

Texas A&M University Central Texas
BIOL 3452 Principles of Genetics

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Mr. Dalton Cross

Office:

Phone: 254-444-9151

Email: dcross7x21@me.com

Online:

Office Hours:

I am available by appointment. As an adjunct instructor I will not be maintaining office hours but will be more than glad to set up visits either before or after class. I encourage you to either call or e-mail me so we can find a time that is mutually convenient.

Course Calendar

Time/Day: Lecture: TR 8:00 – 9:15; Laboratory: T 9:30 – 12:30

Where: Lecture: 316 Warrior Hall; Laboratory: 410 Warrior Hall

UNILERT

Emergency Warning System for Texas A&M University – Central Texas

UNILERT is an emergency notification service that gives Texas A&M University-Central Texas the ability to communicate health and safety emergency information quickly via email, text message, and social media. All students are automatically enrolled in UNILERT through their myCT email account.

Connect to [UNILERT](#) to change where you receive your alerts or to opt out. By staying enrolled in UNILERT, university officials can quickly pass on safety-related information, regardless of your location.

COURSE INFORMATION

Course Overview and description:

Explore the mechanisms of inheritance, from bacteria to humans, as well as mutations and phenotypes, Mendelian genetics, population genetics and evolution, and complex inheritance. Three hours of lecture and three hours of laboratory each week. Prerequisite: BIOL 1407.

Course Objective:

Student Learning Outcomes

Students will:

- a. Relate the structure and function of the DNA molecule to its functional role in encoding genetic material.
- b. Apply the principles of inheritance as formulated by Mendel.

- c. Apply the principles of extensions to Mendelian inheritance, including multiple alleles, lethal alleles, gene interactions, and sex-linked transmission.
- d. Describe normal chromosome number, structure, and behavior in human cells
- e. Understand how to identify and classify mutations in DNA.
- f. Describe the basic aspects of the flow of genetic information from DNA to proteins.
- g. Explain and make deductions about gene regulation with emphasis on the lac operon model.
- h. Deduce the relationship between genetic, physical, and cytogenetic maps.
- i. Illustrate how information generated by genome sequencing projects can be used to discover practical knowledge about gene expression and relationships between species.
- j. Apply the Hardy-Weinberg Law in analyzing population genetics for gene frequency, sex linkage, equilibrium, and heterozygote frequency.

Required Reading and Textbook(s):

- a. Hartwell, Goldberg, Fischer, and Hood. 2015. Genetics: From Genes to Genomes, 5th ed. McGraw Hill. ISBN: 978-0-07-352531-0
- b. Mertens, T.L., and Hammersmith, R.L. 2013. Genetics Laboratory Investigations, 13th ed. Benjamin Cummings. ISBN: 978-0131742529

I expect you to read the corresponding chapters in your textbook before coming to class.

WEEKLY COURSE OUTLINE AND CALENDAR (subject to change)

1. Week of August 29
 - a. Lecture Topic: Genetics: Introduction/Mendel's Principle of Heredity
 - i. Chapters 1 and 2
 - b. Laboratory: Laboratory Safety and check in
2. Week of September 5
 - a. Lecture Topic: Extensions to Mendel's Laws
 - i. Chapter 3
 - b. Laboratory: #2 Principles of Probability
3. Week of September 12
 - a. Lecture Topic: Chromosome theory of inheritance
 - i. Chapter 4
 - b. Laboratory: #22 Polygenic Inheritance
4. Week of September 19
 - a. Lecture Topic: Linkage, recombination, and mapping of genes on chromosomes / *Exam I*
 - i. Chapter 5
 - b. Laboratory: #1 Drosophila and Maize
5. Week of September 26
 - a. Lecture Topic: DNA structure, replication, and recombination
 - i. Chapter 6
 - b. Laboratory: #14 The genetic material: isolation of DNA
6. Week of October 3
 - a. Lecture Topic: Anatomy and function of a gene

