

**BIOL 2415\_001, Statistics in Biology & Medicine (4.0 Credits)**  
**Texas A&M University—San Antonio**  
**Fall 2024**

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**Contact Information**

**Instructor:** Ashley Aguilar, M.Sc.

**Office:** STEM 311

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**Preferred Contact Method:** E-mail: [aaguilar2@tamusa.edu](mailto:aaguilar2@tamusa.edu)

Do not use “blackboard messenger”

**Office Hours:** Tuesdays & Thursdays 10AM – 12PM; before/after class; by appointment; feel free to email me!

**General Information on Lecture Sections**

**Prerequisites:** BIOL 1106, BIOL 1107, BIOL 1306, BIOL1307, MATH 1314

**Lecture Location for Section 001:** MWF 9:00AM- 9:50 PM; SciTech 141

**General Information on Lab Sections**

**Lab Instructor:** Ashley Aguilar, M.Sc.

**Lab Location for Section 01L:** M- 11:00am - 1:45pm; SciTech 227

**Lab Location for Section 05L:** W- 11:00am - 1:45pm; SciTech 227

**Lab Location for Section 06L:** F- 11:00am - 1:45pm; SciTech 227

**Lab Instructor:** Md. Imran Hasan; Email: [mhasa02@jaguar.tamu.edu](mailto:mhasa02@jaguar.tamu.edu)

**Lab Location for Section 03L:** T- 11:00am - 1:45pm; SciTech 227

**Lab Location for Section 04L:** TH- 11:00am - 1:45pm; SciTech 227

If you have lab specific questions contact your lab instructor.

**Lecture Textbook:**

Whitlock MC, Schluter D. 2020. *The Analysis of Biological Data, 3rd Edition*. MacMillan Learning.

**Online Resources:** I will do my best to make course materials available online in a timely fashion. My goal is to have in-class materials (PowerPoint slides, etc.) posted within 24 hours of completion of the class in which the material was covered.

**Course Description:** This course explores the principles of probability, exploratory data analysis, experimental design and common inferential statistical techniques used in the biological and medical sciences. Emphasis is placed on the applications of these methods and practical considerations associated with their proper use. A major focus of the laboratory portion of the

course is using the R statistical computing environment for methodological implementation and generation of scientific figures.

**Objectives:** To provide students with a sound foundation in applied statistical reasoning. Specifically, during the course of and/or upon completing BIOL 2415, students should:

- (1) Deepen their abilities to engage in population-level thinking and appreciate the importance of sampling in drawing inferences about populations
- (2) Develop an appreciation for the roles of probability theory and probability distributions in statistical analysis and quantitative reasoning
- (3) Become familiar with the basic tenets of sound experimental design
- (4) Develop an understanding of the concepts of statistical error and power
- (5) Become competent with a variety of commonly used parametric and non-parametric inferential statistics
- (6) Deepen their appreciations for the concept of statistical association and how such associations are quantified
- (7) Learn the principles of model criticism and how to assess whether data meet the assumptions of a variety of statistical tests and modeling approaches
- (8) Develop the ability to choose and defend which statistical procedure among the procedures explored during the course is most appropriate for a particular dataset/experimental design
- (9) Develop basic statistical computing skills, including the ability to make customized publication quality graphics

## Evaluation & Course Structure

### Grade Components from Lecture:

Assignment	Points	Total
Exam	200 pts $\times$ 3 Exams	600 pts
Final Exam	200 pts	200 pts
Homework	25 pts $\times$ 8 HWs	200 pts
		1000 pts

### Bonus points:

Participation in the course by answering questions during the lecture will make you eligible for a boost to your final grade. Throughout the semester, I will select some of the in-class questions to count towards the boost. If you answer **at least 10** of the selected questions **correctly**, you will receive an additional 10 bonus points on your final grade.

Completing the pre-test during the first full week of the course, independent of your score, will make you eligible to take the post-test at the end of the semester.

For each correct response on the post-test given at the end of the semester you will also receive an additional bonus point. (Note: These bonus points **do not** count towards the 10 needed from the in-class lecture questions)

The maximum number of in class bonus points that you can accumulate is **25**.

### Grade Components for Lab:

Assignment	Points	Total
Lab Assignment	25 pts × 8 Labs	200 pts
		200 pts

**Lecture and Lab Grade are combined for your Final Grade.**

The lecture portion of the course will account for 75% of your final grade and the lab component will account for the other 25%

For example, if you received 900 pts in lecture and 180 pts in the lab your final grade calculation would be:

$$0.75 \times (900/1000) + 0.25 \times (180/200) = 0.90$$

Grades will be assigned at the end of the term based on the percentage of points earned, where 90% = A, 80% = B, 70% = C, and 60% = D.

**Before you email me, check if your question is answered by the syllabus or the schedule!**

**Email Etiquette:** When contacting me **via email you must include the name of the course in the subject line and the section you are in.** Example:

To: aaguilar2@tamusa.edu

Subject: Question about Stat in Bio. Section 1

Hi Ashley,

My name is “your name here” and I was wondering if Chapter 4 material will be on Exam 2.

