BIOL 2316 - 001, Genetics Lecture (4.0 Credits)

Texas A&M University—San Antonio

Fall 2026

Meeting Times

MW 14:00–15:15 in STEM (Science & Technology) 145

Contact Information

Instructor: Utpal Smart

Office: STEM 311B

Phone: 210-784-2676

E-mail: usmart@tamusa.edu

Office Hours: F 10:00–12:00 in STEM 311B

Preferred Contact Method: If you need to leave me a message, please do so through TAMUSA email only. I will ignore communications via any other means.

General Information

Prerequisites: BIOL 1306, BIOL 1106, BIOL 1307, BIOL 1107, MATH 1314

Textbook: Brooker RJ. 2022. *Concepts of Genetics*, 4th edition, McGraw-Hill, Columbus, OH. Students are not required to purchase a physical copy (please see below).

Online Resources: Access to an online copy of the book and the McGraw-Hill Connect learning system will be provided with registration and is covered by tuition via the Follett ACCESS program. I will also provide materials to support your learning this semester. The PowerPoints that are the basis of this course are found in the Course Content > Lectures section on Blackboard. The exams will be based on the information found in these PowerPoints.

How you study for this course is ultimately up to you. Students have different learning styles and schedules, so organize your study time in a way that works best for you. However, I strongly encourage you to read the assigned textbook chapters before and after class, as they provide essential background, terminology, and explanations that lectures and assessments build on. I also recommend using all available course resources—including lectures, readings, review materials, and practice opportunities—to support your learning.

Course Description

This class covers fundamental mechanisms and other aspects of heredity, with an emphasis on eukaryotic systems. Topics covered include transmission genetics, linkage and gene mapping.

Objectives

To provide students with a sound foundation in classical and modern genetics and the approaches to problem solving used by geneticists. Specifically, during or upon completing BIOL 2316, students should:

(1) Gain a firm understanding of Mendelian inheritance and common departures from Mendelian inheritance
(2) Understand how genetic material is partitioned during asexual and sexual cell division
(3) Understand the basic structure and properties of chromosomes, including linkage, recombination, and large-scale mutation
(4) Gain an appreciation for how genetic markers can be used to address a variety of questions
(5) Understand the basic structure, composition, and function of DNA, genes, genomes, and the genetic code
(6) Understand the fundamentals of DNA replication, gene expression, and gene regulation

(7) Understand that mutation is the ultimate source of genetic variation and therefore profoundly influences adaptive evolution and human health

(8) Gain an appreciation for the rapidly advancing fields of genomics and biotechnology

(9) Gain an appreciation for how epigenetic modifications influence gene expression and cellular differentiation

Evaluation & Course Structure

Grading Scale

A = 90–100
B = 80–89
C = 70–79
D = 60–69
F = below 60

Grade Components

Mean of 4 exams, one for each of the four subject sections (12.5% each) **= 50%**

Mean score on homework assignments **= 25%**

Mean score of SmartBook modules **= 25%**

Note that there is no formal "final" exam. Each exam covers the material since the last exam (or the beginning of the course for Exam 1).

Class Schedule

(subject to modification at the instructor's discretion as necessary)

Date	Topic	Reading	Assignments
Aug 24	Syllabus; Intro to genetics	No reading	–
Aug 26	Genetic info flow; pre-test	Lecture slides	–
Aug 31	Probability & statistics in genetics	Ch. 3.6 / Lecture slides	Homework 1 due
Sep 02	Mendelian inheritance	Ch. 3.1–3.5	SmartBook module 1 due
Sep 07	*Labor Day Holiday – no class*		
Sep 09	Mitosis	Ch. 2	Homework 2 due
Sep 14	Meiosis	Ch. 2	SmartBook module 2 due
Sep 16	**Exam 1 (Aug 24 – Sep 14)**	–	Homework 3 due
Sep 21	Non-Mendelian patterns 1	Ch. 5	SmartBook module 3 due
Sep 23	Non-Mendelian patterns 2	Ch. 6	Homework 4 due
Sep 28	Linkage 1	Ch. 7.1–7.3	SmartBook module 4 due
Sep 30	Linkage 2	Ch. 7.1–7.3	Homework 5 due
Oct 05	DNA & chromosome structure	Ch. 11; Ch. 12.1–12.4, Ch. 12.6	SmartBook module 5 due
Oct 07	DNA Replication 1	Ch. 13.1–13.2	Homework 6 due
Oct 12	DNA Replication 2	Ch. 13.3–13.5	SmartBook module 6 due
Oct 14	Homologous recombination	Ch. 13.6	Homework 7 due
Oct 19	**Exam 2 (Sep 21 – Oct 14)**	–	SmartBook module 7 due
Oct 21	Genome structure	Ch. 21.1, 21.3, 21.4	Homework 8 due
Oct 26	Transposons	Ch. 12.5	SmartBook module 8 due
Oct 28	Gene expression overview	Lecture slides/notes	Homework 9 due

