



TEXAS A&M UNIVERSITY  
SAN ANTONIO

## **BIOL 2411, Genetics Lecture (4.0 Credits)**

**Texas A&M University—San Antonio**

**Fall 2024**

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### **Meeting times**

**TR 9:30-10:45 am in STEM (Science & Technology) 131**

### **Contact Information**

**Instructor:** Utpal Smart

**Office:** STEM 311B

**Phone:** 210-784-2676

**E-mail:** [usmart@tamusa.edu](mailto:usmart@tamusa.edu)

**Preferred Contact Method:** If you need to leave me a message, please do it through the tamusa e-mail only. Communications via any other means will be promptly ignored.

**Office Hours:** MW 2:00PM – 4:00PM in STEM 311B

### **General Information**

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

**Textbook:** Pierce BA. 2020. *Genetics: A Conceptual Approach, 7<sup>th</sup> Edition*. Freeman, New York. Suggested readings will be provided for this edition and the previous (6<sup>th</sup>) edition if you prefer to use that textbook.

**Online Resources:** We will be using Achieve, you should purchase this with your textbook. I will also be providing material to support your learning this semester. The powerpoints that are the basis of this course are to be 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 up to you. Different people study in different ways and have different schedules around which they need to organize their studying. I would strongly recommend that you make use of as many, ideally all, of the resources available to you.

**Course Description:** This course covers the basic concepts and principles of inheritance in eukaryotes and prokaryotes from classical and modern perspectives.

**Objectives:** To provide students with a sound foundation in classical and modern genetics and approaches to problem solving used by geneticists. Specifically, during the course of or upon completing BIOL 2411, 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 < 60

#### **Grade Components:**

Mean of 4 exams, one for each of the four subject sections = 55%

Mean score on homework assignments = 20%

Lab grade = 25%

\*\*\*Note that there is no formal “final” exam. Each exam is on the material covered since the last exam (or beginning of the course for Exam 1).\*\*\*

### Class Schedule

<b>Date</b>	<b>Topic</b>	<b>Reading</b>
Aug 27	Syllabus; Genetics Intro (1&2)	No reading
Aug 29	Genetic info flow; Pre-test	Lecture slides/notes
Sep 3	Mendelian inheritance 1	Ch 3
Sep 5	Mendelian inheritance 2	Ch 3
Sep 10	Probability & statistics	Lecture slides/notes
Sep 12	Mitosis	Ch 2
Sep 17	Meiosis	Ch 2
Sep 19	Exam 1 (Aug 27 - Sep 17)	-
Sep 24	Non-Mendelian patterns 1	Ch 5.1-5.2
Sep 26	Non-Mendelian patterns 2	Ch 5.3, 5.5
Oct 1	Linkage 1	Ch 7.1-7.2
Oct 3	Linkage 2	Ch 7.3, 7.5
Oct 8	DNA Structure	Ch 10.3, 11.1
Oct 10	Replication modes	Ch 12
Oct 15	DNA Replication	Ch 12
Oct 17	Homologous recombination	Ch 12
Oct 22	Exam 2 (Sep 24 - Oct 17)	-
Oct 24	Eukaryotic genome structure	Ch 11.1-11.3, 20.3 (p.636+)
Oct 29	Transposons	Ch 8, 18.4
Oct 31	Gene expression overview	Lecture slides/notes
Nov 5	Transcription 1	Ch 13
Nov 7	Transcription 2	Ch 13
Nov 12	Exam 3 (Oct 24 - Nov 7)	-
Nov 14	RNA processing	Ch 14.1-14.2
Nov 19	Translation 1	Ch 15
Nov 21	Translation 2	Ch 15
Nov 26	Translation 3	Ch 15
Nov 28	Thanksgiving - No class	-
Dec 3	Prokaryotic gene regulation	Ch 16.2-16.3
Dec 5	Eukaryotic gene regulation	Ch 17
Dec 7-13	Exam 4 (Nov 14 - Dec 5)	-

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

**Homework assignments** are designed to familiarize you with the vocabulary of genetics and to reinforce concepts and processes covered during class. In general, these assignments will be administered via Blackboard, and you will be allowed two attempts at each assignment—with your grade for a given assignment being the higher score of these two attempts.

**Policy on Assignments and Exam Questions Involving Written Communication:** The ability to write clearly is a fundamental skill that all educated people, including scientists, should have. While I will not deduct points for grammar and spelling per se, if your writing is muddled to the point that the content of your answer is unclear, you will lose points. While you are always free to ask why points were deducted (after class), subsequent clarification of your answer via verbal conversation will not result in the restoration of deducted points to your grade, as grades must be based upon the answer that was turned in at the time that the assignment was due.

