Cover Sheet: Request 15543

ENY 4XXX – Honey Bee Biology

Info

Process	Course|New|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Cameron Jack cjack@ufl.edu
Created	12/4/2020 10:07:45 AM
Updated	2/27/2021 11:46:12 AM
Description of request	Proposal of a new undergraduate/graduate course

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Entomology and Nematology 60140000	Heather Mcauslane		12/4/2020
ENY 6XXX Honey Bee Biology Fall 2021.pdf CALS CC Checklist_Honey Bee Biology.pdf					12/4/2020 12/4/2020
College	Approved	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Approved by the CALS CC.	2/27/2021
ENY 4XXX Honey Bee Biology Fall 2021.pdf					2/26/2021
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			2/27/2021
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 15543

Info

Request: ENY 4XXX – Honey Bee Biology
Description of request: Proposal of a new undergraduate/graduate course
Submitter: Cameron Jack cjack@ufl.edu
Created: 12/1/2020 3:48:42 PM
Form version: 1

Responses

Recommended Prefix
Enter the three letter code indicating placement of course within the discipline (e.g., POS, ATR, ENC). Note that for new course proposals, the State Common Numbering System (SCNS) may assign a different prefix.

Response:
ENY

Course Level
Select the one digit code preceding the course number that indicates the course level at which the course is taught (e.g., 1=freshman, 2=sophomore, etc.).

Response:
4

Course Number
Enter the three digit code indicating the specific content of the course based on the SCNS taxonomy and course equivalency profiles. For new course requests, this may be XXX until SCNS assigns an appropriate number.

Response:
XXX

Category of Instruction
Indicate whether the course is introductory, intermediate or advanced. Introductory courses are those that require no prerequisites and are general in nature. Intermediate courses require some prior preparation in a related area. Advanced courses require specific competencies or knowledge relevant to the topic prior to enrollment.

Response:
Joint (Ugrad/Grad)

• 1000 level = Introductory undergraduate
• 2000 level = Introductory undergraduate
• 3000 level = Intermediate undergraduate
• 4000 level = Advanced undergraduate
• 5000 level = Introductory graduate
• 6000 level = Intermediate graduate
• 7000 level = Advanced graduate
• 4000/5000= Joint undergraduate/graduate
• 4000/6000= Joint undergraduate/graduate

**Joint undergraduate/graduate courses must be approved by the UCC and the Graduate Council)*

Lab Code
Enter the lab code to indicate whether the course is lecture only (None), lab only (L), or a combined lecture and lab (C).

Response:
None

Course Title
*Enter the title of the course as it should appear in the Academic Catalog. There is a 100 character limit for course titles. *

Response:
Honey Bee Biology

Transcript Title
Enter the title that will appear in the transcript and the schedule of courses. Note that this must be limited to 30 characters (including spaces and punctuation).

Response:
Honey Bee Biology

Degree Type
Select the type of degree program for which this course is intended.

Response:
Baccalaureate

Delivery Method(s)
Indicate all platforms through which the course is currently planned to be delivered.

Response:
Online

Co-Listing
Will this course be jointly taught to undergraduate, graduate, and/or professional students?

Response:
Yes

Co-Listing Explanation
Please detail how coursework differs for undergraduate, graduate, and/or professional students. Additionally, please upload a copy of both the undergraduate and graduate syllabus to the request in .pdf format. For more information please see the Co-Listed Graduate Undergraduate Courses Policy.

Response:
The graduate version of the course requires five additional readings of relevant research articles, different critical thinking exercise assignments, and an additional major project.

Effective Term
Select the requested term that the course will first be offered. Selecting "Earliest" will allow the course to be active in the earliest term after SCNS approval. If a specific term and year are selected, this should reflect the department's best projection. Courses cannot be implemented retroactively, and therefore the actual effective term cannot be prior to SCNS approval, which must be obtained prior to the first day of classes for the effective term. SCNS approval typically requires 2 to 6 weeks after approval of the course at UF.

Response:
Fall

Effective Year
Select the requested year that the course will first be offered. See preceding item for further information.

Response:
2021

Rotating Topic?
Select "Yes" if the course can have rotating (varying) topics. These course titles can vary by topic in the Schedule of Courses.

Response:
No

Repeatable Credit?
Select "Yes" if the course may be repeated for credit. If the course will also have rotating topics, be sure to indicate this in the question above.

Response:
No

Amount of Credit
Select the number of credits awarded to the student upon successful completion, or select "Variable" if the course will be offered with variable credit and then indicate the minimum and maximum credits per section. Note that credit hours are regulated by Rule 6A-10.033, FAC. If you select "Variable" for the amount of credit, additional fields will appear in which to indicate the minimum and maximum number of total credits.

Response:
3

S/U Only?
Select "Yes" if all students should be graded as S/U in the course. Note that each course must be entered into the UF curriculum inventory as either letter-graded or S/U. A course may not have both options. However, letter-graded courses allow students to take the course S/U with instructor permission.