- i. Chapter 7
 - b. Laboratory: #3 The Chi Square Test
- 7. Week of October 10
 - a. Lecture Topic: Gene expression: DNA to RNA
 - i. Chapter 8
 - b. Laboratory: #20 Bacterial mutagenesis
- 8. Week of October 17
 - a. Lecture Topic: Digital analysis of genomes
 - i. Chapter 9
 - b. Laboratory: #15 Restriction endonuclease digestion and gel electrophoresis of DNA
- 9. Week of October 24
 - a. Lecture Topic: Analyzing genomic information / *Exam II*
 - i. Chapter 10
 - b. Laboratory: #16 Amplification of DNA Polymorphisms
- 10. Week of October 31
 - a. Lecture Topic: The Eukaryotic chromosome
 - i. Chapter 11
 - b. Laboratory: #16 Amplification of DNA Polymorphisms / #10 Human Chromosomes
- 11. Week of November 7
 - a. Lecture Topic: Chromosomal rearrangements and changes in number
 - i. Chapter 12
 - b. Laboratory: #4 Mitosis
- 12. Week of November 14
 - a. Lecture Topic: Bacterial Genetics
 - i. Chapter 13
 - b. Laboratory: #9 Sex check: A study of sex chromatin in human cells
- 13. Week of November 21
 - a. Lecture Topic: Organellar inheritance / Thanksgiving Break
 - i. Chapter 14
 - b. Laboratory: #17 Transformation of E. coli
- 14. Week of November 28
 - a. Lecture Topic: *Exam III* / Gene regulation in prokaryotes
 - i. Chapter 15
 - b. Laboratory: #23 Hardy Weinberg
- 15. Week of December 5
 - a. Lecture Topic: Gene regulation in eukaryotes
 - i. Chapters 16
 - b. Laboratory: #18 Synthesis of B-Galactosidase
- 16. Week of December 12
 - a. Comprehensive Final Exam

COURSE REQUIREMENTS

Course Assessments:

- 30% Three lecture exams
- 25% Comprehensive final exam
- 20% Homework Assignments
- 25% Laboratory reports
- 5% Participation

Criteria Rubric and Conversion

Grading scheme

A 4.00 (90 +) Achievement that is outstanding relative to the level necessary to meet course requirements.

B 3.00 (80–89%) Achievement that is significantly above the level necessary to meet course requirements.

C 2.00 (70–79%) Achievement that meets the course requirements in every respect.

D 1.00 (60–69%) Achievement that is worthy of credit even though it fails to meet fully course requirements.

F 0.00 (<60%) Represents failure and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an “I” (incomplete).

I (Incomplete) The “I” shall be assigned at the discretion of the instructor when, due to extraordinary circumstances, the student was prevented from completing the work of the course on time. The assignment of an “I” requires a written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements. In no event may any such written agreement allow a period of longer than one year to complete the course requirements. For graduate and professional students, an “I” is to remain on the transcript until changed by the instructor or department. For all other students, work to make up an I must be submitted within one year of the last day of final examinations of the term in which the “I” was given; if not submitted by that time, then the “I” will automatically change to an F. *To obtain an incomplete you must have been doing passing work in the course*

COURSE AND UNIVERSITY PROCEDURES AND POLICIES

Read these carefully as I am strict with my policies.

Grading Policy and Point Breakdown. Grades in this course will be criteria-based on a number of activities including exams, discussion, and projects. This means that grades will not be curved and anyone achieving a 90% or above will receive an A in this course.

Grade Dispute Policy. Grading disputes must be put in writing (with justification such as supporting statements from the text or another credible source) and given to me no earlier than 24 hours after the assignment has been returned. I will consider your request carefully, but reserve the right to adjust your grade up or down.

Labs. The weekly lab points will consist of 2 items; a lab quiz and a lab report. The lab quiz will be based on the current week's laboratory exercise to be sure that you have read your lab book before coming to lab. Quizzes will be distributed at the beginning of class. To be fair to the students who arrive to lab on time, if you arrive after the quiz has been distributed, you miss the quiz. No exceptions regardless of excuse. A maximum of 3 absences will be allowed; additional absences in lab will result in an "F" for the entire course, regardless of excuse.

