Term Information

Effective Term	Autumn 2022

General Information

Course Bulletin Listing/Subject Area	Entomology
Fiscal Unit/Academic Org	Entomology - D1130
College/Academic Group	Food, Agric & Environ Science
Level/Career	Undergraduate
Course Number/Catalog	2102
Course Title	Insects and Human Affairs: Virtual Laboratory
Transcript Abbreviation	PestsPlaguesLab
Course Description	Insects are a daily fact of life, exerting major influence on human affairs over the course of history. The course gives students experience in observing, recording and analyzing data associated with insect-human interactions.
Semester Credit Hours/Units	Fixed: 1

Offering Information

Length Of Course	14 Week, 12 Week, 8 Week, 7 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	Yes
Is any section of the course offered	100% at a distance
Grading Basis	Letter Grade
Repeatable	No
Course Components	Laboratory
Grade Roster Component	Laboratory
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus, Lima, Mansfield, Marion, Newark, Wooster

Prerequisites and Exclusions

Prerequisites/Corequisites	2101 or concurrent enrollment
Exclusions	
Electronically Enforced	Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.0702
Subsidy Level	General Studies Course
Intended Rank	Freshman, Sophomore, Junior, Senior

Requirement/Elective Designation

Natural Sciences

Course Details

Course goals or learning objectives/outcomes

- Identify the scientific process and synthesize insect related experimental designs
- Observe insects and identify links to their impact their world
- Analyze insect related data with appropriated tool and summarize results for a lay audience

Content Topic List

- Insect morphology and digital specimen observation
- Insect trapping methods and observation skills
- Interpretations of insects in popular media
- Evolution of insects and natural selection
- Plague and epidemiology
- Forensic entomology and insect development
- Scientific method and data analysis

Sought Concurrence

No

Attachments

- Pages from ge-foundations-submission.pdf: GE Nat Science Submission Form

  (Other Supporting Documentation. Owner: Klinger,Ellen G)
- ENTMLGY 2102 Laboratory Descriptions.docx: Descriptions of laboratory activities

  (Other Supporting Documentation. Owner: Klinger,Ellen G)
- Distance Approval Cover Sheet ENTMLGY 2102.docx: Distance Approval Sheet

  (Other Supporting Documentation. Owner: Klinger,Ellen G)
- ENTMLGY 2102 Syllabus AU22 v.4.docx: Revised syllabus

  (Syllabus. Owner: Klinger,Ellen G)

Comments

- This course, combined with ENTMLGY 2101, an existing Natural Sciences GE course with submitted course change request to the new GE, will be a 3+1 credit hour Natural Sciences GE. Both courses must be taken to satisfy the Natural Sciences GE requirement.

  Revise as per COAA via email message 21 February 2022

  Revise as per email message 15 February 2022 *(by Osborne,Jeanne Marie on 02/24/2022 12:46 PM)*
- Revised syllabus as indicated by COAA request. *(by Klinger,Ellen G on 02/22/2022 02:00 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Klinger,Ellen G	02/13/2022 04:30 PM	Submitted for Approval
Approved	Strange,James P	02/14/2022 08:48 AM	Unit Approval
Revision Requested	Osborne,Jeanne Marie	02/15/2022 11:39 AM	College Approval
Submitted	Klinger,Ellen G	02/16/2022 03:47 PM	Submitted for Approval
Approved	Strange,James P	02/16/2022 08:46 PM	Unit Approval
Revision Requested	Osborne,Jeanne Marie	02/21/2022 03:03 PM	College Approval
Submitted	Klinger,Ellen G	02/22/2022 02:01 PM	Submitted for Approval
Approved	Strange,James P	02/24/2022 12:33 PM	Unit Approval
Approved	Osborne,Jeanne Marie	02/24/2022 12:46 PM	College Approval
Pending Approval	Cody,Emily Kathryn Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	02/24/2022 12:46 PM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

College of Food, Agricultural, and Environmental Sciences
Department of Entomology

SYLLABUS
ENTMLGY 2102

Insects and Human Affairs: Virtual Laboratory
Autumn 2022

Course Information

- **Course times and location:** Asynchronous and online
- **Credit hours:** 1
- **Mode of delivery:** Distance Learning

Instructor

- **Name:** Dr. Ellen Klinger
- **Email:** klinger.80@osu.edu
- **Phone Number:** 614-247-4763 (office)
- **Office location:** 255 Kottman Hall

- **Office hours:** TBA; email instructor to set up Zoom meeting
- **Preferred means of communication:**
  - My preferred method of communication for questions is **email.**
  - My class-wide communications will be sent through the Announcements tool in CarmenCanvas. Please check your notification preferences (go.osu.edu/canvas-notifications) to be sure you receive these messages. For announcements that are time sensitive or critical, I may also use e-mail as an additional notification route.