Response:
No

Contact Type
Select the best option to describe course contact type. This selection determines whether base hours or headcount hours will be used to determine the total contact hours per credit hour. Note that the headcount hour options are for courses that involve contact between the student and the professor on an individual basis.

Response:
Regularly Scheduled

• Regularly Scheduled [base hr]
• Thesis/Dissertation Supervision [1.0 headcount hr]
• Directed Individual Studies [0.5 headcount hr]
• Supervision of Student Interns [0.8 headcount hr]
• Supervision of Teaching/Research [0.5 headcount hr]
• Supervision of Cooperative Education [0.8 headcount hr]

Contact the Office of Institutional Planning and Research (352-392-0456) with questions regarding contact type.

Weekly Contact Hours
Indicate the number of hours instructors will have contact with students each week on average throughout the duration of the course.

Response:
4

Course Description
Provide a brief narrative description of the course content. This description will be published in the Academic Catalog and is limited to 500 characters or less. See course description guidelines.

Response:
This course will provide an in-depth look into the fascinating world of honey bee biology. Herein, we will explore topics including honey bee sociality, taxonomy, biogeography, behavior, anatomy, physiology, reproduction, nutrition and genetics. Additionally, these topics will be discussed via the paradigm of the honey bee superorganism.

Prerequisites
Indicate all requirements that must be satisfied prior to enrollment in the course. Prerequisites will be automatically checked for each student attempting to register for the course. The prerequisite will be published in the Academic Catalog and must be formulated so that it can be enforced in the registration system. Please note that upper division courses (i.e., intermediate or advanced level of instruction) must have proper prerequisites to target the appropriate audience for the course.
Courses level 3000 and above must have a prerequisite.
Please verify that any prerequisite courses listed are active courses.

Response:
BSC 2005 or BSC 2010

Completing Prerequisites on UCC forms:

• Use "&" and "or" to conjoin multiple requirements; do not used commas, semicolons, etc.
• Use parentheses to specify groupings in multiple requirements.
• Specifying a course prerequisite (without specifying a grade) assumes the required passing grade is D-. In order to specify a different grade, include the grade in parentheses immediately after the course number. For example,

"MAC 2311(B)" indicates that students are required to obtain a grade of B in Calculus I. MAC2311 by itself would only require a grade of D-.
• Specify all majors or minors included (if all majors in a college are acceptable the college code is sufficient).
• "Permission of department" is always an option so it should not be included in any prerequisite or co-requisite.
• If the course prerequisite should list a specific major and/or minor, please provide the plan code for that major/minor (e.g., undergraduate Chemistry major = CHY_BS, undergraduate Disabilities in Society minor = DIS_UMN)

Example: A grade of C in HSC 3502, passing grades in HSC 3057 or HSC 4558, and undergraduate PBH student should be written as follows: HSC 3502(C) & (HSC 3057 or HSC 4558) & UGPBH
* *

Co-requisites
Indicate all requirements that must be taken concurrently with the course. Co-requisites are not checked by the registration system. If there are none please enter N/A.

Response:
N/A

Rationale and Placement in Curriculum
Explain the rationale for offering the course and its place in the curriculum.

Response:
While the Beekeeping I and Beekeeping II courses focus primarily on the management of honey bees, this course focuses specifically on the biology of honey bees. This course may be interesting to a wide audience of biology-related majors, as topics like evolution, behavior, physiology, genetics, etc. will all be discussed. Honey Bee Biology will become a required, foundational course in the future Apiculture Certificate.

Course Objectives
Describe the core knowledge and skills that student should derive from the course. The objectives should be both observable and measurable.

Response:
1. Compare the life-history strategies of different honey bee species and contrast the different traits of honey bee subspecies.
2. Describe the different tasks of honey bee workers and distinguish how these might change depending on conditions within the colony.
3. Identify the different structures of the honey bee anatomy and discuss how these function together as physiological systems.
4. Appraise the concept of the honey bee superorganism and argue whether or not honey bees fit this paradigm.
5. Interpret the findings from recent honey bee biology research publications and discuss the relevance they may have to beekeepers.

Course Textbook(s) and/or Other Assigned Reading
*Enter the title, author(s) and publication date of textbooks and/or readings that will be assigned. Please provide specific examples to evaluate the course and identify required textbooks. *

Response:
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. Aamidor et al., 2020. What mechanistic factors affect thelytokous parthenogenesis in Apis mellifera caponizes queens? Apidologie 51:329–341.
4. Simone-Finstrom et al., 2017. Propolis counteracts some threats to honey bee health. Insects 8: 46; doi:10.3390/insects8020046
5. Boncristiani, H. et al., 2020. World Honey Bee Health: The Global Distribution of Western Honey Bee (Apis mellifera L.) Pests and Pathogens. Bee World, 1-5. Doi:10.1080/0005772X.2020.1800330.
6. Mortensen et al. 2018. The discovery of Varroa destructor on drone honey bees, Apis mellifera at drone congregation areas. Parasitology Research 117: 3337-3339.