Best,

“your name here”

**If you have lab specific questions contact your TA**

**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 or email 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 Late Assignments & Making Up Exams:** Please complete exams and other assignments by the dates when they are due. Should extenuating circumstances arise that prevent you from taking or turning in an exam or assignment at the normal time, I may ask you to present verifiable documentation of the circumstances. Failure to produce such documentation may result in refusal to accept your late exam or assignment and a grade of '0'. Whenever possible, let me know ahead of time if you are going to be tardy with an exam or assignment.

**Policy on Receiving an 'Incomplete':** 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.

## Miscellaneous Policies

**Attendance Policy:** Attendance and participation are compulsory. However, videos of our lecture and lab sessions will be available through Blackboard Collaborate Ultra for you to view in the event that asynchronous attendance and participation are necessary.

**Learning Environment:** Please be punctual. Late entry into lecture and lab 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 not appropriate. 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.

\*\*\*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\*\*\*

## University Policies

**Academic Accommodations for Persons with Disabilities:** The Americans with Disabilities Act of 1990, as amended, and the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights protection for individuals with disabilities. Title II of the ADA and Section 504 of the Rehabilitation Act require that students with disabilities be guaranteed equal access to the learning environment through the provision of reasonable and appropriate accommodation of their disability. If you have a disability that may require accommodation, please contact Disability Support Services (DSS) for the coordination of services. The phone number for DSS is (210) 784-1335 and email is [dss@tamusa.edu](mailto:dss@tamusa.edu).

**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 is an appointment-based center where appointments are made through the Navigate platform. Students access Navigate through Jagwire in the Student Services tab. The Center is active on campus outreaching to students to highlight services offered. You can contact

the Academic Learning Center by emailing [tutoring@tamusa.edu](mailto:tutoring@tamusa.edu) or calling (210)-784-1332. Appointments can also be made through JagWire under the services tab.

**Counseling Resources:** As a college student, there may be times when personal stress interferes with your academic performance and/or negatively impacts your daily functioning. If you or someone you know is experiencing life stressors, emotional difficulties, or mental health concerns at Texas A&M University – San Antonio, please contact the Student Counseling Center (SCC) located in Modular C, Room 166 (rear entrance) or call 210-784-1331 between the hours of 8:00AM and 5:00PM, Monday – Friday. After-hours crisis support is available by calling 210-784-1331 (select option “2”). Please contact UPD at 911 if harm to self or harm to others is imminent. All mental health services provided by the SCC are free, confidential (as the law allows), and are not part of a student’s academic or university record. SCC provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information, please visit [www.tamusa.edu/studentcounseling](http://www.tamusa.edu/studentcounseling)

**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 and/or phone call with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com/> More information about Emergency Preparedness and the Emergency Response Guide can be found here: <https://www.tamusa.edu/upd/index.html>

**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.

**Meeting Basic Needs:** If you face challenges securing food, housing or other basic needs, you are not alone, and A&M- San Antonio can help during this time of crisis. We invite you to learn about the many resources available to support you by visiting the [Dean of Student’s website](#) or by reaching out via [dos@tamusa.edu](mailto:dos@tamusa.edu). Additionally, it is not unusual for students to encounter temporary illness or injuries that may interfere with your academic success. Students may request temporary illness/disability assistance by reaching out to the [Dean of Student’s Office](#) (210) 784-1354. If you are comfortable doing so, please notify the professor of any issues so that they may provide additional resources.

**Military Affairs:** Veterans and active-duty military personnel are welcomed and encouraged to communicate, in advance if possible, and in special circumstances (e.g., upcoming deployment, drill requirements, disability accommodations). You are also encouraged to visit the Patriots’ Casa in-person 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 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.

**Respect for Diversity:** We understand that our students represent diverse backgrounds and perspectives. When we are equity-minded, we are aware of differences and inequalities and are willing to discuss them so we can act to resolve them. The University is committed to building cultural competencies, or the attitudes, skills, and knowledge that enable individuals and organizations to acknowledge cultural differences and incorporate these differences in working with people from diverse cultures. Respecting and accepting people different than you is vital to your success in the class, on campus, and as a future professional in the global community.

While working together to build this community we ask all members to:

- Share their unique experiences, values, and beliefs.
- Be open to the views of others.
- Honor the uniqueness of their colleagues.
- Value each other's opinions and communicate respectfully.
- Keep confidential discussions that the community has of a personal (or professional) nature.
- Use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the A&M-San Antonio community.

**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, equality of 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, diversity, pluralism, 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, or gender expression. 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 helping create 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 has staff members trained to support survivors 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 university. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and other healthcare providers) 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. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact the Student Counseling Center at (210) 784-1331, Modular C.

**Students' Rights and Responsibilities:** The purpose of the following statement is to enumerate the essential provisions for the student freedom and responsibility to learn at Texas A&M University-San Antonio. All students are required to follow all policies and regulations as set forth by The Texas A&M University System. This includes the [A&M-San Antonio Student Code of Conduct](#).

#### *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 procedure 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, genetic information, veteran status, gender identity, or gender expression 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 the 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, University Catalog and students must comply with them and the laws of the land.
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 an environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notification.
6. 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. Behaviors that infringe on the rights of another individual will not be tolerated.

**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://bit.ly/WLDCCenter>.