Date	Topic	Reading	Assignments
Nov 02	Transcription 1	Ch. 14.1–14.3	SmartBook module 9 due
Nov 04	Transcription 2	Ch. 14.1–14.3	Homework 10 due
Nov 09	**Exam 3 (Oct 21 – Nov 04)**	–	SmartBook module 10 due
Nov 11	RNA processing	Ch. 14.4–14.5	Homework 11 due
Nov 16	Translation 1	Ch. 15.1–15.3	SmartBook module 11 due
Nov 18	Translation 2	Ch. 15.4–15.6	Homework 12 due
Nov 23	Prokaryotic gene regulation	Ch. 16.1–16.3	SmartBook module 12 due
Nov 25	*Study Day – no classes*		
Nov 30	Eukaryotic gene regulation	Ch. 17.1–17.5	–
Dec 2	Review; post-test	–	–
Dec 07	**Exam 4 (Nov 11 – Nov 30)**	–	–

Exam Format

Exams will be held in person using Scantron and paper exams. I reserve the right to ask exam questions in a variety of formats, including but not limited to multiple choice, multiple answer, True/False, and fill-in-the-blank. Scratch paper may also be provided to solve problems when necessary.

Homework Assignments

Homework assignments are intended to familiarize students with genetics vocabulary and to reinforce concepts and processes after they have been discussed in class. Students will access these assignments through Blackboard, which will direct them to McGraw-Hill Connect to complete them. Each homework assignment covers material already presented in class and will be due by the following class session. On occasion, an assignment will be due on an exam day; this is intentional, as the assignment reviews material the exam covers. Students will be permitted two attempts for each assignment, with the higher score recorded as the grade.

To provide flexibility in the event of unforeseen circumstances (such as illness, technical difficulties, or personal emergencies), the lowest two homework grades will be dropped at the end of the semester. This policy ensures that a couple of missed or low-scoring assignments will not disproportionately affect the final course grade.

SmartBook Modules

SmartBook reading modules are intended to ensure that students engage with each chapter before it is discussed in class and to build familiarity with the vocabulary and concepts of genetics ahead of lecture. Students will access these modules through Blackboard, which will direct them to McGraw-Hill Connect to complete them. Each module will be due before the class session covering the corresponding material. Students will have one attempt for each module; because SmartBook allows students to read the material and revisit sections as they work, a single attempt is sufficient to master the content and earn full credit.

To provide flexibility in the event of unforeseen circumstances (such as illness, technical difficulties, or personal emergencies), the lowest two reading module grades will be dropped at the end of the semester. This policy ensures that a couple of missed or low-scoring modules will not disproportionately affect the final course grade.

Policy on Grade Appeals

We all make errors, and I'm no different. If you believe I made an error when grading an exam or assignment, let me know after class or during an office visit. If your concern warrants further consideration, I may ask you for a written explanation of why you think your answer is correct and/or why my grading is overly harsh. Please note that a request for you to elaborate verbally or in writing does not guarantee that points will be restored to your grade.

Policy on Makeup Exams

Please take exams on the scheduled dates. Should extenuating circumstances arise that prevent you from taking an exam at the normal time, I may ask you to present verifiable documentation of the circumstances. Failure to present such documentation may result in denial of a makeup and a grade of '0' for the missed exam. Whenever possible, let me know ahead of time if you will miss an exam. Likewise, contact me as soon as possible after missing an exam if you have a verifiable excuse and need to take a makeup.