Weekly Schedule of Topics

Provide a projected weekly schedule of topics. This should have sufficient detail to evaluate how the course would meet current curricular needs and the extent to which it overlaps with existing courses at UF.

Response:
1. Insects: Insecta, Hymenoptera, Differentiating bees and wasps, common bee groups, common wasp groups, bee/wasp mimics
2. Sociality: What makes insects social?, Levels of sociality, Evolution of sociality
3. Honey Bee Taxonomy: Apidae, Apis, Honey bee taxonomy (Micrapis, Megapis and Apis)
4. Biogeography and Taxonomy of genus Apis: Apis florea, andreniformis, dorsata, laboriosa, nigrocinta, cerana, koshvenokvi, nuluensis, mellifera
5. Biogeography and Taxonomy of Apis mellifera: Overview of lineages, Lineage A, Lineage M, Lineage, C, Lineage O, Minor lineages
6.:The Colony and the Nest: Adult members of a honey bee colony, Immature members of honey bee colonies, Components of a nest, Life cycle of a honey bee colony
7. Honey Bee and Colony Behaviors: Tasks of a worker, Honey bee dance language, Thermoregulation, Swarm preparation, The swarm, Choosing a nest site, Queen and drone behaviors
8. External Anatomy and Physiology: Head, thorax, abdomen
9. Internal Anatomy and Physiology: Digestive, Nervous, Circulatory, Respiratory, Reproductive, Muscular, Endocrine, Immune, Exocrine
10. Honey Bee Genetics: Introduction, Haplo-diploidy, Arrhenotoky, Thelytoky
11. Honey bee nutrition: Larval diet, adult diet, Nectar and honey, Pollen, Foraging habitats
12: Honey Bee Pests and Pathogens: Major arthropod pests, Minor arthropod pests, Pathogen stressors, Other stressors, Principle stressors, Overcoming bee defenses
13. Honey Bee Mating: Sexual maturation of the queen, Sexual maturation of the drones, Drone congregation areas, Honey bee mating, Post-mating maturation
14. Superorganism: Food collection, Endocrine and exocrine systems, Respiration and thermoregulation, Immune system, Communication, Summary

Grading Scheme

List the types of assessments, assignments and other activities that will be used to determine the course grade, and the percentage contribution from each. This list should have sufficient detail to evaluate the course rigor and grade integrity. Include details about the grading rubric and percentage breakdowns for determining grades. If participation and/or attendance are part of the students grade, please provide a rubric or details regarding how those items will be assessed.

Response:
1. Module assessments: 15 points each × 14 assessments, 210 points, 42%
2. Section critical thinking exercises: 35 points each × 5 exercises, 175 points, 35%
3. Subspecies report (Topic submission 10 points, peer evaluation 25 points, final draft 85 points) 115 points, 23%

See syllabus for details related to assignments and grading.

Instructor(s)
Enter the name of the planned instructor or instructors, or "to be determined" if instructors are not yet identified.

Response:
Cameron Jack
Jamie Ellis

Attendance & Make-up
Please confirm that you have read and understand the University of Florida Attendance policy.
A required statement statement related to class attendance, make-up exams and other work will be included in the syllabus and adhered to in the course. Courses may not have any policies which conflict with the University of Florida policy. The following statement may be used directly in the syllabus.

• 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:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Response:
Yes

Accomodations
Please confirm that you have read and understand the University of Florida Accommodations policy.
A statement related to accommodations for students with disabilities will be included in the syllabus and adhered to in the course. The following statement may be used directly in the syllabus:

• Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.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.

Response:
Yes

UF Grading Policies for assigning Grade Points
Please confirm that you have read and understand the University of Florida Grading policies.
Information on current UF grading policies for assigning grade points is require to be included in the course syllabus. The following link may be used directly in the syllabus:

• https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Response:
Yes

Course Evaluation Policy
Course Evaluation Policy
Please confirm that you have read and understand the University of Florida Course Evaluation Policy.
A statement related to course evaluations will be included in the syllabus. The following statement may be used directly in the syllabus:

• 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 https://gatorevals.aa.ufl.edu/public-results/. 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 https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

* *

Response:
Yes

CALS Curriculum Committee
Submission Checklist

NOTE: This checklist must be included with all course and certificate submissions.

The checklist below is intended to facilitate course and certificate submissions to the University of Florida Academic Approval Tracking System (https://approval.ufl.edu/). The checklist consists of the most common items that can cause a submission to require changes or be recycled. Contrary to information provided on the UF approval site, the CALS Curriculum Committee requires a syllabus be submitted with each new course or course modification request. Please note that submitters are encouraged to attend the CALS CC meeting at which their item is being reviewed. This allows the submitter to answer any potential questions that may arise that could cause the item to not be approved. Also, be aware that when completing the UCC form the section Description of Request is asking for a brief statement about what you are doing. This is **not** the place for a course description. A statement such as "Proposal of a new undergraduate course" is all that is needed. Please do not submit documents in pdf format. All documents should be submitted in Word to facilitate editing on our end if necessary.

CHECKLIST: PLEASE INITIAL OR MARK N/A FOR EACH STATEMENT TO INDICATE YOUR COMPLIANCE.