Course Prerequisites

ENTMLGY 2101 or concurrent enrollment

Course Description

Insects are a daily fact of life, exerting major influence on human affairs over the course of history. The course gives students experience in observing, recording and analyzing data associated with insect-human interactions.

General Education Goals and Expected Learning Outcomes (ELO)

This course, in combination with ENTMLGY 2101 is a General Education (GE) Foundations: Natural Sciences course. ENTMLGY 2102 fulfills Goal 1 in the GE Foundations: Natural Sciences and Expected Learning Outcome 1.3.

When this 1-credit ENTMLGY 2102 laboratory is taken in combination with the 3-credit ENTMLGY 2101 lecture, these 4-credits (i.e., 1-credit laboratory + 3-credit lecture) fulfill ALL Goals (i.e., Goals 1 and 2) and ALL Expected Learning Outcomes (i.e., ELOs 1.1, 1.2, 1.3, 2.1, 2.2, 2.3) for the GE Foundations: Natural Sciences category.

GE Goal 1: Successful students will engage in theoretical and empirical study within the natural sciences, gaining an appreciation of the modern principles, theories, methods, and modes of inquiry used generally across the natural sciences.

- Expected Learning Outcome 1.1: Successful students are able to explain basic facts, principles, theories and methods of modern natural sciences; describe and analyze the process of scientific inquiry.
- Expected Learning Outcome 1.2: Successful students are able to identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods.
- Expected Learning Outcome 1.3: Successful students are able to employ the processes of science through exploration, discovery, and collaboration to interact directly with the natural world when feasible, using appropriate tools, models, and analysis of data.

GE Goal 2: Successful students will discern the relationship between the theoretical and applied sciences, while appreciating the implications of scientific discoveries and the potential impacts of science and technology.

- Expected Learning Outcome 2.1: Successful students are able to analyze the inter-dependence and potential impacts of scientific and technological developments
- Expected Learning Outcome 2.2: Successful students are able to evaluate social and ethical implications of natural scientific discoveries
- Expected Learning Outcome 2.3: Successful students are able to critically evaluate and responsibly use information from the natural sciences

This course fulfills goal 1 and learning outcome 1.3 of the foundations of the Natural Science GE through a variety of activities such as:
Designing experiments involving fly trap design, and insect behavior, carrying out those experiments and reflecting on the process. Collecting and analyzing data in these experiments as well as though other data collection sources, manipulating and analyzing the data responsibility and creating appropriate results and data summaries. Experiencing and investigating the insect world around you with light trapping, pollinator observations and diapausing insect searching. Creating links between society and insects through investigation into insect uses in the media. All goals will be assessed through weekly lab assignments as well as through questions on the lab final exam.

Course Specific Learning Outcomes

By the end of this course, students should successfully be able to (with reference to the related general education learning objectives above):

- Identify the scientific process and synthesize insect related experimental designs (ELO1.3)
- Observe insects and identify evidence of their impact to the world (ELO 1.3)
- Analyze insect related data with appropriate tool and summarize results for a lay audience (ELO 1.3).

How this course works

Mode of delivery: This course is 100% online. There are no required sessions when you must be logged in to Carmen at a scheduled time, however there will be at home activities to complete during the week.

Pace of online activities: This course is divided into **weekly labs** that are released one week ahead of their due date, via Carmen module. Laboratory modules will include a laboratory overview outlining expectations, video explanations by the instructor as well as relevant links and materials. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame. Keep in mind that some assignments cannot be completed at the last minute and students should review their expected workload at the beginning of the week. In some labs requiring data collection, students may need to distribute their effort over several days.

Credit hours and work expectations: This is a [1] credit-hour course. According to Ohio State bylaws on instruction (go.osu.edu/credithours), students should expect around 2 hours per week of time spent on direct lab work and instruction and an additional 1 hour per week studying and completing assignments to receive a grade of C average.

