

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Undergraduate Programs		UUPC Approval <u>12/4/23</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	Department Honors College College Wilkes Honors College (To obtain a course number, contact erudolph@fau.edu)		
Prefix PCB Number 4054C	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code C	Type of Course Lecture/Lab	Course Title RI: Honors Drosophila Genes and Behavior
Credits (Review Provost Memorandum) 3	Grading (Select One Option) Regular <input checked="" type="radio"/> Pass/Fail <input type="radio"/> Sat/UnSat <input type="radio"/>	Course Description (Syllabus must be attached; Syllabus Checklist recommended; see Guidelines) RI: Honors Drosophila Genes and Behavior will bring students closer to an understanding of how genetic variations can manifest in behavioral phenotypes using the widely used model organism, <i>Drosophila melanogaster</i> . Conceptual knowledge will be gained in <i>Drosophila</i> husbandry, use as a model system, disease models, and how genes affect behavior using behavioral assays. Students will learn how to collect, analyze and derive significance from scientific data. Research-intensive course	
Effective Date (TERM & YEAR) Fall 2024	Prerequisites, with minimum grade* BSC1010, C BSC1010L, C and permission of instructor		Corequisites _____
		Registration Controls (Major, College, Level) Honors College, Undergraduate	
*Default minimum passing grade is D-. Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course			
WAC/Gordon Rule Course <input type="radio"/> Yes <input checked="" type="radio"/> No WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines .		Intellectual Foundations Program (General Education) Requirement (Select One Option) None General Education criteria must be indicated in the syllabus and approval attached to the proposal. See GE Guidelines .	
Minimum qualifications to teach course P.h.D in Biology or related field.			
Faculty Contact/Email/Phone Jennifer Krill/jkrill@fau.edu/561-295-8667		List/Attach comments from departments affected by new course Wilkes Honors College, College of Science Biology Department	
Approved by Department Chair <u>Miguel Ángel Vázquez</u> College Curriculum Chair <u>Rachel Carr</u> College Dean <u>[Signature]</u> UUPC Chair <u>Korey Sorge</u> Undergraduate Studies Dean <u>Dan Meeroff</u> UFS President _____ Provost _____			Date 10/24/23 10/24/23 <u>10/24/23</u> 12/4/23 12/4/23 _____ _____

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.



RI: Honors *Drosophila* Genes and Behavior

PCB 4054C-Section TBA-CRN TBA

3 credits

COURSE PREREQUISITES:

Biological Principles (BSC 1010 and BSC1010L with grade of C) and permission of Instructor.

LOGISTICS:

PERIOD/SEMESTER Fall 2024

LOCATION: Jupiter Campus, EC104

CLASS HOURS:

OPEN LAB HOURS*: TBA

**Open Lab Hours are optional and intended for students who need extra time to complete experiments. Students who miss lab for unexcused reasons will not be permitted to make up lab during open lab hours. Students wishing to attend open lab hours should email me 24 hours prior to lab.*

CONTACT INFORMATION:

Instructor: Dr. Jennifer Krill

Office: EC2021

Email: jkrill@fau.edu

Office hours: TBA

TA: TBA

Office: TBA

Email: TBA

Office Hours: TBA

**Office hours are also available by appointment outside of normal office hours for class conflicts.*

COURSE DESCRIPTION:

RI: Honors *Drosophila* Genes and Behavior will bring students closer to an understanding of how genetic variations can manifest in behavioral phenotypes using the widely used model organism, *Drosophila melanogaster*. Conceptual knowledge will be gained in *Drosophila* husbandry, use as a model system, disease models, and how genes affect behavior using behavioral assays. Students will learn how to collect, analyze and derive significance from scientific data. This is a research-intensive (RI) course.

NOTE ON HONORS DISTINCTION:

This Honors course differs from a non-Honors course in the work and intellectual demands it places on students. In addition to the textbook readings, students will read articles published by professional scholars in peer-reviewed journals, and are expected to think critically about the debates within the field.