CJ It is required when making a submission that you consult your department's representative to the CALS CC. A list of current members can be found on the committee site located at: https://cals.ufl.edu/faculty-staff/committees/.

CJ You MUST comply with the CALS Syllabus Policy, including items 1 through 8 and all standard syllabus statements. This document can be viewed at the committee site(https://cals.ufl.edu/faculty-staff/committees/) by clicking on the Curriculum Committee – Information & Documents heading and scrolling down to Forms, Checklists, and Other documents. The other items included here are all very helpful when making a curriculum submission. Some will be mentioned in other checklist items below.

CJ Joint course submissions must include both graduate and undergraduate syllabuses and a separate statement outlining the substantial (more than one) differences in assignments between the two courses. These assignments must account for at least a 15% difference in graded material between the two levels. If this is a new course submission both courses must be submitted for approval simultaneously.

CJ The course description on the UCC form and in the syllabus must match. Any other information you wish to include needs to be under a different heading such as background or additional information.

CJ The course learning objectives must be consistent with Bloom's taxonomy. Please see the following link at the CALS Curriculum site. (https://cals.ufl.edu/content/PDF/Faculty_Staff/cals-course-objectives.pdf). Do not use the words demonstrate or understand when listing learning objectives.

CJ The course schedule should be concise and include the appropriate number of weeks in the semester.

CJ All graduate course submissions must include a reading list if a textbook is not required. The reading list should include at least some current readings (within the last 5 years). All readings do not need to be current.

CJ Outside consultations are required if there is a possibility of the proposed course covering material taught in another department or college on campus. There must be a consult form completed by the chair of the department from who you are seeking the consult. Instructors may provide additional consults. The form can be found at: https://registrar.ufl.edu/pdf/uccconsult.pdf.

CJ Prerequisite courses are required for 3000 and 4000 level courses. This line of the approval form cannot be "none" or left blank. Junior or senior standing is an acceptable option. A phrase such as "a course in basic biology" is not acceptable.

CJ Decimal points must be included in the grading scale if grade cut-offs are based on percentages. While this is not a university policy it is a CALS standard practice to avoid any confusion when final grades for the course are determined.

CJ The attendance and make-up policy in a syllabus cannot contradict the university's policy. Do not include any additional wording to this policy. A statement and link regarding this is included in the CALS Syllabus Statements. For the approval process the college suggests a less is more view when it comes to this policy.

CJ The most recent version of the CALS Syllabus Statements boiler plate must be included in all syllabuses. This document is included in the CALS Syllabus Policy and can be copied and pasted to the syllabus. Do not use the boilerplate statements from an old syllabus as they are likely to be out of date.

Certificates

If proposing a new undergraduate or graduate level certificate that includes any courses outside of the submitters department a statement regarding any possible impact on those courses needs to be included. An email from the instructor is acceptable. Also, any courses required for the certificate must have permanent prefixes and course numbers. The submission must include intended catalog copy. (Contact Dr. Joel Brendemuhl (brendj@ufl.edu) for further instruction)

ENY 4XXX
Honey Bee Biology
Fall 2021 (3 credits)

***This course is co-taught with ENY 6XXX Honey Bee Biology.**

Lead-Instructor: Cameron Jack, PhD **E-mail:** cjack@ufl.edu
Office Room #: ENY (Bldg 964), room 114
Office Address: Steinmetz Hall, Natural Area Drive, P.O. Box 110620, Gainesville, FL 32611
Office Phone #: 352-294-6926 (*Please email to set up a phone appointment.*)

Instructor: Jamie Ellis, PhD **E-mail:** jdellis@ufl.edu
Office Room #: ENY (Bldg 964), room 116
Office Address: Steinmetz Hall, Natural Area Drive, P.O. Box 110620, Gainesville, FL 32611
Office Phone #: 352-273-3924 (*Please email to set up a phone appointment.*)
Website: www.ufhoneybee.com

TA: TBA
Office Room #:
Office Address:
E-mail:

Course Format: Online

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: Tuesday and Thursdays 1:00 – 3:00 pm in ENY (Bldg 964), room 114 or via Zoom. Please schedule by appointment.

Course Description: This course will provide an in-depth look into the fascinating world of honey bee biology. Herein, we will explore topics including honey bee sociality, taxonomy, biogeography, behavior, anatomy, physiology, reproduction, nutrition and genetics. Additionally, these topics will be discussed via the paradigm of the honey bee superorganism.

Course Learning Objectives:
1. Compare the life-history strategies of different honey bee species and contrast the different traits of honey bee subspecies.
2. Describe the different tasks of honey bee workers and distinguish how these might change depending on conditions within the colony.
3. Identify the different structures of the honey bee anatomy and discuss how these function together as physiological systems.
4. Appraise the concept of the honey bee superorganism and argue whether or not honey bees fit this paradigm.

5. Interpret the findings from recent honey bee biology research publications and discuss the relevance they may have to beekeepers.