Attendance and participation requirements: Research shows regular participation is one of the highest predictors of success. With that in mind, I have the following expectations for everyone's participation:

Participating in online activities for attendance: **at least once per week**

You are expected to log in to the course in Carmen every week. During most weeks you will probably log in many times. If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible.*

Zoom meetings and office hours: **optional**
All live, scheduled events for the course, including my office hours, are optional.

Participating in lab group forums: **one to two times per week**
Each week you will interact with your lab group online. This

discussion may take place via Carmen discussion or an alternate collaborative way as indicated by your instructor.

If you have an absence due to medical conditions, school activities or other documentable issues, please contact the instructor to alert them to this excused absence. Due dates will be adjusted accordingly.

Course Materials, Fees and Technologies

Required Materials and/or Technologies

There is no required text for this class.

As part of the animal behavior lab, students may need to purchase a feeder cricket or mealworm beetle larvae from a pet store. The instructor will provide you information regarding sources for this purchase in Carmen- total student cost should be less than $0.25.

Students will need to locate common household products to complete the light trap and fly trap labs; in certain circumstances students may need to purchase an inexpensive component of the lab setup. The instructor will provide you with a full list of equipment needed via Carmen in week one of the course.

Required Equipment

Computer: current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.

Webcam: built-in or external webcam, fully installed and tested.

Microphone: built-in laptop or tablet mic or external microphone.

Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication.

If you do not have access to the technology you need to succeed in this class, review options for technology and internet access (go.osu.edu/student-tech-access).

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the installing Office 365 (go.osu.edu/office365help) help article for full instructions.

Students will access several additional internet-based systems. There will be no need to download these programs. They include
NetLogo:(https://ccl.northwestern.edu/netlogo/index.shtml)
CovidSim:(https://askabiologist.asu.edu/covid-sim/index.html)

CarmenCanvas Access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device (go.osu.edu/add-device) help article for step-by- step instructions
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes, good for 365 days, that can each be used once.
- Install the Duo Mobile application (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- Navigating CarmenCanvas (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)
- Recording a slide presentation with audio narration and recording, editing and uploading video (go.osu.edu/video-assignment-guide)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat**: go.osu.edu/it
- **Phone:** 614-688-4357 (HELP)
- **Email:** servicedesk@osu.edu

Grading and Faculty Response

How Your Grade is Calculated

Assignment Category	Points
Class Intro Materials (Syllabus Quiz)	10
Weekly Lab Reports (30 points each)	390
Laboratory Final	30
Total points	430

See Carmen and course schedule for specific due dates, however **all lab reports will be due on Tuesdays at 11:59PM**

Descriptions of Major Course Assignments

Class Intro Materials

Description: Each student will be required to take a short quiz on the syllabus material for this lab. This quiz ensures students will understand the lab format and serves as a measure for initial engagement in his online course

Academic integrity and collaboration: These quizzes are open-book and untimed. Students must complete the syllabus quiz on their own, but they will have multiple untimed opportunities to take the quiz.

Weekly Lab Reports:

Description: Students will submit a lab report via a Carmen assignment after completing each week's activity. This lab report will include any data and observations as well as answers to questions posed by the instructor via the assignment. The lab reports will also include student reflections with classmate interaction in discussion and other online forums regarding the previous week's lab. Each Carmen lab report assignment will include details about the required information for that week's assignment.

Academic integrity and collaboration: Each student must turn in a lab report that is their own work. While in some laboratory cases we will use shared data, all student question answers and reflections will be their own. Students may work with other students on specific areas that will be clearly designated by the instructor within the Carmen assignment.

Laboratory Final

Description: The laboratory final will be administered using the Carmen quiz function

during the last week of class. This laboratory final will be composed of multiple choice and short answer questions and will evaluate student understanding of the concepts learned during the semester.

Academic integrity and collaboration: Students may not work with others on the laboratory final, but students may use any notes and books during the online final. The laboratory final will not be timed and will be available for completion in lieu of a weekly lab assignment in Week 14.

Late Assignments

Please refer to Carmen for specific due dates for each assignment. Due dates are set to help you stay on pace and to allow timely feedback that will help you complete subsequent assignments. Late assignments may be subject to a 10% reduction of points per 24-hour period. If you are unable to turn in an assignment due to an excused absence, alert the instructor via e-mail as soon as possible and the instructor will discuss a modified due date with you when you submit your excused absence reason.