RI Designation: This course contains an assignment or multiple assignments designed to help students conduct

research and inquiry at an intensive level. If this class is selected to participate in the university-wide assessment program, students will be asked to complete a consent form and submit electronically some of their research assignments for review. Visit the Office of Undergraduate Research and Inquiry (OURI) for additional opportunities and information at <http://www.fau.edu/ourj>.

Undergraduate Research Certificate: FAU now offers an Undergraduate Research Certificate to recognize undergraduate students for the systematic development of excellence in undergraduate research. Students seeking a certificate must complete 12 credits in research-intensive (RI), skillbuilding, exposure, and research dissemination activities. Successfully completing this course earns you three credits in research intensive coursework. Learn more about the RI Certificate here Office of Undergraduate Research and Inquiry (OURI) | Florida Atlantic University (fau.edu)

COURSE OBJECTIVES:

To expose students to the concept and principles of behavioral assays using *Drosophila*:

- [1] Knowledge *Drosophila* husbandry and use as a model system to investigate human disease.
- [2] Use of behavioral assays to determine single gene effects on organismal behavior.
- [3] Ability to analyze wet lab data to determine significance of experimental results.
- [4] Demonstrate [1] through [3] through written and oral explanation.

STUDENT LEARNING OUTCOMES:

SLO 1: Knowledge. Students will demonstrate content knowledge, core principles, and acquired technical skills in *Drosophila* behavioral assays. Competency in concepts of how genetic variation and disease models can affect foraging, activity, locomotion, stress tolerance, circadian rhythms, aggression, courtship, feeding, and ethanol preference will be demonstrated in laboratory reports. Students will also gain mastery of the technical skills of behavioral assays and *Drosophila* genetic tools required to gather and analyze data on such concepts.

SLO 2: Formulate Questions. Students will formulate their own independent research projects that integrate fundamental principles and knowledge of *Drosophila* genetics and behavioral assays to a novel and unique question.

SLO 3: Plan of Action. Students will develop and implement a plan of action to address research and inquiry questions using the behavioral techniques mastered in the lab. This will include the development of the student's own methods for carrying out the experiment to answer their independent research question in SLO1.

SLO 4: Critical Thinking. Students will apply critical thinking skills to evaluate and integrate information from published scientific journals with predicted outcomes of experiments from simulations and experimental data gathered in lab (for both the required reports and independent project). This will include analysis of the data from their laboratory experiments and their own independent research question in SLO1.

SLO 5: Ethical Conduct. While this laboratory utilizes invertebrate model organisms, it is recommended that students complete the Responsible conduct of research (RCR) certificate through the CITI training of academic research on-line at <http://www.fau.edu/graduate/events/citi-training.php>. Students are also encouraged to attend FAU OURI workshops on topics related responsible conduct of research. Information on OURI workshops can be found here http://www.fau.edu/ourj/student_workshops.php

SLO 6: Communication. Students will convey all aspects of their research and inquiry in laboratory reports that follow the format of primary scientific articles. Students are also encouraged to share their independent research findings by submitting their paper to the Florida Atlantic University Undergraduate Research Journal (FAURJ) or at Florida Atlantic University's Undergraduate Research Symposium held at Florida Atlantic University (Boca Raton campus) each Spring Semester. Use the following links for information: journal submissions- https://www.fau.edu/our/ug_research_journal.php, symposium submissions- http://www.fau.edu/our/undergrad_symposium.php.

WRITING COURSE COMPONENT

The writing component of this course involves laboratory reports written in the format of a scientific journal article. Each 8-page report will be co-authored by lab partners and include an introduction, materials and methods, results, discussion and references sections. Students will take wet lab data and through data analysis, relate their findings to the underlying cellular and molecular mechanisms as well as extrapolate the significance of their findings to a scientific concept. Students will receive feedback on their reports which they will use to improve their scientific writing skills over the course of the semester. There are a total of 6 reports due throughout the semester. Up to 2 reports will be eligible for revision and resubmission for full credit.