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. Aamidor et al., 2020. What mechanistic factors affect thelytokous parthenogenesis in *Apis mellifera caponizes* queens? Apidologie 51:329–341.
4. Simone-Finstrom et al., 2017. Propolis counteracts some threats to honey bee health. Insects 8: 46; doi:10.3390/insects8020046
5. Boncristiani, H. et al., 2020. World Honey Bee Health: The Global Distribution of Western Honey Bee *(Apis mellifera* L.) Pests and Pathogens. Bee World, 1-5. Doi:10.1080/0005772X.2020.1800330.
6. Mortensen et al. 2018. The discovery of *Varroa destructor* on drone honey bees, *Apis mellifera* at drone congregation areas. Parasitology Research 117: 3337-3339.

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://elearning.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.

Please note that all video clips and photographs are copyrighted and are NOT to be used outside of this class. They may be viewed and used only by students this semester. Students are prohibited from copying and/or distributing 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 TA via e-mail.

The instructor and TAs will do our best to respond within 24 hours during the week and 48 hours on weekends. We will also do our best to grade assignments within one week of the due date.

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	Weekly Readings	Module Quizzes	Critical Thinking Exercises	Subspecies Report Assignments
Getting Started	Welcome video	Course syllabus; Tips for success	Aug. 27th		
Insects	Insecta, Hymenoptera, Differentiating bees and wasps, common bee groups, common wasp groups, bee/wasp mimics	Textbook: p. 21-26	Aug. 27th		
Sociality	What makes insects social?, Levels of sociality, Evolution of sociality	Textbook: p. 37-47	Sep. 3rd		
Honey Bee Taxonomy	Apidae, Apis, Honey bee taxonomy (Micrapis, Megapis and Apis)		Sep. 10th	Sep. 10th	
Biogeography and Taxonomy of genus Apis	florea, andreniformis, dorsata, laboriosa, nigrocinta, cerana, koshvenokvi, nuluensis, mellifera	Textbook: p. 26-28	Sep. 17th		
Biogeography and Taxonomy of Apis mellifera	Overview of lineages, Lineage A, Lineage M, Lineage, C, Lineage O, Minor lineages	Textbook: p. 28-34 ABJ: Stocks of Bees	Sep. 24th	Sep. 24th	Select Subspecies Sep. 24th
The Colony and the Nest	Adult members of a honey bee colony, Immature members of honey bee colonies, Components of a nest, Life cycle of a honey bee colony	Textbook: p. 49-57 ABJ: Members of a Colony; Components of Nests Simone-Finstrom et al. 2017	Oct. 1st		
Honey Bee and Colony Behaviors	Tasks of a worker, Honey bee dance language, Thermoregulation, Swarm preparation, The swarm, Choosing a nest site, Queen and drone behaviors	Textbook: 87-96 ABJ: Swarms; Tasks of Workers; Thermoregulation and Dance Language	Oct. 8th	Oct. 8th	
External Anatomy and Physiology	Head, Thorax, Abdomen	Textbook: 61-66 ABJ: External Anatomy	Oct. 15th		
Internal Anatomy and Physiology	Digestive, Nervous, Circulatory, Respiratory, Reproductive, Muscular, Endocrine, Immune, Exocrine	Textbook: 67-73 ABJ: Internal Anatomy	Oct. 22nd		1st Submission Oct. 22nd
Honey Bee Genetics	Introduction, Haplo-diploidy, Arrhenotoky, Thelytoky	Aamidor et al. 2020	Oct. 29th		Peer Review Oct. 29th

Honey Bee Nutrition	Larval diet, adult diet, Nectar and honey, Pollen, Foraging habitats	Textbook: 133-145	Nov. 5th	Nov. 5th	
Pest Pathogen Overview	Major arthropod pests, Minor arthropod pests, Pathogen stressors, Other stressors, Principle stressors, Overcoming bee defenses	Textbook: 309-325 ABJ: Biotic Stressors; Other Stressors Boncristiani et al. 2020	Nov. 12th		
Mating	Sexual maturation of the queen, Sexual maturation of the drones, Drone congregation areas, Honey bee mating, Post-mating maturation	Textbook: 116-131 ABJ: Mating Biology Mortensen et al. 2018	Nov. 19th		Final Submission Nov. 19th
Superorganism	Overview, Food collection, Endocrine and exocrine systems, Respiration and thermoregulation, Immune system, Communication, Summary	ABJ: Superorganisms	Dec. 3rd	Dec. 3rd	

Evaluation: The course grade is based on total points earned out of 500 possible points.

Module assessments	15 points each × 14 assessments	210 points
Section critical thinking exercises	35 points each × 5 exercises	175 points
Select Topic for Subspecies Report	10 points	10 points
Submission of your peer evaluations of two of your peers' Subspecies Reports	10 points × 2 peer reviews (you get 10 points per peer review you submit)	20 points
Final draft of your Subspecies Report	85 points	85 points
	Total Course Points	500 points

Grades and Grade Points
For information on current UF policies for assigning grade points, see catalog.ufl.edu/UGRD/academic-regulations/grades-gradingpolicies/.

