

Course Information

BIOLOGY 3133.001, 002 - GENETICS LABORATORY

Fall 2026

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:

Emily McMakin

Office hours: TBA, 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
- use a light microscope and a stereo microscope
- perform a Barr body stain
- extract DNA from tissue, quantify DNA and perform a quality check

- 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 basic phylogenetic tree
- use NCBI Blast
- understand the concept of genetic markers and how they are used
- understand how DNA fingerprinting is used in forensic analyses
- understand basic gene regulation and Crispr gene editing techniques

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 PROTOCOLS:

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; 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:

$\text{Prelab points} * 5\% + \text{In class points} * 30\% + \text{Post lab points} * 5\% + \text{Lab report points} * 30\% + \text{Lab final exam} * 30\%$

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. 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 the beginning of the lab, 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 Schedule

	Lab Topic	Assignments	Fly work Schedule*	Plant work Schedule*
08/24	Lab1: Lab Safety, Microscopy, Meiosis	Safety Quiz and Sheets		
08/31	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)
09/07	Labor Day – no labs this week!			
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 <i>D. Melanogaster</i> , 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 at noon		Waiting...
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, 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.

We will always indicate when and where the use of AI tools for this course is appropriate.

Resources to assist you in this course

- [UT Tyler Student Accessibility and Resource \(SAR\) Office](#)[Links to an external site.](#) (provides needed accommodations to students with document needs related to access and learning)
- [UT Tyler Writing Center](#)[Links to an external site.](#)
- [The Mathematics Learning Center](#)[Links to an external site.](#)
- [UT Tyler PASS Tutoring Center](#)[Links to an external site.](#)
- [UT Tyler Supplemental Instruction](#)[Links to an external site.](#)
- [Upswing \(24/7 online tutoring\) - covers nearly all undergraduate course areas](#)[Links to an external site.](#)[Links to an external site.](#)
- [Robert Muntz Library](#)[Links to an external site.](#) and [Library Liaison](#)[Links to an external site.](#)
- [Canvas 101](#) (learn to use Canvas, proctoring, Unicheck, and other software)
- LIB 422 -- Computer Lab where students can take a proctored exam
- [The Career Success Center](#)[Links to an external site.](#)
- [UT Tyler Testing Center](#)[Links to an external site.](#)
- [Office of Research & Scholarship Design and Data Analysis Lab](#)[Links to an external site.](#)

Resources available to UT Tyler Students

- [UT Tyler Counseling Center](#) [Links to an external site.](#) (available to all students)
- [My SSP App](#)[Links to an external site.](#) (24/7 access to Student Support Program counseling through phone or chat and online wellness resources available in a variety of languages)
- [Student Assistance and Advocacy Center](#)[Links to an external site.](#)
- [Military and Veterans Success Center](#) [Links to an external site.](#) (supports for all of our military-affiliated students)
- [UT Tyler Patriot Food Pantry](#)[Links to an external site.](#)
- [UT Tyler Financial Aid and Scholarships](#)[Links to an external site.](#)
- [UT Tyler Student Business Services](#)[Links to an external site.](#) (pay or set up payment plans, etc.)
- [UT Tyler Registrar's Office](#)[Links to an external site.](#)
- [Office of International Programs](#)[Links to an external site.](#)
- [Title IX Reporting](#)[Links to an external site.](#)
- [Patriots Engage](#)[Links to an external site.](#) (available to all students. Get engaged at UT Tyler.)

University Policies and Information

Withdrawing from Class

Students may [withdraw](#) (drop) from this course using the [Withdrawal Portal](#). Withdrawing (dropping) this course can impact your Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please speak with your instructors, consider your options, speak with your advisor, and visit the One-Stop Service Center (STE 230) or email enroll@uttyler.edu to get a complete review of your student account and the possible impacts to withdrawing. We want you to make an informed decision. UT Tyler faculty and staff are here for you and often can provide additional support options or assistance. Make sure to carefully [read the implications for withdrawing from a course and the instructions](#) on using the [Withdrawal portal](#).