Policy on Late Assignments and Receiving an 'Incomplete'

I will not accept late assignments, and I will not extend deadlines for homework or SmartBook modules for any reason. This flexibility is already built into the course. Because the two lowest homework grades and the two lowest SmartBook module grades are dropped at the end of the semester, an occasional missed or low-scoring assignment resulting from illness, technical difficulties, or a personal emergency will not count against your final grade. For this reason, you do not need to contact me or provide an excuse for a single missed assignment; the dropped grades cover exactly these situations. I will honor accommodations required by university policy, such as approved disability accommodations or religious observances, in accordance with that policy.

Extended absences are handled separately. If you are ill or otherwise unable to participate for an extended period, please contact me as soon as possible so that we can develop a plan to help you complete the course, which may include arranging a grade of 'Incomplete' (documentation may be required). Students with extended absences who have not contacted me by the end of the semester will receive a grade of '0' for all incomplete or missing work.

Policy on Extra Credit

I do not offer extra credit on an individual basis. I do not offer personal opportunities to raise a grade, and I will not grant requests for individual extra credit—particularly at the end of the semester. From time to time, I may offer a small extra-credit opportunity to the entire class, such as attending and reflecting on a departmental seminar talk. I will announce any such opportunity to everyone and make it available to everyone on the same terms. Aside from these occasional class-wide offerings, grades are based solely on the assignments, modules, and exams described in this syllabus, so please plan your effort accordingly throughout the term.

Course Policies

Attendance Policy

You are expected to attend each lecture and participate in exercises and discussions in this forum. While attendance itself is not graded, it is strongly tied to how well you will do in the course. In my experience, students who miss many classes almost always struggle to pass, not because absences are penalized directly, but because the exams draw heavily on material developed in class, and students who miss that material consistently perform poorly on exams. Attending regularly is therefore one of the most reliable things you can do to succeed in this course.

Learning Environment

Please be punctual. Late entry into class is disruptive to your fellow students and me. I will do my best to facilitate learning by respecting you and your time, and I expect you to return the favor. Talking, texting, e-mailing, preparing for other courses, etc. during class is disrespectful; please refrain from using handheld devices during lecture. I understand that emergencies occur, so if you are in a situation that may require your attention during class, please let me know ahead of time and set your phone to vibrate, so you can exit with minimal disturbance. I understand that some students prefer to take notes on their laptops. However, except where required as an approved accommodation, I reserve the right to suspend laptop use if, in my judgment, they are more of a hindrance than an asset.

If I am confusing or unclear, let me know. Don't hesitate to ask questions. If a concept is unclear to you, odds are other students in the class are struggling with the concept as well.

Assigned Readings

Please read the assigned material. It will improve your comprehension and will likely reduce the amount of 'cramming' that you need to do to prepare for exams.

Policy on Calculator Use

While a working knowledge of basic algebra is sufficient for this course, you will occasionally be asked to answer mathematical questions during homework assignments and exams. Very few modern scientists conduct calculations without the aid of a computer or calculator. Therefore, you are allowed and encouraged to use a calculator on assignments of all types, including exams. However, for exams, use will be restricted to simple calculators without data storage or streaming capabilities.

Important Policies and Resources

University Email Policy and Course Communications

All correspondence between professors and students must occur via university email accounts. You must have your Jaguar email account ready and working. If it is not working, contact the help desk at helpdesk@tamusa.edu or at 210-784-HELP (4357). If you don't hear back within 48 hours, contact them again. They have many requests during the first part of the semester, so you may need to follow up with them.

Academic Accommodations for Individuals with Disabilities

Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is located in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us at the website or email us at dss@tamusa.edu. All students are encouraged to discuss their academic accommodation with Disability Support Services and their instructors as soon as possible.

Academic Learning Center

All currently enrolled students at Texas A&M University-San Antonio can utilize the Academic Learning Center for subject-area tutoring. The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the Tools section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784-1307, or visiting the Central Academic Building, room 202. Online tutoring is also available for after hours and weekend assistance.