**Policy on Grade Appeals:** We all make errors, and I'm no different. If you feel that I am in error upon receiving a grade for 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 dates that are scheduled. 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 are going to 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':** If extenuating circumstances occur that prevent you from attending class, a verifiable excuse (see above) may be required in order for late assignments to be accepted. In other cases, a penalty of 10% per day late may be applied. If you are ill or otherwise unable to attend class for an extended period, please let me know what is going on as soon as possible, so that we can develop a plan that will enable you to complete the course. Students with extended absences who have not contacted me by the end of the semester will receive a grade of '0' for all incomplete/missing work.

## **Course Policies**

**Attendance Policy:** You are expected to attend each lecture and to participate in exercises and discussions that take place in this forum.

**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 being respectful of you and your time. I expect for you to return the favor. Talking, texting, e-mailing, preparing for other courses, etc. during class is disrespectful. Therefore, please refrain from using handheld devices during lecture. I understand that emergencies occur, so if you are in the midst of a situation that may require your attention during class, please let me know ahead of time and set your phone to vibrate, so that you will cause a minimal disturbance when you exit the classroom. I understand that some students prefer to take notes on their laptops. However, 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. You should not 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:** Genetics is an inherently mathematical and statistical field. 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 that lack data storage and streaming capabilities.

### **Important Tamusa Policies And Resources**

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 <https://www.tamusa.edu/Disability-Support-Services/index.html> or email us at [dss@tamusa.edu](mailto:dss@tamusa.edu). Disabilities may include, but are not limited to, attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability-related needs with Disability Support Services and their instructors as soon as possible.

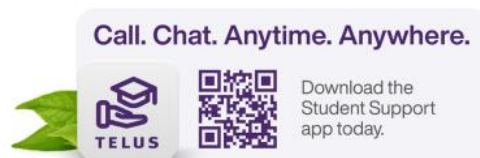
Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing [tutoring@tamusa.edu](mailto:tutoring@tamusa.edu), calling (210) 784-1307, or visiting the Central Academic Building, room 202.

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, call 210-784-1331 or visit Madla 120.

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. For more information on SCC services visit [tamusa.edu/studentcounseling](http://tamusa.edu/studentcounseling)

*Crisis support is available 24/7 by calling the SCC at 210-784-1331 (after-hours select option '2').*

Additionally, the TELUS Student Support App provides a variety of mental health resources to including support for in the moment distress, 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. 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 about Emergency Operations Plan and the Emergency Action Plan can be found here: <https://www.tamusa.edu/about-us/emergency-management/>.

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 the first week of class. Any student receiving federal financial aid who does not attend 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.

Writing, Language, and Digital Composing Center: The Writing, Language, and Digital Composing Center supports graduate and undergraduate students in all three colleges as well as faculty and staff. 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. Students can schedule appointments through JagWire under the Student Services tab. Click on “Writing, Language, and Digital Composing Center” to make your appointment. The Center offers face-to-face, synchronous online, and asynchronous digital appointments. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at <https://www.tamusa.edu/academics/>.

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 referral (<https://www.tamusa.edu/university-policies/Student-Rights-and-Responsibilities/file-a-report.html>) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources.

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 to contact the Office of Military Affairs with any questions at [military.va@tamusa.edu](mailto:military.va@tamusa.edu) or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity 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 within our state, nation, and world. All decisions and actions involving students and employees should 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, gender identity, gender expression, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.

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- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, 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 misconduct, the faculty member must share that information with the university's Title IX Coordinator ([titleix@tamusa.edu](mailto: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](mailto: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.

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, sexual orientation, gender identity, gender expression, 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, sexual orientation, 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 (<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/documents/Student-Handbook-2022-23.pdf>) or visit the resources available in the OSRR website (<https://www.tamusa.edu/university-policies/student-rights-and-responsibilities/academic-integrity.html>).

### **No Use of Generative AI Permitted**

BIOL 2411 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.

### Important Dates:

August 26	First day of class
September 2	Labor Day Holiday
November 11	Last day to drop with an automatic "W"
November 19	Last day to drop a course or withdraw from the University
November 27	Study Day – No classes

November 28- Thanksgiving Holiday – No classes  
30  
December 5 Last day of classes  
December 6 Study Day – No classes  
December 7-13 Final exams

*The complete academic calendar is available online:*

<https://www.tamusa.edu/academics/academic-calendar/index.html>.