FINAL GRADING		
% grade	Letter grade	Points needed to achieve letter grade
100-93	A	≥ 465
90-92	A-	450 – 464
87-89	B+	435 – 449
83-86	B	415 – 434
80-82	B-	400 – 414
77-79	C+	385 – 399
73-76	C	365 – 384
70-72	C-	350 – 364
67-69	D+	335 – 349
63-66	D	315 – 334
60-62	D-	300 – 314
0-59	E	0 – 299

Assignments:

(1) Module Assessments: There is a 15-point assessment associated with each of the fourteen 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 (30 minutes each), and 3) are due on the following Friday 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: These exercises are designed to encourage you to think critically about the content presented in the module lectures. The critical thinking exercises are worth 35 points each. 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 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) Subspecies Report: One of the most useful skills in any profession is writing. Furthermore, one of the missions of the Land Grant Institution is extension, which means we are communicating with the general public. As such, you are required to produce an informational article which explains the biology of a specific *Apis mellifera* subspecies. This article should be written following the standard Featured Creature format. This format is available at the Featured Creatures link (http://entnemdept.ufl.edu/creatures/) under the "Format for Authors" link. Your *Apis mellifera* subspecies article should be written to 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 article so that they can verify that such an article does not already exist on your subspecies. The instructor or TA can provide ideas for selecting a subspecies, but the topics will be reserved on a first come first serve basis. **A grading rubric will be provided in Canvas to facilitate the development of your article.**

Here is an example of two Featured Creature articles that have been written on *Apis mellifera* subspecies.
Apis mellifera capensis: http://entnemdept.ufl.edu/creatures/misc/bees/cape_honey_bee.htm
Apis mellifera scutellata: http://entnemdept.ufl.edu/creatures/misc/bees/ahb.htm
You'll notice how the authors created figures helpful to understanding the subspecies distribution as well as including other useful figures and information.

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 Subspecies Report called "Subspecies 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.

There are four components of the Subspecies Report 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 subspecies report by completing the Canvas assignment "Subspecies Report Topic."

2) 1st Submission – This is not a rough draft, but rather is what the student considers the completed document.

3) Peer Review – The 1st submission will be shared with other 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 reports.

4) Final Submission – Students are expected to revise their reports as per the comments provided during the peer review process. The final report 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 Subspecies Reports. **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.** Please do not wait until the last minute to write your reports or meet any of the other deadlines. All points lost will be deducted from the final Subspecies Report grade.

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/

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/. 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/. Summaries of course evaluation results are available to students at gatorevals.aa.ufl.edu/public-results/.

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Library Support: 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/

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. writing.ufl.edu/writing-studio/

Student Complaints On-Campus: sccr.dso.ufl.edu/policies/student-honor- codestudent-conduct-code/

On-Line Students Complaints: distance.ufl.edu/student-complaint-process/

ENY 6XXX
Honey Bee Biology
Fall 2021 (3 credits)

***This course is co-taught with ENY 4XXX Honey Bee Biology.**

Lead-Instructor: Cameron Jack, PhD **E-mail:** cjack@ufl.edu
Office Room #: ENY (Bldg 964), room 114
Office Address: Steinmetz Hall, Natural Area Drive, P.O. Box 110620, Gainesville, FL 32611
Office Phone #: 352-294-6926 (*Please email to set up a phone appointment.*)

Instructor: Jamie Ellis, PhD **E-mail:** jdellis@ufl.edu
Office Room #: ENY (Bldg 964), room 116
Office Address: Steinmetz Hall, Natural Area Drive, P.O. Box 110620, Gainesville, FL 32611
Office Phone #: 352-273-3924 (*Please email to set up a phone appointment.*)
Website: www.ufhoneybee.com

TA: TBA **E-mail:**
Office Room #:
Office Address:

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: Tuesday and Thursdays 1:00 – 3:00 pm in ENY (Bldg 964), room 114 or via Zoom. Please schedule by appointment.

Course Description: This course will provide an in-depth look into the fascinating world of honey bee biology. Herein, we will explore topics including honey bee sociality, taxonomy, biogeography, behavior, anatomy, physiology, reproduction, nutrition and genetics. Additionally, these topics will be discussed via the paradigm of the honey bee superorganism.

Course Learning Objectives:
1. Compare the life-history strategies of different honey bee species and contrast the different traits of honey bee subspecies.
2. Describe the different tasks of honey bee workers and distinguish how these might change depending on conditions within the colony.
3. Identify the different structures of the honey bee anatomy and discuss how these function together as physiological systems.
4. Appraise the concept of the honey bee superorganism and argue whether or not honey bees fit this paradigm.
5. Interpret the findings from recent honey bee biology research publications and discuss the relevance they may have to beekeepers.
6. Create extension documents that will teach honey bee biology to non-scientific audiences.