Students will also compose an independent research project. Students will receive feedback on their project idea, experimental design, and significance of their results from a research mentor. Students will conduct a literature review, experimental design, and an independent project proposal. Mentor meetings are intended to provide students with feedback to better develop their independent projects. Students will submit their notes from mentoring meeting and incorporate mentor feedback from their literature review and experimental design in their formal project proposal. Students will compose a formal written report in the format of a scientific journal article and a poster presentation on their project. Based on feedback, students will revise their papers for publication. Projects that do not incorporate feedback in their revisions will not be published. Posters may also be used to present their independent projects at symposia.

For all co-authored assignments, students will be required to submit an assessment of individual student contributions. This will be used for grading purposes and individual student contribution will contribute to individual student grades on a particular assignment.

COURSE DELIVERY MODE

This is a fully in-person course accessible only during class time and open lab hours. Assignments, lecture materials, and other useful course information will be posted through FAU's learning management system, Canvas. You must log into Canvas with your FAU ID and Password to access the materials and assignments in this course. If you do not know your FAU ID or Password, [contact OIT for help](#). The course is organized into modules with due dates. **Unless otherwise specified, each module begins on Monday at 12:00am, EST, and ends on Sunday at 11:59pm, EST.** The course begins with the Start Here module, which will familiarize you with the organization and navigation of the course. You will open a new learning module to access the assigned reading materials, videos, presentations, and other relevant materials for each subsequent module.

COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

1. Explain biological concepts, principles, and paradigms as it relates to neuroscience. Apply the

principles of scientific inquiry and ethical standards using earthworms and crickets to develop and investigate research questions about neurophysiological processes.

2. Apply neuroscience knowledge (concepts) from simulations, provided data or scientific journal articles to experimental findings.
3. Critically evaluate scientific claims, arguments, and methodology using simulations, provided data or extracellular techniques.
4. Demonstrate and explain how experiments are conducted through virtual wet lab experimentation and written explanation.
1. This is a fully in-person course accessible only during class time and open lab hours. Assignments, lecture materials, and other useful course information will be posted through FAU's learning management system, Canvas. You must log into Canvas with your FAU ID and Password to access the materials and assignments in this course. If you do not know your FAU ID or Password, [contact OIT for help](#). The course is organized into modules with due dates. **Unless otherwise specified, each module begins on Monday at 12:00am, EST, and ends on Sunday at 11:59pm, EST.** The course begins with the Start Here module, which will familiarize you with the organization and navigation of the course. You will open a new learning module to access the assigned reading materials, videos, presentations, and other relevant materials for each subsequent module.

REQUIRED TEXTS & MATERIALS

- Markstein, Michele. *Drosophila Workers Unite! A laboratory manual for working with Drosophila*. Creative Commons Attribution-NonCommercial (CC-BYNC) International License, version 4.0. 2018 <http://marksteinlab.org/wp-content/uploads/2018/11/Markstein-DrosophilaWorkersUnite.pdf>
- Roote, J., and Prokop, A. *How to design a genetic mating scheme: a basic training package for Drosophila genetics. Version 32*. Creative Commons Attribution (CC-BY) International License, version 4.0. 2021 https://figshare.com/articles/journal_contribution/How_to_design_a_genetic_mating_scheme_a_basic_training_package_for_Drosophila_genetics/106631?file=3697504

Both textbooks are free and available to use. Links are provided here and in Canvas.

ASSIGNMENT DESCRIPTIONS

Quizzes: For each lab a short 5 question quiz will be posted on Canvas. Questions will come from the lab that the students are going to perform that day. Questions will be short answer, fill in the blank and true/false. The purpose of the quizzes is that students review the lab materials prior to class time. **All quizzes will be available on Canvas from Monday of the week of the lab until Wednesday or Friday at 11:59am.**

Preparatory Assignments- Figures, Data Analysis, Genetics (3 x 25 points each, 5% total grade)

