials, announcements, tests, etc. will be posted on eLearning: <http://lss.at.ufl.edu>. All lectures for this course are narrated presentations and will include videos and supplemental readings. We will provide text from all the narrated presentations, but you should pay close attention, as knowing and understanding the spoken information is critical for success in this course. All lectures and tests will be delivered online in Canvas.

Please note that all video clips and photographs are copyrighted and are NOT to be used outside of this class and may be used only this semester. Please do not copy or distribute these photographs or video clips. All class notes are provided for educational use only.

**Course Notifications and Communication:** All course communications (assignments, announcements, test information, etc.) will be made via the Announcements in Canvas. Please ensure that your Canvas profile is set to receive notifications (i.e. please check the appropriate box to receive all notifications). To do this, click on your name in the upper right corner of the Canvas homepage after logging into Canvas. Next, click “notifications” on the left. This will take you to the Notification Preferences page. Then, click the check symbol for at least the following notifications: Due Date, Course Content, Announcement, and Grading.

Students are encouraged to post general questions on topics taught in the class under the General Questions thread. The instructor and/or the TAs will respond to the questions. Other students are also encouraged to respond to the questions. Private questions should be sent to the TAs via e-mail.

**Course Schedule:** This course is offered via Canvas as a distance education course. To stay on track, students must adhere to the course schedule.

Module	Video Content	Required Readings	Module Assessments	Critical Thinking Exercises	Beekeeping Experience Report	Extension Project
Getting Started	Syllabus, course orientation, tips for success	Course syllabus; Tips for success	Syllabus quiz May 15 <sup>th</sup>	Critical Thinking Exercise 1 May 29 <sup>th</sup>		
Bees and Beekeeping	Why keep honey bees?	Textbook: p. 9-15; 22-25. ABJ: Members of a colony; Honey bee stings.	Bees and Beekeeping quiz May 22 <sup>nd</sup>			Project Topic May 22 <sup>nd</sup>
	Educational resources for beekeepers					
	Naming the bee					
	What to do about honey bee stings?					
	Differentiating bees and wasps					
Common bee groups						
Honey Bee Biology	Adult members of a honey bee colony	Textbook: p. 49-57; 61-73. ABJ: Honey bee biology; Worker tasks; Swarms. Kaspar et al. 2018	Honey Bee Biology quiz May 29 <sup>th</sup>	Critical Thinking Exercise 1 May 29 <sup>th</sup>		
	Immature members of honey bee colony					
	Components of a honey bee nest					
	Life Cycle of a honey bee colony					
	Tasks of honey bee workers					
	Honey bee dance language					
Honey bee thermoregulation						
Evolution of beekeeping	Ancient honey bee/human interactions	Textbook: p. 13-19. ABJ: Langstroth Hive; Time commitment of beekeeping.	Evolution of Beekeeping quiz June 5 <sup>th</sup>			
	The evolution of beekeeping					
	The golden age of beekeeping					
	Beekeeping today					
	Making money with beekeeping					
Beekeeping equipment	The parts of a Langstroth hive	Textbook: p. 159-165. ABJ: Hive tool and smoker; Protective equipment.	Equipment quiz June 12 <sup>th</sup>	Critical Thinking Exercise 2 June 12 <sup>th</sup>		
	Frames and foundation					
	Three essential beekeeping tools					
	Other beekeeping equipment					
	Assembling hive equipment					
Getting Started with Beekeeping	Hive choice and configuration	Textbook: p. 177-195. ABJ: Choosing an apiary site; Beekeeping goals.	Getting Started in Beekeeping quiz June 19 <sup>th</sup>		Beekeeping Report Due June 19 <sup>th</sup>	Project 1 <sup>st</sup> Submission June 19 <sup>th</sup>
	Starting a new honey bee colony					
	Monetary and time requirements of beekeeping					
	Rules and regulations for keeping honey bees					
	Your bees and other people					
	Qualities of a good apiary location					

