Course Information

BIOLOGY 3133.001, 002 - GENETICS LABORATORY

Fall 2025

TIME: 001: 2-4:50pm Mon; 002: 2-4:50pm Wed

LOCATION: BEP 129

INSTRUCTOR:

Dr Katrin Kellner (kkellner@uttyler.edu)

Office hours: MF, 9-10am at HPR 104; MW, 1-2pm, HPR 104 or BEP129

TEACHING ASSISTANT:

Ciara Moroney, cmoroney@uttyler.edu

Office hours: T, 8-10am, and TH, 9-10am at BEP149, or by appointment

E-MAIL POLICY: When sending an email, please add "**BIOL3133**" at the beginning of the title and clearly indicate your **name** and your **section number (001 or 002)** in the first few sentences of the main text. Please note that the instructor may not be able to respond to emails in two working days or over the weekend

COURSE FORMAT: This lab course is in a **face-to-face** format. Attendance is required in this course. You will find a calendar with the planned program in this syllabus. Please check Canvas frequently for changes and updates.

COURSE DESCRIPTION: An introduction to experimental and quantitative laboratory techniques fundamental to genetic analysis.

COURSE GOALS:

1) To learn and apply concepts of modern transmission and molecular genetics.

2) To learn and practice common genetics laboratory and field techniques.

LEARNING OUTCOMES: Upon completion of BIOL 3133, the student should be able to:

- outline the basic procedures for culturing and experimenting with *Drosophila melanogaster*
- outline the basic procedures for culturing and experimenting with Wisconsin Fast Plants
- recognize and interpret F2 data from genetic crosses
- define and give an example of what is meant by the concept of chance
- use probability principles in solving problems concerning independent events occurring simultaneously, binomial expansion, and mutually exclusive events
- apply probability concepts to the analysis of pedigrees
- perform a chi-square test to determine whether a given set of data approximates a theoretically expected ratio
- compare and contrast the mitotic and meiotic process in plant and animal cells
- diagram how an X-linked gene is transmitted from parents to F1 and F2 generations
- extract DNA from tissue
- outline a procedure for conducting a polymerase chain reaction
- use agarose gel electrophoresis to visualize DNA
- genetically transform *Escherichia coli*
- use Hardy-Weinberg equilibrium theory to determine gene and allele frequencies in populations
- use DNA sequences to construct a phylogenetic tree
- use NCBI Blast

MATERIALS: All material required can be found on Canvas and/or will be provided by the instructors.

A NOTE ABOUT YOUR GENERAL RESPONSIBILITY IN THE LAB AND SAFETY PROTOLS:

Clean up after yourself. If you use it, put it back; if you dirty it, clean it up; at all times practice safe laboratory practices.

Laboratory Safety and Dress Code: Food and drink are NOT allowed in the labs at any time. All students are required to take part in the general safety introduction on the first days and to take an online safety quiz. All students have to follow general safety instructions.

Students are also required to wear the following PPE (Personal Protective Equipment) during all lab sections:

- **Closed-toed shoes**; absolutely **NO open-toed shoes** are allowed. If you show up to lab with flip-flops, sandals, or other open-toed shoes you will be asked to leave OR must wear departmental rubber boots or waders during the lab time.
- **Long pants must be worn at all times during the lab**. Please do not show up in shorts, you will be asked to leave or wear full waders during lab.
- **Gloves** are required for some labs. If you leave the lab, you must remove your gloves, and wash your hands, and obtain new ones upon returning.
- **Lab coats** will be provided as needed. We do not need lab coats every week, but will let you know for which labs you need to wear a lab coat.
- **Safety goggles** will be provided as needed, and must be worn when appropriate.

GRADING:

Item	**Percentage**
Pre-lab Quizzes/Assignments – 108 points total (9 points x 12)	**5%**
In-class Assignments – 108 points total (9 points x 12)	**30%**
Post-lab Assignments – 108 points total (9 points x 12)	**5%**
Lab Report – 100 points	**30%**
Lab Exam – 100 points	**30%**

The final percentage will be calculated as follows:

Prelab points*5% + In class points * 30% + Post lab points * 5% + Lab report points * 30% + Lab final exam * 30%

Letter grades will be assigned according to the following scale:

A = 90-100%

B = 80-89%

C = 70-79%

D = 60-69%

F = below 60%

In-class Assignments and Attendance

In this course, we take attendance by signing of your assignments at the end of the lab day. If you are missing a lab due to a sport events, religious event, or other reasons, please let us know in advance. There are no make-up lab days. An alternative online assignment will only be available if you have a legit excuse with documentation. If you miss a lab unexcused, you will miss the points for that day. You cannot miss more than 3 lab days unexcused. Please do not come to the lab if you are feeling ill.

Prelab Quizzes and Assignments

It is expected that you start the lab prepared for the topic. Therefore, before each lab, there will be a short reading, online tutorial, etc. to do, followed up with a short quiz assigned through Canvas. Some labs may require you to submit the assignments online. These online prelab quizzes and assignments will be due at noon on the lab day, unless there are other instructions. Some labs may require you to hand in a paper assignment at the beginning of the lab.

Late Assignment Policy

If you submit your assignments late, Canvas will automatically deduct 25% of the points with every day, and you receive 0 points once 4 days have passed.

Lab Report

Part of your lab grade will come from a lab report. The lab report is a written document including all parts of a primary research article. **You are expected to work on the lab report as a team of no more than three students.** You will conduct an experiment for several weeks and collect the data needed for the report. Each team is responsible for their

own experiment! There will be more detailed instructions on how to write the lab report, and you can ask us for help and feedback at any time during the semester. All members of one team receive the same grade.