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. Robinson et al., 2008. Genes and Social Behavior. Science 322: 896-900.
4. Bustamante et al. 2020. Comparing classical and geometric morphometric methods to discriminate between the South African honey bee subspecies *Apis mellifera scutellata* and *Apis mellifera capensis* (Hymenoptera: Apidae). Apidologie, 51:123-136.
5. Simone-Finstrom et al., 2017. Propolis counteracts some threats to honey bee health. Insects 8: 46; doi:10.3390/insects8020046
6. Reyes, M. et al. 2019. Flight activity of honey bee (*Apis mellifera*) drones. Apidologie 50: 669-680.
7. Aamidor et al., 2020. What mechanistic factors affect thelytokous parthenogenesis in *Apis mellifera caponizes* queens? Apidologie 51:329–341
8. Dolezal, A.G.; Toth, A.L. 2018. Feedbacks between nutrition and disease in honey bee health. Current Opinion in Insect Science, 26: 114–119.
9. Boncristiani, H. et al., 2020. World Honey Bee Health: The Global Distribution of Western Honey Bee *(Apis mellifera* L.) Pests and Pathogens. Bee World, 1-5. Doi:10.1080/0005772X.2020.1800330.
10. Mortensen et al. 2018. The discovery of *Varroa destructor* on drone honey bees, *Apis mellifera* at drone congregation areas. Parasitology Research 117: 3337-3339.
11. Simone-Finstrom, M. 2017. Social Immunity and the Superorganism: Behavioral Defenses Protecting Honey Bee Colonies from Pathogens and Parasites, Bee World, 94: 21-29.

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://elearning.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.

Please note that all video clips and photographs are copyrighted and are NOT to be used outside of this class. They may be viewed and used only by students this semester. Students are prohibited from copying and/or distributing 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 TA via e-mail.

The instructor and TAs will do our best to respond within 24 hours during the week and 48 hours on weekends. We will also do our best to grade assignments within one week of the due date.

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	Weekly Readings	Module Quizzes	Critical Thinking Exercises	Subspecies Report Assignments	Extension Fact Sheet Project
Getting Started	Welcome video	Course syllabus; Tips for success	Aug. 27th			
Insects	Insecta, Hymenoptera, Differentiating bees and wasps, common bee groups, common wasp groups, bee/wasp mimics	Textbook: p. 21-26	Aug. 27th			
Sociality	What makes insects social?, Levels of sociality, Evolution of sociality	Textbook: p. 37-47 Robinson et al. 2008	Sep. 3rd			
Honey Bee Taxonomy	Apidae, Apis, Honey bee taxonomy (Micrapis, Megapis and Apis)		Sep. 10th	Sep. 10th		
Biogeography and Taxonomy of genus Apis	florea, andreniformis, dorsata, laboriosa, nigrocinta, cerana, koshvenokvi, nuluensis, mellifera	Textbook: p. 26-28	Sep. 17th			Fact Sheet Topics Sep. 17th
Biogeography and Taxonomy of Apis mellifera	Overview of lineages, Lineage A, Lineage M, Lineage, C, Lineage O, Minor lineages	Textbook: p. 28-34 ABJ: Stocks of Bees Bustamante et al. 2020	Sep. 24th	Sep. 24th	Select Subspecies Sep. 24th	
The Colony and the Nest	Adult members of a honey bee colony, Immature members of honey bee colonies, Components of a nest, Life cycle of a honey bee colony	Textbook: p. 49-57 ABJ: Members of a Colony; Components of Nests Simone-Finstrom et al. 2017	Oct. 1st			
Honey Bee and Colony Behaviors	Tasks of a worker, Honey bee dance language, Thermoregulation, Swarm preparation, The swarm, Choosing a nest site, Queen and drone behaviors	Textbook: 87-96 ABJ: Swarms; Tasks of Workers; Thermoregulation and Dance Language Reyes et al. 2019	Oct. 8th	Oct. 8th		
External Anatomy and Physiology	Head, Thorax, Abdomen	Textbook: 61-66 ABJ: External Anatomy	Oct. 15th			
Internal Anatomy and Physiology	Digestive, Nervous, Circulatory, Respiratory, Reproductive, Muscular, Endocrine, Immune, Exocrine	Textbook: 67-73 ABJ: Internal Anatomy	Oct. 22nd		1st Submission Oct. 22nd	1st Submission Oct. 22nd

Honey Bee Genetics	Introduction, Haplo-diploidy, Arrhenotoky, Thelytoky	Aamidor et al. 2020	Oct. 29th		Peer Review Oct. 29th	Peer Review Oct. 29th
Honey Bee Nutrition	Larval diet, adult diet, Nectar and honey, Pollen, Foraging habitats	Textbook: 133-145 Dolezal et al. 2018	Nov. 5th	Nov. 5th		
Honey Bee Pests and Pathogens	Major arthropod pests, Minor arthropod pests, Pathogen stressors, Other stressors, Principle stressors, Overcoming bee defenses	Textbook: 309-325 ABJ: Biotic Stressors; Other Stressors Boncristiani et al. 2020	Nov. 12th			
Mating	Sexual maturation of the queen, Sexual maturation of the drones, Drone congregation areas, Honey bee mating, Post-mating maturation	Textbook: 116-131 ABJ: Mating Biology Mortensen et al. 2018	Nov. 19th		Final Submission Nov. 19th	Final Submission Nov. 19th
Superorganism	Overview, Food collection, Endocrine and exocrine systems, Respiration and thermoregulation, Immune system, Communication, Summary	Simone-Finstrom, 2017 ABJ: Superorganisms	Dec. 3rd	Dec. 3rd		