Instructor Feedback and Response Time

I am providing the following list to give you an idea of my intended availability throughout the course. Remember that you can call 614-688-4357 (HELP) at any time if you have a technical problem.

- **Preferred contact method:** If you have a question, please contact me first through my Ohio State email address. I will reply to emails within **24 hours on days when class is in session at the university**.
- **Class announcements:** I will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check your notification preferences (go.osu.edu/canvas-notifications) to ensure you receive these messages. I may also send important announcements directly to your email if needed.
- **Grading and feedback:** For assignments submitted before the due date, I will try to provide feedback and grades within **ten days**. Assignments submitted after the due date may have reduced feedback and grades may take longer to be posted.

Grading Scale

93–100%: A
90–92.9%: A-
87–89.9%: B+
83–86.9%: B
80–82.9%: B-
77–79.9%: C+
73–76.9%: C
70–72.9%: C-
67–69.9%: D+
60–66.9%: D
Below 60%: E

Insect safety

This class will require you to observe live insects and arthropods. If an assignment asks you to observe insects, please understand that handling the insects may result in bites or stings. In cases in which you may be asked to handle insects (insect behavior lab) the instructor will provide clear guidelines for safe insect handling if needed. At any time, if you have a question regarding safety with insects, or are uncomfortable handling insects, please contact your instructor via e-mail.

Other Course Policies

Discussion and Communication Guidelines

Students will be placed into small lab groups. There may be need to communicate between members of this group. These are my general expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style**: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. Excessive spelling and grammar errors may result in a reduction in your discussion grades. A more conversational tone is fine for non-academic topics.
- **Tone and civility**: Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online. I will provide specific guidance for discussions on controversial or personal topics. Abide by your agreed upon group discussion rules.
- **Citing your sources**: When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Academic integrity policy

See descriptions of course assignments for integrity expectations for specific assignments. Consult your instructor if you have a question about expectations.

Ohio State's academic integrity policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's *Code of Student Conduct* (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must

recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.
If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.
Other sources of information on academic misconduct (integrity) to which you can refer include:

- Committee on Academic Misconduct web page (go.osu.edu/coam)
- *Ten Suggestions for Preserving Academic Integrity (*go.osu.edu/ten-suggestions*)*
- *Eight Cardinal Rules of Academic Integrity* (go.osu.edu/cardinal-rules)

Safe and Healthy Buckeyes

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (https://safeandhealthy.osu.edu). Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Commitment to a diverse and inclusive learning environment and creating an environment free from harassment, discrimination, and sexual misconduct.

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic

information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.
To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member.

Diversity Statement

The Ohio State University affirms the importance and value of diversity of people and ideas. We believe in creating equitable research opportunities for all students and to providing programs and curricula that allow our students to understand critical societal challenges from diverse perspectives and aspire to use research to promote sustainable solutions for all. We are committed to maintaining an inclusive community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among all members; and encourages each individual to strive to reach their own potential. The Ohio State University does not discriminate on the basis of age, ancestry, color, disability, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, race, religion, sex, gender, sexual orientation, pregnancy, protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment.

To learn more about diversity, equity, and inclusion and for opportunities to get involved, please visit:

- https://odi.osu.edu/
- https://odi.osu.edu/racial-justice-resources
- https://odi.osu.edu/focus-on-racial-justice
- http://mcc.osu.edu/

In addition, this course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at https://go.osu.edu/principlesofcommunity. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity,

Equity, and Inclusion (https://equityandinclusion.cfaes.ohio-state.edu/). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at https://studentlife.osu.edu/bias/report-a-bias-incident.aspx.

Your mental health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24-hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org

David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

Accessibility accommodations for students with disabilities

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Canvas accessibility (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- CarmenZoom accessibility (go.osu.edu/zoom-accessibility)
- Collaborative course tools

Course schedule

Schedules of activities will be coordinated between student and instructor and will be based upon expected workloads.