Lab Exam

The course will finish with a lab exam (see date below).

	Lab Topic	**Assignments**	**Fly work Schedule***	**Plant work Schedule***
08/24	Lab1: Lab Safety, Microscopy, Meiosis	Safety Quiz and Sheets		
08/31	Labor Day – no labs this week!			
09/07	Lab 2: Principles of probability, Solving genetic problems, Pedigree analysis, Chisquare tests	Lab 1 Postlab & Lab 2 Prelab due at noon	Start the Cross (Cross Parents)	Plant seeds (F1)
09/14	Lab 3: Human Chromosomes, Karyotypes, Barr Body staining	Lab 2 Postlab & Lab 3 Prelab due at noon	(Remove Parents)	Waiting…
09/21	Lab 4: Working with *D. Melanogaster*, Pedigrees with sex-linked inheritance patterns	Lab 3 Postlab & Lab 4 Prelab due at noon	Phenotype F1 & Cross F1	Phenotype F1 & Cross F1
09/28	Lab 5: Bioinformatics I: HWE & Phylogenetics	Lab 4 Postlab & Lab 5 Prelab due at noon	(Remove F1)	Waiting…
10/05	Lab 6: Bacterial transformation	Lab 5 Postlab & Lab 6 Prelab due at noon	Phenotype F2 when hatching	Waiting…
10/12	Lab 7: PTC tasting I, DNA extraction & PCR	Lab 6 Postlab & Lab 7 Prelab due		Waiting…

		at noon		
10/19	Lab 8: PTC tasting II, Restriction enzyme digest & agarose gel electrophoresis	Lab 7 Postlab & Lab 8 Prelab due at noon		Harvest & dry F2 seeds
10/26	Lab 9: Forensics I	Lab 8 Postlab & Lab 9 Prelab due at noon		Plant F2 seeds
11/02	Lab 10: Forensics II	Lab 9 Postlab & Lab 10 Prelab due at noon		Waiting…
11/09	Lab 11: Bioinformatics II: Gene expression & NCBI Blast	Lab 10 Postlab & Lab 11 Prelab due at noon		Phenotype F 2 plants
11/16	Lab 12: Gene Regulation & Gene Editing	Lab 11 Postlab & Lab 12 Prelab due at noon		
11/23	Thanksgiving Break			
11/30	Lab Exam			Lab Report due

***The lab program and schedule is subject to change, depending on availability of supplies, Covid precautions, etc. Please check the announcements at the beginning of the week for any changes.**

Corrupted File Policy

Any student that turns in a corrupted file will be given 24 hours to turn in a file that can be opened successfully by the instructor. Failure to do so will earn a grade of "0" (Zero) for the paper.

Make-up Exam Policy

If you are unable to take an exam as scheduled, a make-up exam will be arranged ONLY if the reason is legitimate (illness, sport and religious events, emergencies, etc.), and a written documentation is provided (doctor's note, etc.). A make-up exam will have to be scheduled no later than one week after the missed exam. Students who fail to make appropriate arrangements will receive zero points for the exam missed. Make-up exams are in the same style as the regular exams but contain different questions.

Behavior during Exams: Being -Late-to-Exam Policy

Students who are late more than 10 minutes after an exam has started will receive a zero and are not allowed to enter the exam room. Students are required to keep their desks clear of backpacks, purses, jackets and such. No cell phones, laptops or tablets can be out on the tables. Students can bring their own calculator or obtain one from the instructor. Cell phones are not allowed as calculators for exams.

Academic Integrity: Students should be aware that absolute academic integrity is expected of every student in all undertakings at The University of Texas at Tyler. Failure to comply can result in strong university-imposed penalties. Be forewarned that possession of anything containing course content will be considered cheating, whether or not you actually refer to it during the exam. Also be aware that TALKING during an EXAM to anyone other than the instructor or proctor will automatically be considered cheating. It does not matter what you were talking about. This includes the use of cell phones (even if they call YOU) or any other electronic device that could be used to record test material. Violation of this policy will be considered cheating and treated accordingly. Penalties for cheating include anything from a zero on the exam or quiz during which the cheating occurred, up to an F for the course in question, at the discretion of the instructor

WHAT IS PLAGIARISM AND HOW CAN IT BE AVOIDED?

Plagiarism may be defined as (1) presenting work, ideas, or phrasing of another, in whole or part, as one's own without giving credit and proper documentation of sources; (2) copying material directly from sources (including electronic media) except when the material is enclosed in quotation marks and the source is clearly identified; (3) paraphrasing too closely to the original, even when the source is identified; and (4) claiming credit for work in any media (electronic, digital, artistic, etc.) where the student is not the original creator of said work. Work that is plagiarized will receive an automatic grade of "F". If you are unsure about this subject, please take the time to talk to your instructor and/or read this:

https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism

You will also be required to turn in all written assignments (lab report assignments) in a Word document on CANVAS which will use TurnItIn to assess your paper for Plagiarism. You will find this on your Canvas page for this lab course; each assignment will be compared to previous student work and the work of your classmates!

Usage of AI

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

For this course, AI is permitted only for specific assignments or situations, and appropriate acknowledgment is required.

During some class assignments, we may leverage AI tools to support your learning, allow you to explore how AI tools can be used, and/or better understand their benefits and limitations. Learning how to use AI is an emerging skill, and we will work through the limitations of these evolving systems together. However, AI will be limited to assignments where AI is a critical component of the learning activity. We will always indicate when and where the use of AI tools for this course is appropriate.

Student Resources

University Policies and Information