Assignments. These will be varied in nature, but will consist of activities that cause the students to reflect upon the state of knowledge of the topic of the week, how that topic is perceived in the media, and/or analysis of specific research projects relevant to the subject. All assignments are to be turned in, on time (i.e. at class time on due date), to the Canvas website. I will distribute instructions on how to do this. I will not accept e-mailed assignments of any kind.

Late Assignments. I expect all assignments to be turned in on time. Late assignments interfere with my ability to provide timely, detailed feedback, as well as with your ability to learn and process new material. Accordingly, any unauthorized late assignment will receive a 5% reduction in grade for each day it is late. No assignments will be accepted after it has been graded and returned.

Exams. The exams will be a mixture of matching, multiple choice and short answer, designed to provoke reflection, critical thought, and application of knowledge. You will receive a list of several sample or real exam questions ahead of time. You are encouraged to prepare for the exam by reviewing reading materials, outlining a draft of a response, and discussing these thoughts with your peers. You will then demonstrate your individual, integrated thoughts on the topic in a closed-book exam during the class period.

Missed exams. If you know you will miss an exam, please contact me BEFORE the exam. I will gladly give make-up exams if the student has an unavoidable reason for missing the exam (i.e. death in the family, severe illness). Keep in mind that I will expect documentation of your reason for missing the exam (e.g. doctor's note, obituary notice). Exams must be made up within a week of the original scheduled date, no exceptions regardless of excuse.

What I expect of you. To get the most out of this class, you are expected to conduct yourself in a professional manner, which includes contributing to class discussions, being punctual, and notifying me of absences in advance.

Class Attendance. I expect that you attend each class session and arrive on time. If an unavoidable situation arises that prevents you from attending class, I expect that you also promptly contact me to

discuss the missed material and get the notes from a classmate. I will not distribute my notes to students as they are often abbreviated and do not contain the detail needed to sufficiently understand the material.

What you can expect of me. You can expect me to start and end class on time, be available through office hours, e-mail, and by appointment, be responsive to student suggestions for course improvement, answer questions to the fullest extent possible and/or direct you to appropriate resources, return graded assignments and exams within a reasonable time frame, and treat you with respect as future colleagues.

Discussion. The topics in this class encompass a diversity of issues that merit in-depth thought and discussion. Since individuals will be expressing their opinions, I expect that will you respect others' contributions, as you would want them to do for you.

Credits and Workload expectations. For undergraduate courses, one credit is defined as equivalent to an average of two hours of learning effort per week (over a full semester) necessary for an average student to receive an average grade for the course. A student taking a four-credit class that meets for four hours a week should expect to spend an additional eight hours a week outside the classroom in order to earn an average grade.

Class Structure. Classes will involve a balance of active lecture and engaging learning activities. I believe that students learn the theories and concepts much better when they have an active role. I know that this may be new to some of you, but please keep an open mind and I know that you will get more out of this class because of it.

Drop Policy. If you discover that you need to drop this class, you must go to the Records Office and ask for the necessary paperwork. Professors cannot drop students; this is always the responsibility of the student. The record's office will provide a deadline for which the form must be returned, completed and signed. Once you return the signed form to the records office and wait 24 hours, you must go into Warrior Web and confirm that you are no longer enrolled. Should you still be enrolled, FOLLOW-UP with the records office immediately? You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the deadline or fail to follow the procedure, you will receive an F in the course.