Week	Lab Activity (each weekly activity assessed via digital lab report)
1	Virtual insect morphology identification; Digital insect measurements; t-test analysis
2	Light Traps (AU); Forensic Entomology Lab (SP)
3	Pollinator observation (AU)/diapause observation (SP)
4	Media project: Collect data
5	Media project: Select hypothesis; parse dataset
6	Media project: Analyze data and make conclusions
7	Media project: Poster design and presenting; virtual presentations and reflection on networking
8	Pepper moth evolution project
9	Plague Project/SIR model
10	Building the Best Fly Trap
11	Insect behavior experiment; chi square analysis.
12	Light Traps (AU); Forensic Entomology Lab (SP)
13	Pollinator observation (SP)/diapause observation (AU)
14	Lab final exam online.

AU – students taking this course in Autumn semesters should expect the activities designated as AU
SP- students taking this course in Spring semesters should expect the activities designated as SP

ENTMLGY 2101 Laboratory Descriptions

Laboratory descriptions:

Up close and personal: Students will study in greater detail the external morphological adaptations of insects via a highly zoomable repository of insect images. Students will search through multiple digital insect specimens to locate and identify various insect morphological features. Once located, students will capture their observations via screenshot and submit these observations as part of their lab worksheet. Students will be introduced to the concept of data management by virtually measuring wing lengths of honey bees via digital images, collecting 20 measurements, and completing basic statistics on the measurements. Students will then use a t-test to determine whether bees from two separate images have the same wing size. *Trial run in ENTMLGY 2101 in SP22.*

Light Traps (various placement depending on semester of offering): Students will learn a basic collection technique used by entomologists- the light trap. This is a simple trap that students can set up at any outdoor light during the nighttime involving a sheet of paper. Students will set the light trap up on two evenings during the week, collect data on ambient temperatures, and count insects they find at their light trap. Students will then determine whether insect presence is altered by temperature. *Attempted online in ENTMLGY 1101 in SP20*

Forensic Entomology Lab (various placement depending on semester of offering): Students will utilize the concept of insect degree day accumulation to predict insect growth. They will utilize these measures of growth to date a virtual cadaver and decide as a lab group who in the line of suspects has deposited the cadaver. This lab utilizes averaging of temperature and applying it to insect growth models for blowflies. Students will also learn information about forensic entomology as a career. *Adapted from an in-person lab activity in ENTMLGY 1101.*

Pollinator Observation (various placement depending on semester of offering): What insects are pollinating our flowers? Students will observe pollinators in their backyards or common areas. Students will select three different types of flowers that differ based on shape and/or color. They will then spend 20 min at each flower type, counting insects that visit each plant and identifying them to insect order. The student will make a prediction as to which type of flower will receive the most visitors and use their data to test their hypothesis. *Adapted from in class activities from previous course*s.

Diapause observation (various placement depending on semester of offering): Where are insects in the winter? Students will utilize the concepts of diapause vs. hibernation to find insects both indoors and

outdoors. They will learn insect collection technique of the Berlese funnel which they can complete at home. Students will identify found insects to order using a dichotomous key.

Media project- this is a four week-long project in which the students learn and practice the concept of the scientific method. The overall goal of this project is to investigate how insects are utilized in movies, tv, books and other social media. *Partially adapted from assignments performed in another ENTMLGY 1101 (Insect Literacy Projects).*

Week 1- Students will identify and collect data on insect use in popular media of their choosing. They will enter the data in a class spreadsheet that will be used in subsequent weeks. Embedded in this data collection activity are the concepts of categorical vs. continuous data as well as the concept of identifying meaningful data points for a study.
Week 2- Students will, using the class collected variables, select a hypothesis based on the data (prior to gaining access to the entire class data set). This lesson will include instruction and practice in what is and is not a valid hypothesis as well as identifying null and alternate hypotheses. Finally, the students will parse the dataset to create their workable data set and prepare for subsequent analysis.
Week 3- Students will utilize their knowledge gained already in this lab to analyze their data using simple statistics, including t-test, ANOVA and logistic regression, as supported by open-source statistical programs and pre-formatted excel sheets. Students will learn formatting and simple statistical programming to analyze their data and draw conclusions.
Week 4- Student will prepare a short infographic depicting their results and will interact asynchronously with their peers to comment and discuss their results. Embedded in this lab is proper scientific communication skills and appropriate networking.