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

Module assessments	15 points each × 14 assessments	210 points
Section critical thinking exercises	45 points each × 5 exercises	225 points
Select Topic for Subspecies Report	10 points	10 points
Submission of your peer evaluations of two of your peers' Subspecies Reports	10 points × 2 peer reviews (you get 10 points per peer review you submit)	20 points
Final draft of your Subspecies Report	85 points	85 points
Extension Fact Sheet Project	100 points	100 points
	Total Course Points	650 points

Grades and Grade Points
For information on current UF policies for assigning grade points, see 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 15-point assessment associated with each of the fourteen 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 (30 minutes each), and 3) are due on the following Friday 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 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 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) Subspecies Report: One of the most useful skills in any profession is writing. Furthermore, one of the missions of the Land Grant Institution is extension, which means we are communicating with the general public. As such, you are required to produce an informational article which explains the biology of a specific *Apis mellifera* subspecies. This article should be written following the standard Featured Creature format. This format is available at the Featured Creatures link (http://entnemdept.ufl.edu/creatures/) under the "Format for Authors" link. Your *Apis mellifera* subspecies article should be written to 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 article so that they can verify that such an article does not already exist on your subspecies. The instructor or TA can provide ideas for selecting a subspecies, but the topics will be reserved on a first come first serve basis. **A grading rubric will be provided in Canvas to facilitate the development of your article.**

Here is an example of two Featured Creature articles that have been written on *Apis mellifera* subspecies.
Apis mellifera capensis: http://entnemdept.ufl.edu/creatures/misc/bees/cape_honey_bee.htm
Apis mellifera scutellata: http://entnemdept.ufl.edu/creatures/misc/bees/ahb.htm
You'll notice how the authors created figures helpful to understanding the subspecies distribution as well as including other useful figures and information.

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 Subspecies Report called "Subspecies 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.

There are four components of the Subspecies Report 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 subspecies report by completing the Canvas assignment "Subspecies Report Topic."

2) 1st Submission – This is not a rough draft, but rather is what the student considers the completed document.

3) Peer Review – The 1st submission will be shared with other 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 reports.

4) Final Submission – Students are expected to revise their reports as per the comments provided during the peer review process. The final report 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 Subspecies Reports. **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. Please do not wait until the last minute to write your reports or meet any of the other deadlines. All points lost will be deducted from the final Subspecies Report grade.

4) Extension Project: Students enrolled in ENY 6934 are required to produce an additional project in the form of extension fact sheets. Each fact sheet 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 fact sheets do not already exist on your topics. The instructor or TA can help you come up with ideas for fact sheet topics. **A grading rubric will be provided to facilitate development of your extension fact sheets.**

Each student will create 5 one to two-page fact sheets that provide basic and pertinent information regarding a topic of honey bee biology. Your five fact sheets should succinctly convey scientific information in a way that a high school student could understand. These fact sheets are designed to provide basic information about complex topics, which means that you will need to take special care to not provide too much information in a single sheet. You must obtain use permission from the owner of any figures you include in your fact sheets if the figure is not original to you. There will be an additional assignment to submit with the Final Submission called "Extension Fact Sheet 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.

Here are some examples of fact sheets produced that might help you understand what we are looking for:
https://innovate.cired.vt.edu/wp-content/uploads/2015/08/CommunitiesofPractice_LS.pdf ;
http://sfyl.ifas.ufl.edu/media/sfylifasufledu/orange/hort-res/docs/pdf/008-How-to-Build-a-Raised-Bed-Garden.pdf ;
http://sfyl.ifas.ufl.edu/media/sfylifasufledu/orange/hort-res/docs/pdf/007-Living-Easter-Basket-Fact-Sheet.pdf;
http://sfyl.ifas.ufl.edu/media/sfylifasufledu/orange/hort-res/docs/pdf/012-Caladium-Fact-Sheet.pdf.

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

1) Fact Sheet Topics Due – The student should identify **5** topics for the fact sheets by completing the Canvas assignment "Extension Fact Sheet Topics."

2) 1st Submission – This is not a rough draft, but rather is what the student considers the completed fact sheets.

3) Peer Review – The 1st submission will be shared with other graduate students in the class who will provide a peer reviews by the due date listed in the course schedule. Each student will peer review the fact sheets of at least two students.

4) Final Submission – Students are expected to revise the fact sheets as per the comments provided during the peer review process. The final version of the fact sheets 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 Fact Sheet 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 produce your fact sheets or meet any of the other deadlines. All points lost will be deducted from the final Extension Fact Sheet Project grade.

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Library Support: 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/

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. writing.ufl.edu/writing-studio/

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