While tutoring hours may change based on tutor schedules and availability, the current tutoring hours for MATH in the ALC are as follows:

Day	Appointments available	Walk-in Tutoring (no appointment needed)
Monday	8 am – 6 pm	9 am – 5 pm
Tuesday	8 am – 6 pm	9 am – 5 pm
Wednesday	8 am – 6 pm	9 am – 5 pm
Thursday	8 am – 6 pm	9 am – 5 pm
Friday	8 am – 5 pm	11 am – 4 pm

Counseling / Mental Health Resources

As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, visit our website, call 210-784-1331 or visit Madla 120 between the hours of 8:00 AM and 5:00 PM.

All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. Crisis support is available 24/7/365 by calling the SCC at 210-784-1331 or through the TELUS student support App.

The TELUS Student Support App provides a variety of mental health resources including 24/7/365 support for in-the-moment distress, crisis support, an anonymous peer-to-peer support network, mental health screenings, podcasts, and articles to improve your mental wellbeing.

Emergency Preparedness

JagE Alert is Texas A&M University-San Antonio's mass notification system. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit: https://tamusa.bbcportal.com/. More information on emergency response may be found at: Emergency Operations Plan and the Emergency Action Plan. Download the SafeZone App (https://safezoneapp.com/) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance

According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended by the published Census Date (the first week of class). Any student receiving federal financial aid who does not attend prior to the published Census Date (the first week of class) will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Jaguar Writing, Language, and Digital Composing Center (WLDCC)

The WLDCC provides support to graduate and undergraduate students in all three colleges as well as faculty and staff. Writing tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as eportfolios, class presentations, or other digital multimedia projects. The WLDCC offers face-to-face, synchronous online, and asynchronous digital appointments. Students can schedule appointments with the WLDCC in JagWire under the Student Services tab. Click on "Writing, Language, and Digital Composing Center" to make your appointment. Students wanting to work in real time with a tutor can schedule an "Online Appointment." Students wishing to receive asynchronous, written feedback from a tutor can schedule an "eTutoring" appointment. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website. The WLDCC can also be reached by emailing wldcc@tamusa.edu.

Meeting Basic Needs

Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to submit a CARE report for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources. A food pantry is available on campus; click here for hours and contact information.

Military Affairs

Veterans and active-duty military personnel are welcomed and encouraged to visit the Office of Military Affairs for any question involving federal or state VA Education Benefits. Visit the Patriots' Casa building, room 202, or contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210) 784-1397.

Religious Observances

Texas A&M University-San Antonio recognizes the wide variety of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or course work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule

Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination

Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual on our campus and within our state, nation, and world. All decisions and actions involving students and employees are to be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the University's Civil Rights Officer at 210-784-2061 or titleix@tamusa.edu.

Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking based on sex, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related sex-based misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant / Parenting Students

Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide such reasonable accommodations to pregnant students as would be provided to a student with a temporary medical condition that are related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784-2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Young Jaguars can support parenting students with daycare if students meet this criteria: (1) must be enrolled in classes at Texas A&M-San Antonio in the current semester, (2) must be Pell eligible or a single parent, (3) child(ren) must be aged 3 to 12-years-old, and (4) child(ren) must be enrolled in Pre-K-3 through 6th grade. Hours of operation are Monday-Thursday 3:30pm-9:00pm. For more information, please contact Young Jaguars at youngjaguars@tamusa.edu or call (210) 784-2636.

Students' Rights and Responsibilities

The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty, and administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, Student Code of Conduct, on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notifications.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, or disability. Conduct that infringes on the rights of another individual will not be tolerated.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the Student Code of Conduct or visit the resources available in the OSRR website.

Important Fall 2026 Dates

Date	Event
August 20	Tuition & Fee Payments deadline
August 24	First day of class
September 7	Labor Day Holiday – No Classes / University Closed
September 9	Census Date – Students not paid in full or enrolled in a payment plan by 4:59 pm may be dropped for non-payment
October 5 – October 16	Midterm grading period
November 13	Last day to drop with an automatic "W"
November 25	Study Day – No classes
November 26 – November 28	Thanksgiving Holiday – No Classes / University Closed

Date	Event
November 30	Last day to drop a course or withdraw from the University
December 4	Last day of classes
December 5 – December 11	Final exams
December 15	Commencement

The complete academic calendar is available online.

No Use of Generative AI Permitted

BIOL 2316 assumes that all work submitted by students will be generated by the students themselves, working individually or in groups. Students should not have another person/entity do the writing of any portion of an assignment for them, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.