Lab Reports (3 x 135 points each, 28% final grade): Students will conduct experiments using *Drosophila* adults and larvae to investigate principles of how genes affect behavior. Students will gain knowledge and experience in using *Drosophila* as a model organism in these experiments, which will culminate in answering a unique student-generated question for the independent project. When conducting these experiments, students will learn how to conduct scientific research, collect and analyze data, and generate a laboratory report in the format of a scientific journal publication with an introduction, materials and methods, results, discussion and citations. Students will also conduct literature searches to gather primary

source publications to synthesize a discussion of their results and the relevance of their results with regard to previously published literature. Students will critically analyze their data in relation to expected results gathered from previously published literature and learn how to create publication-worthy figures and graphs. Students will co-author their findings in the format of a scientific journal article with introduction, materials and methods, results, discussion and references sections. Feedback from these reports will be used by students to iteratively improve on subsequent reports. Students are required to submit a **All reports are due Sundays at 11:59PM. Submissions are uploaded to the Assignments tab in Canvas using the TurnItIn plagiarism application.**

Independent Project (680 total points, 47% final grade)

Mini Independent Project Poster (100 points)

Students will conduct a literature review and design an experiment using a stress assay (i.e. hyperthermia, wet anoxia, starvation, etc.), collect and analyze data to create a scientific poster presentation. Poster presentations will be discussed as a class on points of clarity and effectiveness with respect to scientific communication. This is in preparation for the poster presentation of the comprehensive independent project. Feedback from this assignment can be used by the student to complete their independent project poster presentation.

Lit Review, Experimental Design, Project Proposal and Mentoring (275 points total)

Students will use the content knowledge, skills and techniques learned in lab during the course of the semester to develop their own unique research question. Students will conduct a literature review on their chosen topic to develop a unique student-driven hypothesis that they will then design and experiment to gather and analyze data to test their hypothesis and come up with a conclusion. Students will have mentoring meetings during the research process where they will receive feedback. Students are expected to take notes during mentoring meetings that they will submit for a grade and mentor feedback should be incorporated into the final project proposal for the independent project.

Comprehensive Independent Project- Manuscript, Poster and Oral Presentations (305 points total):

Students will apply the knowledge and technical skills learned in the experimental laboratories and literature searches to develop their own independent hypothesis. Students will design an experiment using the techniques learned in the experimental labs to answer their unique question. Students will relay their findings in the form of a scientific manuscript with abstract, introduction, materials and methods, results, discussion, and references sections, as well as a poster presentation in the format of a scientific symposium presentation with an oral presentation. Oral presentations will be presented during the final exam time for the course. **Assignments due Sunday at 11:59pm (except oral presentation).**

Scientific Communication and Written Component: Students will learn how to communicate their experimental findings in the manner of a scientific journal article. Students will receive feedback on reports and are expected to use that feedback to improve their scientific writing skills throughout the course. Iterative feedback and subsequent report submissions will develop these skills to the level of publication in a scientific journal.

Approved reports of independent projects will be submitted to [BioRxiv](#) for publication in a non-peer reviewed publication or the FAU Undergraduate Research Journal or MicroPub for as peer-reviewed publication. Students will also be able to revise and resubmit up to two reports for full credit. Late penalties from original reports will be applied to any revisions. Students will also create a poster presentation of their independent project findings that they can present at an FAU symposium. Posters and oral presentations will be provided feedback so students can improve on other forms of scientific communication.

EVALUATION METHOD

Professional Scientific Figures

Assignment	25		Total
Data Analysis Assignment	25		1460
Drosophila Genetics Assignment		25	
Lab Report 1 (Mini): Larval Foraging	85		Grading scale:
Lab Report 2: Locomotor Effects on Disease Models	135		A = 100-93%
Mini Indep Project: Stress Tolerance of Related Genes	100		A- = 92-90%
Lap Report 3: CAFE Assay and Ethanol Preference	135		B+ = 89-87%
Lab Report 4: Chemosensation and SARS-CoV2 genes	135		B = 86-83%
Lab Report 6 (Mini): Optogenetics	85		B- = 82-80%
Independent Project Literature Review	50		C+ = 79-77%
Independent Project Experimental Design	50		C = 76-73%
Mentoring Meetings (25 points each x 3)	75		C- = 72-70%
Independent Project Proposal	100		D+ = 69-67%
Independent Project Poster	105		D = 66-60%
Independent Project Oral Presentation	50		F = <59
Independent Project Manuscript	150		
Attendance and Participation	100		
Quizzes 6 @ 5 points each	30		

COURSE OUTLINE:

- An overview of the history of *Drosophila* as a model organism.
- Introduction to the theory behind how behavioral assays can be used to characterize the effects of genetic mutations on behavior.
- The use of animals in research.
- *Drosophila* life cycle and sex and phenotypic classification.
- Instrumentation overview and analysis software training.
- Locomotory assays, feeding assays and stress assay techniques.
- Scientific communication.