Plague Project/SIR: Students will gather observations regarding their surroundings and potential plague infection from small animals in their homes and backyards. Using this metric, students will perform a simulation of travelling around plague ridden Europe. Using dice and proportions from their research and historical information, students will simulate travel throughout the continent, showing the spread of plague and determining how long it takes to contract the disease. This simulation will be followed by framing the outcome leading to an epidemiological SIR (susceptible/infected/recovered) model. SIR modelling used in ENTMLGY 2400H; online game adapted from https://www.teacherspayteachers.com/Product/Black-Death-Bubonic-Plague-Dice-Game-3567375

Pepper Moth Evolution Project: Student will explore how natural selection works in pepper moths, a species of moth whose color has changed based on background pollution levels. Students will be guided through some model simulations via netlogoweb.org and then allowed to choose variables to modify and explain how those variables have altered the selection of moth color. Based on activity published: https://qubeshub.org/community/groups/coursesource/publications?id=2773&v=1

Design a fly trap: Many diseases and issues with insects are improved with our ability to trap insects. Students will select various baits to trap fruit flies (either indoors or outdoors). They will hypothesize which bait will attract the most flies and carry out trials to determine which bait is superior. Based on: https://qubeshub.org/community/groups/coursesource/publications?id=2716&v=1 and adapted from an online activity from ENTMLGY 4601 during AU20.

Insect Behavior Experiment: Students will utilize the skills learned in the media project to understand the difference between observational and experimental research. They will perform simple choice tests with either found insects or purchased feeder crickets (appx.0.15 each) to complete an experimental study and analyze their results with a Chi-Square Test. *Adapted from an in-class activity in ENTMLGY 2400H.*

Expected Learning Outcome 2.2: Successful students are able to critically reflect on and share their own experience of observing or engaging in the visual, spatial, literary, or performing arts and design.
Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. *(50-700 words)*

GE Rationale: Foundations: Natural Science (4 credits)

Requesting a GE category for a course implies that the course fulfills **all** expected learning outcomes (ELOs) of that GE category. To help the reviewing panel evaluate the appropriateness of your course for the Foundations: Natural Sciences, please answer the following questions for each ELO.

A. Foundations

Please explain in 50-500 words why or how this course is introductory or foundational in the study of Natural Science.

The Entomology Department wishes to add a new class, ENTMLGY 2102 that, when taken in addition to the existing (and currently GE Natural Science designated) course, ENTMLGY 2101, will fulfill the new requirements for the GE slated to be enacted in AU22. ENTMLGY 2102 is a virtual laboratory, designed to meet primarily the GE natural Science ELO 1.3. The department would like to have these as separate courses, as we would like to retain the option for our majors to count the lecture based ENTMGLY 2101 towards their major if desired.
Both courses utilize concepts already appreciated and understood by a wide range of non-natural science students (art, religion, history, economics, etc.) and combines those topics with insects, a species that is well observed by all, as it is the largest group of living organisms on this planet. At this intersection, students can take their experiences with insects and their knowledge from a large variety of majors and learn scientific concepts.
Basic insect biology is covered in both classes (although not overlapping), and during this process students will learn about how this biology relates to their own human biology and organization. Evolution is then introduced and this concept is followed though several course topics, such as why insects evolved to blood feeding and why insects become resistant to pesticides as examples. Students gain understanding in the concepts of phylogeny and systematics in this course.
Students will learn about scientific research and access primary scientific literature in Week 3 of 2101. They will add to this skill in successive weeks, learning how to access and interpret literature and the danger of misinformation, and this skill will be utilized during the Media Project in ENTMLGY 2102.
The scientific method is highlighted in both classes, using experience in ENTMLGY 2102 and case studies in 2101 (germ theory, discovery of juvenile hormone). Students will understand the components of the scientific method and get practice in both classes designing and critiquing experimental designs.
Students will gain experience critically looking at past historical events and uses of insects and reframing them using their gained insect knowledge from this course. They are then poised to continue this process as they think about the impact of insects on their lives and in technology in the future.

B. Specific Goals for Natural Sciences

GOAL 1: Successful students will engage in theoretical and empirical study within the natural sciences, gaining an appreciation of the modern principles, theories, methods, and modes of inquiry used generally across the natural sciences.