Beekeeping Basics	Characteristics of a healthy colony	Textbook: p. 115-126; 232-235. ABJ: Inspecting new colonies; Installing packages and nucs. Melicher et al. 2019	Beekeeping Basics quiz July 10 <sup>th</sup>	Critical Thinking Exercise 3 July 10 <sup>th</sup>	Peer Reviews of Beekeeping Report July 10 <sup>th</sup>	Peer Evaluations July 10 <sup>th</sup>
	How to light a smoker					
	Proper colony inspection techniques					
	Installing packages and nucs					
	Marking and clipping queens					
	Requeening					
	Basic swarm management techniques					
	Making splits					
	Feeding bees					
	Moving bees					
Pollination	Flower anatomy, pollen, and nectar	Textbook: 289-305. ABJ: Making money with bees.	Pollination quiz July 17 <sup>th</sup>			
	Pollination Ecology					
	Who are the pollinators?					
	Bees as super pollinators					
	Pollination with honey bees					
Production and Selling of Honey	How bees make honey	Textbook: 237-252. ABJ: Honey extraction and bottling equipment. Hendriksma et al. 2019	Honey Production and Selling quiz July 24 <sup>th</sup>	Critical Thinking Exercise 4 July 24 <sup>th</sup>		
	Optimum Foraging Theory					
	Managing for honey production					
	Monofloral honey					
	Wildflower honey					
	Bad/good honey plants					
	Harvesting honey					
	Honey house rules					
	Honey processing/handling equipment					
	Extracting honey					
	Bottling honey					
	Other honey products					
Labeling and selling honey						
Colony Stressors and Yearly Management	Major arthropod pests of honey bee colonies	Textbook: 205-221; 223-230. ABJ: Biotic stressors; Other stressors. Steinhauer et al. 2018	Colony Stressors and Yearly Management quiz July 31 <sup>st</sup>	Critical Thinking Exercise 5 July 31 <sup>st</sup>		Final Submission July 31 <sup>st</sup>
	Minor arthropod & other pests of honey bee colonies					
	Pathogen stressors of honey bee colonies					
	Other stressors of honey bee colonies					
	Principle stressors of honey bee colonies					
	Spring and summer management					
	Fall and winter management					

**Evaluation:** The course grade is based on total points earned out of 600 possible points.

Module assessments	25 points each × 9 assessments	225 points
Section critical thinking exercises	45 points each × 5 exercises	225 points
Submission of your peer evaluations of two of your peers' beekeeping reports	10 points × 2 peer reviews 5 additional points if you offer good reviews	25 points
Peer evaluation of your beekeeping report (two of your peers' evaluations of your report)	25 points × 3 peer reviews	75 points
Extension project	100 points	100 points
	<b>Total Course Points</b>	<b>650 points</b>

### Grades and Grade Points

For information on current UF policies for assigning grade points, see [catalog.ufl.edu/UGRD/academic-regulations/grades-gradingpolicies/](http://catalog.ufl.edu/UGRD/academic-regulations/grades-gradingpolicies/).

FINAL GRADING		
% grade	Letter grade	Points needed to achieve letter grade
100-93	A	≥ 605
90-92	A-	585 – 604
87-89	B+	566 – 584
83-86	B	540 – 565
80-82	B-	520 – 539
77-79	C+	501 – 519
73-76	C	475 – 500
70-72	C-	455 – 474
67-69	D+	436 – 454
63-66	D	410 – 435
60-62	D-	390 – 409
0-59	E	0 – 389

### Assignments:

**(1) Module Assessments:** There is a 25-point assessment associated with each of the ten modules in this course. These assessments are *open note* (i.e. you are allowed to use class lectures, books, websites, etc. while taking the assessments). The assessments will be composed of true/false and multiple choice questions. **The assessments 1) open the Saturday morning after the previous section ends, 2) are timed (60 minutes each), and 3) are due at 11:59 pm on the date listed in the course schedule.** These are individual assessments so please do your own work and do not work in groups or share your answers. There is a large bank of test questions for each assessment and the assessment questions are selected randomly for each student. You will receive a 5-point deduction for each day a module assessment is late.

The first module assessment is a graded syllabus quiz on the “Getting Started” module. You need to read the syllabus and answer quiz questions related to it by **11:59 pm ET on the date listed in**

**the course schedule.** You must complete the syllabus quiz before you are able to advance to the next module. This quiz will show you how your online assessments will be formatted as well as allow you to demonstrate that you understand how this course works and important due dates.

**(2) Critical Thinking Exercises:** The 10 modules are arranged into five sections. There is a critical thinking exercise associated with each section. The exercises are designed to encourage you to think critically about the content presented in the module lectures. The critical thinking exercises are worth 45 points each. There are separate exercises designed for graduate students incorporating additional questions from the scientific journal articles assigned to that section. These are individual exercises so please do your own work and do not work in groups or share your answers. All of the critical thinking exercises are open note and untimed. You can close and reopen the exercise as many times as you would like until the due date (see course schedule), but you will not be able to make any changes once you have officially submitted your final exercise. **The exercises will be available only during the section open period (see course schedule), are due at 11:59 pm on the date listed in the course schedule.** You will receive a 5 deduction for each day a module assessment is late.