Academic Integrity. Texas A&M University -Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty, and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Academic integrity is defined as a commitment to honesty, trust, fairness, respect, and responsibility. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. Academic misconduct is any act that improperly affects a true and honest evaluation of a student's academic performance and includes, but is not limited to, cheating on an examination or other academic work, plagiarism and improper citation of sources, using another student's work, collusion, and the abuse of resource materials. All academic misconduct concerns will be reported to the university's Office of Student Conduct. Ignorance of the university's standards and expectations is never an excuse

to act with a lack of integrity. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

Access & Inclusion. At Texas A&M University – Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to an education that is barrier-free. The Office of Access & Inclusion is responsible for ensuring that students with a disability enjoy equal access to the University's programs, services and activities. Some aspects of this course or the way the course is taught may present barriers to learning due to a disability. If you feel this is the case, please contact Access & Inclusion at (254) 501-5831 in Warrior Hall, Ste. 212. Please visit their website <https://www.tamuct.edu/departments/access-inclusion/> for more information. Any information you provide is private and confidential and will be treated as such.

Tutoring. Tutoring is available to all TAMUCT students, both on-campus and online. Subjects tutored include Accounting, Finance, Statistics, Mathematics, and Study skills. Tutors are available at the Tutoring Center in Warrior Hall, Suite 111. For tutor schedules and contact information, please visit the [Office of Academic Support](#). If you have a question regarding tutor schedules, contact information, need to schedule a tutoring session, are interested in becoming a tutor, or any other question, contact Academic Support Programs at 254-519-5796, or by emailing Kim Wood at k.wood@tamuct.edu

Chat live with a tutor 24/7 for almost any subject on your computer! Tutor.com is an online tutoring platform that enables TAMUCT students to log-in and receive FREE online tutoring and writing support. This tool provides tutoring in Mathematics, Writing, Career Writing, Chemistry, Physics, Biology, Spanish, Calculus, and Statistics. To access Tutor.com, log into your Canvas account and click "Online Tutoring."

University Writing Center. Located in 416 Warrior Hall, the University Writing Center (UWC) at Texas A&M University-Central Texas is a free workspace open to all TAMUCT students from 11am-6pm Monday-Thursday. Students may arrange a one-on-one session with a trained and experienced writing tutor by visiting the UWC during normal operating hours (both half-hour and hour sessions are available). Tutors are prepared to help writers of all levels and abilities at any stage of the writing process.

While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the University Writing Center is here to help!

If you have any questions about the University Writing Center, please do not hesitate to contact Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu.

University Library. The University Library provides many services in support of research across campus and at a distance. We offer over 200 electronic databases containing approximately 250,000 eBooks and 82,000 journals, in addition to the 72,000 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at TAMUCT are available through our website to help students navigate these resources. On-campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available twenty-four hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place on Skype or in-person at the library. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the TAMUCT main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our homepage: <https://tamuct.libguides.com/>

TECHNOLOGY REQUIREMENTS AND SUPPORT

Technology Requirements: This course will use the TAMUCT Canvas Learn learning management system.

- Logon to [Canvas](#) to access the course.
- Username: Your MyCT username (xx123 or everything before the "@" in your MyCT e-mail address)
- Initial password: Your MyCT password
- Check browser and computer compatibility by using the "Test Your Browser" button, found in the "Check Your Browser" module on your Canvas dashboard, once you have logged in.

Technology Support. For technology issues, students should contact Help Desk Central. 24 hours a day, 7 days a week:

- **Email:** helpdesk@tamu.edu
- **Phone:** (254) 519-5466
- **Web Chat:** <http://hdc.tamu.edu>

When calling for support please let your support technician know you are a TAMUCT student.

For issues related to course content and requirements, contact your instructor.

Technology issues are not an excuse for missing a course requirement – make sure your computer is configured correctly and address issues well in advance of deadlines.

BIO 3452 – Principles of Genetics

Syllabus Contract

Directions:

- First, read the syllabus.
- Second, read the statement below to confirm your personal reading and understanding of the contents of the syllabus.
- Third, provide confirmation by printing the document and providing your signature and date of completion in the space provided below.
- Last, submit this contract to me. Note that your grade for the first assignment will not be calculated until this contract is received.

I have received a copy of the syllabus. I have read and understand the policies of this course as stated in the syllabus.

Print Name _____

Signature _____

Date _____