Expected Learning Outcome 1.1: Successful students are able to explain basic facts, principles, theories and methods of modern natural sciences; describe and analyze the process of scientific inquiry. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. *(50-700 words)*

This class and accompanying lab will introduce the students not only to the facts of insect biology, taxonomy and morphology but will also teach students the concepts of natural selection ,evolution, germ theory and genetics.
Course goals/objectives related to this ELO (and specific assignments designed to assess each):
• Explain how insects differ from other arthropod and invertebrate taxa.
Exploratory exercise 1: Student use morphological features as well as NCBI DNA sequence data to generate taxonomic tress and compare similarity of various species.
A matching question on the midterm tests student's abilities to identify characteristics unique to insects and those shared by all arthropods.
• Compare and contrast human and insect respiratory, endocrine, digestive, circulatory and reproductive systems.
Discussion 1: Students engage with peers in a discussion to create "human to insect" transformation stories while accurately depicting differences in insect internal systems.
Midterm essay question: students will show their understanding of the similarities and differences between insect and human internal and external morphologies.
• Interpret insect behaviors within their biological contexts.
Exploratory exercise 2: In this activity, student interpret the behavior suite of one of four insects and translate this behavior into a short comic strip.
A question bank of multiple choice questions is designed to assess student understanding on this topic on the midterm.
• Examine the role that insects have played in the fields of evolutionary biology, molecular genetics, human medicine, and military operations
Weekly quiz questions in the weeks 11,12 and 13 are designed to test student understanding of natural selection, evolution, germ theory and genetics.
A reading activity during Week 13 is designed to show student understanding of basic genetics (students turn in graded notes from this reading activity).

Expected Learning Outcome 1.2: Successful students are able to identify how key events in the development of science contribute to the ongoing and changing nature of scientific knowledge and methods. Please link this ELO to the course goals and topics and indicate specific activities/assignments through which it will be met. *(50-700 words)*

This class combines entomology and technological advances with historical problems and highlights how gaps in science and understanding of insects have led to problems, or how increased knowledge of insect biology has become a useful tool for society. Some of these specific topics include the shift from miasma to germ theory; practices during the bubonic plague that were a result of misunderstanding, how the need to control insect pests of humans, animals and crops have lead to major societal changes including pesticide development, the use of enslaved cultures and entomological warfare.

• Predict the best methods for managing insect pests in different historical contexts
Exploratory Exercise 3 highlights the progression of the understanding of plague from historical contexts to present day contexts and asks the student to apply the same thought process to some present day insect borne diseases (Dengue, River Blindness and Chagas). Students hypothesize what putative treatments may have been without scientific knowledge and compare to current day treatments.
A specific matching question on the final has student determine how current day technologies could have been applied to historical insect related issues, including typhus, malaria, plague, hunger and wound care in the field.

Course Subject & Number: ENTMLGY 2101-2102

Expected Learning Outcome 1.3: Successful students are able to employ the processes of science through exploration, discovery, and collaboration to interact directly with the natural world when feasible, using appropriate tools, models, and analysis of data. Please explain the 1-credit hour equivalent experiential component included in the course: e.g., traditional lab, course-based research experiences, directed observations, or simulations. Please note that students are expected to analyze data and report on outcomes as part of this experiential component. *(50-1000 words)*

The one credit laboratory- ENTMLGY 2102 is meant to get students interacting with insects in their environments. As insects outnumber all other living things on earth, students will experience how close they actually live with insects.

The lab is composed of three different types of lab activities.
1. Insect observations- students will receive directed instructions on ways to observe insects around them. They will learn the trapping techniques used by professional entomologists to be able to explore and observe these insects. Students will document their experiences via photos and data and share with their classmates so that everyone can see the diversity of insects around them.
2. Insect data: Students will learn the ways we utilize data and data analysis though insect biology. These labs are themed around insects, but will teach the students embedded analysis skills surrounding robust data analysis and basic statistics (averages, t-tests, etc.)
3. Insect experimental design: students will get experience in a multi week lab on the scientific method and the process to collect, analyzed and share data about insects in media. Then, students will learn how this process is modified via experimental treatments when they repeat the skills they have learned but in manipulatable experiments.