**(3) Beekeeping Report:** Historically, the beekeeping report was always preceded by some hands-on activity with honey bees. Usually this beekeeping experience was achieved by attending the Beekeeping Field Day (a half-day event at the UF Honey Bee Lab), shadowing a beekeeper or attending at least three UF Honey Bee Club meetings. Unfortunately, due to the current situation with the COVID-19 pandemic, none of these options are safe to do while still practicing social distancing. Thus, this semester the beekeeping experience will need to be obtained virtually. I will provide a series of beekeeping videos that I will ask you to watch, but you will also need to seek out two additional beekeeping videos on your own.

These two videos of your own selection will be quite important. There is a lot of misinformation available on the internet and I want you to be able to tell the difference between good and bad information. I want the first video you choose to be what you deem a “bad example”. This video should present a particular beekeeping practice or honey bee biology concept that is incorrect. The second video should be your “good example” and will teach a beekeeping skill or concept correctly. You will need to be able to describe the difference.

One of the most useful skills in any profession is writing. As such, you are expected to produce a written report based on the videos you’ve watched. Your report should be well-written and thoughtfully consider the messages in the videos. From the videos that I provide, describe what you’ve learned, what you found interesting, ask questions that may have arisen, and think about how this information might relate to you if you are now or will ever keep bees in the future. From the “bad example” video that you chose, identify the critical flaw, misinformation and/or misrepresentation of the “bad example” and tell us what the correct message should have been. From the “good example” video, describe what you learned and why the message, skill or teaching is important for beekeepers.

**Your report must include:**

- Name

- Title
- Photos or figures (it's OK to take something from online, just make sure you cite it properly. Choose a citation style, just be consistent.)
- Introductory and concluding paragraphs
- Links to your two videos
- Subheadings to differentiate between videos
- Page numbers
- 12-point, professional font
- Double spaced
- 4-5 pages long (including pictures and/or figures)

A grading rubric will be provided to facilitate development and peer review of the beekeeping report. **Five points will be deducted from reports every day past the due date (see the course schedule) that the report is submitted.** Please do not wait until the last minute to produce your report.

The beekeeping report grade (up to 75 pts) is composed of two components.

1) 25 points for submitting your peer evaluations of two other students' reports (10 points per report) – After submission of all students' beekeeping reports, you will be randomly assigned two other students' beekeeping reports to peer evaluate using the rubric at the end of this syllabus. You will be awarded 0, 10, and 25 points for submitting zero, one or two peer reviews respectively. Your evaluations of two of your peer's reports are due by the date listed in the course schedule.

2) 50 points from the Instructor or TA's reviews of your beekeeping report – The two peer reviews offered by the two students in the class based on the beekeeping report rubric will help serve as a reviewing guide. The Instructor or TA will also read your report and assign the final grades based on the rubric provided on the beekeeping report page.

The report must include a title, student name and email address, page numbers, photographs and/or figures, and introductory, supporting (or body), and conclusion paragraphs. The text of the report must be 4-5 double spaced pages long. It should be formatted in 12-point, Times New Roman Font.

**(4) Extension Project:** Students enrolled in ENY 6934 are required to produce an additional extension project which may be in the form of one of three activities (Featured Creatures article (<http://entnemdept.ufl.edu/creatures/>), EDIS document (<http://edis.ifas.ufl.edu/>) or an instructional video). Regardless of which type of extension project you choose, it should have the potential for publication through the University of Florida's extension branch (Cooperative Extension Service). You **must** check with the TA before beginning your project so that they can verify that such a document or instructional video does not already exist on your topic. The instructor or TA can provide ideas for selecting a topic. **A grading rubric will be provided to facilitate development of the extension project.**

Your three options:

1) If you select to write a Featured Creatures document, you must choose a bee pollinator or bee pest of interest and write about it following the standard Featured Creature format. This format is available at the Featured Creatures link above under the “Format for Authors” link. Here are two examples of published Featured Creatures articles completed by students in this course

[http://entnemdept.ufl.edu/creatures/MISC/BEES/Apis\\_dorsata.htm](http://entnemdept.ufl.edu/creatures/MISC/BEES/Apis_dorsata.htm)

[http://entnemdept.ufl.edu/creatures/misc/bees/Nomada\\_fervida.htm](http://entnemdept.ufl.edu/creatures/misc/bees/Nomada_fervida.htm).

2) EDIS documents can be written on a special topic regarding honey bees or beekeeping. These documents are designed to be informational or instructional how-to documents for the public. Students should refer to the “Publishing FAQs” under “Instructions for Authors” on the EDIS website for publication guidelines. Here are two examples of published EDIS documents completed by students in this course <https://edis.ifas.ufl.edu/in1123>  
<https://edis.ifas.ufl.edu/in1064>.