METHODS OF TEACHING:

- Laboratory exercises
- Lectures and students' discussions
- Audio-visuals: power point presentations

TECHNOLOGY REQUIREMENTS:

- **LockDown Browser + Webcam Requirement**
This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be the type that's built into your computer or one that plugs in with a USB cable. Please check the system requirements [here](#). Watch this brief [video](#) to get a basic understanding of LockDown Browser and the webcam feature. Please read the [Download Instructions](#) and [Guidelines](#) for additional information and troubleshooting support resources.
- **Zoom Meetings:** Zoom will be used to host all live virtual content including any lectures and office hours. For assistance using Zoom please visit the [Zoom Help Center](#).
- **Lectures:** Lectures will be held virtually. Links to live lectures will be posted in the Zoom tab on Canvas.

- **Office Hours:** To schedule a personal meeting time, please email me at least 24 hours prior to your desired meeting. Once a meeting time has been confirmed, please access your meeting through the Zoom tab on Canvas. Your meeting will include your name. Only attend the personal meeting that has your name designated.

CLASSROOM ETIQUETTE

All FAU students are expected to behave according to accepted norms that ensure a professional climate wherein all can exercise their right to learn. Questions from students will be recognized at the discretion of the lecturer in a manner that is minimally disruptive to the lecture. Cell phones should be shut off during lectures. Stations must be cleaned up and shut down at the end of the day for full participation credit. Disruptive behavior is not acceptable in the classroom. Students engaging in such behavior may be asked to leave or may be moved from the class by security personnel. Actions such as violence, shouting, use of cell phones, using profanity, interrupting classes, and any other behavior that the instructor believes creates an unpleasant environment in the classroom will be grounds for withdrawal from the course, disciplinary/judicial proceedings, or failure of the course.

TIME COMMITMENT PER CREDIT HOUR

This course has three (3) credit hours. For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

ATTENDANCE POLICY STATEMENT

Students are expected to attend all their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations, or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances, and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

RELIGIOUS ACCOMMODATION POLICY STATEMENT

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations.

Any student who feels aggrieved regarding religious accommodations may present a grievance to the director of Equal Opportunity Programs. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

LATE ASSIGNMENTS/MISSED CLASSES

Late assignments will be penalized 10% per day and none will be accepted after 5 days. No late quizzes or exams will be accepted as questions and answers will be posted after the due date and time.

DISABILITY STATEMENT

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie, and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS) CENTER

Life as a university student can be challenging physically, mentally, and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>.

CODE OF ACADEMIC INTEGRITY POLICY

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

ARTICULATION TO UNIVERSITY MISSION: This course addresses both the university mission statement as well as the strategic plan by offering a high quality academic curriculum in a caring environment, stimulating creative initiative utilizing some problem-based learning, critical thinking, and the development of both written and oral competencies. This course fosters motivated, self-directed analytical thinking. Students in this course will develop an awareness of the contributions of scientists and practitioners from diverse domestic and international backgrounds as well as biomedical and health issues that impact those living within and outside of our community. These goals are attained by providing quality instruction, class discussions or debates, attendance at special seminars, exams, and written reports to help students attain their goals.

GRADE APPEAL PROCESS

You may request a review of the final course grade when you believe that one of the following conditions apply:

- There was a computational or recording error in the grading.
- The grading process used non-academic criteria.
- There was a gross violation of the instructor's own grading system.

[University Regulation 4.002](#) of the University Regulations contains information on the grade appeals process

POLICY ON THE RECORDING OF LECTURES

Because of House Bill 233/Section 1004.097, Florida Statutes in 2021, the following model language is suggested for inclusion in course syllabi, at the discretion of individual faculty:

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member.

Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

STUDENT SUPPORT SERVICES AND ONLINE RESOURCES

- [Center for Learning and Student Success \(CLASS\)](#)
- [Counseling and Psychological Services \(CAPS\)](#)
- [FAU Libraries](#)
- [Math Learning Center](#)
- [Office of Information Technology Helpdesk](#)
- [Office of International Programs and Study Abroad](#)
- [Office of Undergraduate Research and Inquiry \(OURI\)](#)
- [Science Learning Center](#)
- [Speaking Center](#)
- [Student Accessibility Services](#)
- [Student Athlete Success Center \(SASC\)](#)
- [Testing and Certification](#)
- [Test Preparation](#)
- [University Academic Advising Services](#)
- [University Center for Excellence in Writing \(UCEW\)](#)
- [Writing Across the Curriculum \(WAC\)](#)

COURSE SCHEDULE:

Class Schedule	Lab	Pre-Class	Out of Class
WEEK 1	History as a model organism		
WEEK 2	Lecture: Drosophila Husbandry , Life Cycle , Anatomy , Males vs. Females Lab: Using a microscope, identify larval, pupal, and adult stages, sex males and females, identify virgins, identify mutant phenotypes	Quiz 1	Professional Figures Assignment
WEEK 3	Lab: PKG and larval foraging behavior Discussion: Biorender, Data Analysis, Scientific Writing	Quiz 2	Due: Figures Mini Report for Lab: PKG feeding behavior in the presence vs. absence of food
WEEK 4	Lecture- Parkinson's and Locomotory Assays Lab: Locomotory Assays and Disease Models- Climbing Assay Next Lab Prep: Mouth Pipette Assembly	Quiz 3	Due: Lab 1 Mini Report Report for Lab: Effect of Parkinson's-related genes on locomotion
WEEK 5	Lab: Locomotory Assays and Disease Models- DAM Assay Discussion: Independent Project		Report for Lab: Effect of Parkinson's-related genes on locomotion

WEEK 6	Lecture: HSPs and foraging in stress tolerance Stress Assays: Heat Shock and Drowning Assays	Quiz 4	Due: Lab 2 Report Parkinsons Locomotory Report for Lab: Stress Assays
WEEK 7	Lab: Stress Assays Discussion: Independent Projects		Report for Lab: Effect of HSP and foraging gene expression on stress tolerance
WEEK 8	Lab: Ethanol Preference and the CAFE Assay Mentor Meetings: Independent Project	Quiz 5	Due: Research Summary Due: Lab 3 Report Stress Assays
WEEK 9	Spring Break University Holiday (no class)		
WEEK 9	Lecture: Optogenetics, Aggression and the GAL4-UAS System Lab: Ethanol Preference and CAFE Assay Lab: Transgenic Crosses	Quiz 6	Due: Experimental Design Mentor Meetings: Independent Project (Zoom)
WEEK 10	Lab: Optogenetics and Aggression (or Courtship) Nex Week Lab Prep: Transgenic crosses		Due: Genetics Worksheet Due: Lab 4 Report EtOH Preference Mentor Meetings: Independent Project (Zoom)
WEEK 11	Lecture: Chemosensation and SARS-CoV2 genes Lab: CAFE Assay and taste preference using quinine in CoV-2 transgenic lines Next Lab Prep: Independent Projects		Due: Lab 5 Mini Report Optogenetics
WEEK 12	Lab: CAFE Assay and taste preference using quinine in CoV-2 transgenic lines Lab: Independent Project		CAFE Assay Data Analysis
WEEK 13	Independent Project		Due: Lab 6 CAFE Assay Data Analysis
WEEK 14	Independent Project		
WEEK 16	Virtual Only Final Exam Posted to the Quizzes tab in Canvas. Requires Lockdown Browser and Respondus.		
WEEK 17	Virtual Only Independent Project Poster Presentation Zoom Link in Canvas		Due: Independent Project Poster Due: Research Journal Article for Publication*

*Select Articles will be submitted to BioRxiv for publication in a non-peer reviewed pre-print server for Biology hosted by Cold Spring Harbor. Exceptions include articles needing extensive revision and projects that students would like to continue for future publication in a later semester.