Each lab module will be composed of:
1. Overview page outlining the weekly expectation of the students as well as any materials and time constraints for the weekly procedure.
2. Progressive module pages that will include brief video overviews of topics, additional resources and a short quiz that students must pass with 80% before continuing on to additional module pages for the week. This will ensure that students work through the process as if they are in an in-person lab.
3. Any materials needed for data gathering (datasheets, shared documents).
4. Needed tutorials or references for analysis (if applicable)
5. A Carmen lab assignment meant to be turned in as the graded piece.
6. Interaction and reflection with class group members. Students will be put in small lab groups and each week there will be a shared discussion or other interactive feature (padlet, etc.) for the students to look at. The following lab report will begin with a student reflection of their peer findings, to allow for student interaction in a timely manner (reflection for Week 1 will be the beginning of Week 2 lab report).
7. An online laboratory final designed to help with end of class assessment of expected ELOs
8. An undergraduate TA (s) that is/are available to assist with student questions and interactions on discussion

Class ELO with GE reference and corresponding assessments
- Identify the scientific process and synthesize insect related experimental designs (ELO1.3)
- Media Project Lab Report
- Insect Behavior Lab Report
- Build the best fly trap Lab Report
- Question bank on lab final
- Observe insects and identify links to their impact their world (ELO 1.3)
- Light Traps Lab Report
- Diapause Observation Lab Report
- Pollinator Observation Lab Report
- Question Bank on Lab Final
- Analyze insect related data with appropriated tool and summarize results for a lay audience (ELO 1.3, 2.3).
- Insect morphology lab Report
- Forensic Entomology Lab Report
- Pepper Moth Lab Report
- Plague Lab Report
- Media project poster session Presentation
- Question Bank on Lab Final

GOAL 2: Successful students will discern the relationship between the theoretical and applied sciences, while appreciating the implications of scientific discoveries and the potential impacts of science and technology.

Expected Learning Outcome 2.1: Successful students are able to analyze the inter-dependence and potential impacts of scientific and technological developments. Please link this ELO to the course goals and topics and indicate *specific* activities/assignments through which it will be met. *(50-700 words)*

Examine the role that insects have played in the fields of evolutionary biology, molecular genetics, human medicine, and military operations (ELO 1.1, 2.1).
• An essay question on the final exam tests the student's ability to articulate how they perceive insects will be able to improve the future of our society.
• Exploratory Exercise 4 has students trace modern day medical advancements back to insect based remedies as well as determine how frequently insect based remedies are use by worldwide cultures successfully.

Discuss roles played by insects in food webs and as biological control agents (ELO 2.1)
• A short essay question on the final exam asks students to outline and describe a trophic food web of their choice that includes three insects
• A question bank of multiple choice questions in Week 12 is designed to assess student understanding of insects as agricultural pests.

Expected Learning Outcome 2.2: Successful students are able to evaluate social and ethical implications of natural scientific discoveries. Please link this ELO to the course goals and topics and indicate *specific* activities/ assignments through which it will be met. *(50-700 words)*

Articulate the positive and negative impacts that insects have had on human and veterinary medicine and well-being (ELO 2.2).
• The final exam essay focuses on student ability to outline and articulate how insects have influenced our valuation of insects in political, cultural, scientific and religious beliefs. Students are graded on how well they support their statements and articulate how insect valuation increases or decreases due to each use.
• Discussion 4 assesses the ability of students to link the value of pollination service by insects to the foods they eat and allows them to assess threats to these pollinators.

Course Subject & Number: ENTMLGY 2101-2102

Expected Learning Outcome 2.3: Successful students are able to critically evaluate and responsibly use information from the natural sciences. Please link this ELO to the course goals and topics and indicate *specific* activities/ assignments through which it will be met. *(50-700 words)*

Distinguish between scientific, religious, political and popular beliefs (ELO 2.3).
• Students are graded specifically on both the midterm and final to determine insects in these beliefs. A short essay question asks student to discriminate between insect use for science advancement versus use in religious and art. The final exam essay (mentioned above) is also graded whether a student can correctly align the use and the description with the topic of belief.
• Analyze insect related data with appropriate tool and summarize results for a lay audience (ELO 1.3, 2.3).
• Student discussion 3 centers around students designing solutions to historical problems using the scientific method, as well as critiquing and correcting their classmates experimental designs.

Integrate biological information and historical perspectives to evaluate the accuracy of insect representations in art, literature and religious texts (ELO 2.3).
• Student Discussion 2 is used to assess student interpretation of a popular piece of fiction (The Metamorphosis) and allow the students to assess the accuracy of insect depictions in this piece of literature.