All written reports should convey scientific information in a way that a high school student could understand. Figures are extremely helpful in extension documents, and students are encouraged to include as many figures as necessary to explain a topic. You must obtain use permission from the owner of any figures you include in your final report if the figure is not original to you. There will be an additional assignment to submit with the Final Extension Report called “Extension Report Figures and Permissions.” For this assignment, you will upload the full-sized jpeg file for each figure and fill in the accompanying word document with the proof of permission for use.

3) If you enjoy using a camera and are skilled in videography, you may wish to produce a 5-minute instructional or informational video useful to U.S. beekeepers. You will still write a draft and a production plan for others to peer review that will be graded using a different rubric. If you do not have the technical expertise to perform the beekeeping tasks in the video, the Instructors or course TA’s may be available to help. The video should be of excellent quality; thus, you will need to have access to professional equipment and should have previous experience filming in a narrative style. The video of course does not have to be a masterpiece, but it should be professional enough that it can be published on our lab YouTube channel. Here are two examples of videos produced by a student in this class <https://youtu.be/urDsKwHPAV0>  
<https://youtu.be/U6HyBbs9454>.

There are four components of the extension project that compose the completed assignment. Due dates for each component are listed in the course schedule.

1) Report Topic Due – The student should identify and record the topic chosen for the extension report by completing the Canvas assignment “Extension Report Topic.”

2) 1<sup>st</sup> Submission – This is not a rough draft, but rather is what the student considers the completed document. If you are producing a video, you will need to submit a detailed production plan.



3) Peer Review – The 1<sup>st</sup> submission will be shared with other graduate students in the class who will provide a peer review of the report by the due date listed in the course schedule. Each student will peer review two extension reports.

4) Final Submission – Students are expected to revise the extension report or production plan per the comments provided during the peer review process. The final report or video must be submitted by the due date shown in the course schedule.

A grading rubric will be provided in Canvas to facilitate development and peer review of the extension project. **Five points will be deducted from the final project score every day past the due dates that any of the information requested above is late, regardless of the excuse.** Please do not wait until the last minute to submit your project or meet any of the other deadlines. All points lost will be deducted from the final Extension Project grade.

**Absences and Make-Up Work:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: [catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/](http://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/)

**Online Course Evaluation Process:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at [gatorevals.aa.ufl.edu/students/](http://gatorevals.aa.ufl.edu/students/). Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [ufl.bluera.com/ufl/](http://ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at [gatorevals.aa.ufl.edu/public-results/](http://gatorevals.aa.ufl.edu/public-results/).

**Academic Honesty:** UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code ([sccr.dso.ufl.edu/process/student-conduct-code/](http://sccr.dso.ufl.edu/process/student-conduct-code/)) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Services for Students with Disabilities:** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [dso.ufl.edu/drc](http://dso.ufl.edu/drc)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Campus Resources:**

## Health and Wellness

*U Matter, We Care:* If you or someone you know is in distress, please contact <mailto:umatter@ufl.edu>, 352-392-1575, or visit [umatter.ufl.edu/](http://umatter.ufl.edu/) to refer or report a concern and a team member will reach out to the student in distress.

*Counseling and Wellness Center:* Visit [counseling.ufl.edu/](http://counseling.ufl.edu/) or call 352-392-1575 for information on crisis services as well as non-crisis services.

*Student Health Care Center:* Call 352-392-1161 for 24/7 information to help you find the care you need, or visit [shcc.ufl.edu/](http://shcc.ufl.edu/).

*University Police Department:* Visit [police.ufl.edu/](http://police.ufl.edu/) or call 352-392-1111 (or 9-1-1 for emergencies).

*UF Health Shands Emergency Room / Trauma Center:* For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [ufhealth.org/emergency-room-trauma-center](http://ufhealth.org/emergency-room-trauma-center).

## Academic Resources

*E-learning technical support:* Contact the [UF Computing Help Desk](http://ufcomputinghelpdesk.com) at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).

*Career Connections Center:* Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services [career.ufl.edu/](http://career.ufl.edu/).

*Library Support:* [cms.uflib.ufl.edu/ask](http://cms.uflib.ufl.edu/ask) various ways to receive assistance with respect to using the libraries or finding resources.

*Teaching Center:* Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring. [teachingcenter.ufl.edu/](http://teachingcenter.ufl.edu/)

*Writing Studio:* 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. [writing.ufl.edu/writing-studio/](http://writing.ufl.edu/writing-studio/)

*Student Complaints On-Campus:* [sccr.dso.ufl.edu/policies/student-honor-codestudent-conduct-code/](http://sccr.dso.ufl.edu/policies/student-honor-codestudent-conduct-code/)

*On-Line Students Complaints:* [distance.ufl.edu/student-complaint-process/](http://distance.ufl.edu/student-complaint-process/)