Texas law prohibits students from dropping more than six courses during their entire undergraduate career*. The six courses dropped include those from other 2-year or 4-year Texas public colleges and universities. Consider the impact withdrawing from this class has on your academic progress and other areas, such as financial implications. We encourage you to consult your advisor(s) and Enrollment Services for additional guidance. **CAUTION #1:** Withdrawing before census day does not mean you get a full refund. Please see the [Tuition and Fee Refund Schedule](#). **CAUTION #2:** All international students must check with the [Office of International Programs](#) before withdrawing. All international students are required to enroll full-time for fall and spring terms. **CAUTION #3:** All UT Tyler Athletes must check with the Athletic Academic Coordinator before withdrawing from a course. **CAUTION #4:** All veterans or military-affiliated students should consult with the [Military and Veterans Success Center](#).

* Students who began college for the first time before 2007 are exempt from this law.

Artificial Intelligence Statement

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 is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy. Refer to the About This Course section of the UT Tyler Syllabus Module for specific information on appropriate use of AI in your course(s).

Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the Dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members must maintain student final examination papers for a minimum of three months following the examination date.

Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in place of a grade only when all of the following conditions are met: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all coursework or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons before the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average.

The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval.

The time limit established must not exceed one year. Should the student fail to meet all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has yet to be assigned within one year, then the Incomplete will be changed to an F, or NC. If the course was initially taken under the CR/NC grading basis, this may adversely affect the student's academic standing.

Grade Appeal Policy

Disputes regarding grades must be initiated within sixty (60) days from the date of receiving the final course grade by filing a Grade Appeal Form with the instructor who assigned the grade. A grade appeal should be used when the student thinks the final course grade awarded does not reflect the grades earned on assessments or follow the grading scale as documented in the syllabus. The student should provide the rationale for the grade appeal and attach supporting document about the grades earned. The form should be sent via email to the faculty member who assigned the grade. The faculty member reviews the rationale and supporting documentation and completes the instruction section of the form. The instructor should return the form to the student, even if a grade change is made at this level. If the student is not satisfied with the decision, the student may appeal in writing to the Chairperson of the department from which the grade was issued. In situations where there is an allegation of capricious grading, discrimination, or unlawful actions, appeals may go beyond the Chairperson to the Dean or the Dean's designee of the college from which the grade was issued, with that decision being final. The Grade Appeal form is found in the [Registrar's Form Library](#).
NOTE: The Grade Appeal Form is different from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical, and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler/> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <https://www.uttyler.edu/disability-services>, the SAR office located in the Robert Muntz Library, LIB 460, email saroffice@uttyler.edu, or call 903.566.7079."

Military Affiliated Students

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. The [Military and Veterans Success Center \(MVSC\)](#) has campus resources for military-affiliated students. The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

Students on an F-1 Visa

To remain in compliance with Federal Regulations requirements you must do the following:

- Traditional face-to-face classes: Attend classes on the regular meeting days/times.
- Hybrid Classes: Attend all face-to-face classes convened by the instructor according to the schedule set for your specific course.
- Online course: Only one online course can count toward your full-time enrollment. Students are expected to be fully engaged and meet all requirements for the online course.

Academic Honesty and Academic Misconduct

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the [Student Conduct and Discipline policy](#) in the Student Manual Of Operating Procedures (Section 8).

FERPA

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in [University Policy 5.2.3](#). The course instructor will follow all requirements to protect your confidential information.

Absence for Official University Events or Activities

This course follows the practices related to [Excused Absences for University Events or Activities](#) as noted in the Catalog.

Absence for Religious Holidays

This course follows the practices related to [Excused Absences for Religious Holy Days as noted in the Catalog](#).

Absence for Pregnant Students

This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at parents@uttyler.edu and also complete the [Pregnant and Parenting Self-Reporting Form](#).

Campus Carry

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttler.edu/about/campus-carry/index.php>.