

BIOL 4304-Undergraduate Research in Biology—509 section – Spring 2025 Syllabus
Texas A&M University-San Antonio

Instructor: Dr Davida Smyth

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Course Description and Prerequisites: This course provides an independent review opportunity that will allow undergraduates majoring in biology to make an original intellectual contribution to the discipline. The research will be conducted in collaboration with a faculty mentor. Variable credit for a total of 3 maximum. Prerequisite: Instructor approval and BIOL 1306, BIOL 1106, BIOL 1307, BIOL 1107. Recommended: BIOL 3104 or 3402 (Evolution). Approval of the instructor is required.

Follow me on Threads/X and Instagram @profsmyth
Smyth Lab Website: davidasmyth.net

The Smyth Lab:

In this authentic research course, students will join the research team of Prof. Smyth, and tackle questions regarding how pathogenic bacteria can reside and survive in buildings, the urban built environment microbiome, and local water bodies in and around San Antonio. Designed as a follow-up to the Introduction to Microbiology Lab course, students continue their research projects from these courses or develop new areas of research that align with the research questions of the Smyth Lab. Throughout the course, students will engage with the literature at the forefront of urban microbial ecology, particularly in the area of antibiotic resistance, and design, conduct independent research, generate data, document their progress in online laboratory notebooks, participate in weekly lab meetings, and troubleshoot their own experiments. In addition to the weekly lab meetings, students will be expected to work independently in the lab for up to 6 additional hours per week to complete their projects. Students will generate an abstract and draft a poster suitable for presentation at a local, national, or international conference or meeting. Students will have access to a range of classical and next-generation microbiological techniques and will be able to use our iSeq machine, a novel DNA sequencing technology available in the Biosafety Level 2 lab.

Learning Outcomes:

Content Knowledge:

- Understand the importance of responsibility and ethical behavior in the conduct of science
- Gain insights into the need for greater diversity in science and the value of multiple perspectives and interdisciplinarity in science
- Practice communicating science to a non-scientist audience

Epistemology of Science:

- Generate new knowledge and make this new knowledge available to the broader scientific community
- Students will draw connections between their research, research in general, and real-world

problems and issues. Students will understand how research can be an agent for social good.

Social Context/Interdisciplinarity:

- Students will take responsibility for their learning and put the knowledge and methods of science to immediate use in their projects.
- Students will draw connections between their research, research in general, and real-world problems and issues. Students will understand how research can be an agent for social good.

Lab Skills:

- Demonstrate proficiency using microbiological and molecular lab equipment, methods, and standard operating procedures of the instructor.
- Describe and demonstrate relevant safety practices associated with microbiology-specific laboratory procedures
- Integrate both classical and next-generation microbiology techniques in their research project.
- Design and execute basic microbiology experiments, based on acquired laboratory skills, in an applied context.

Skills and Abilities:

- Critically read, interpret, and explain primary research articles.
- Experience the formulation of hypotheses and the design of a research plan and experiments.
- Maintain appropriate records of experimental methods used and data generated in a laboratory notebook
- Analyze experimental data and propose appropriate, supported conclusions related to experimental objectives.
- Conduct a database search of scientific literature on a given topic in the field of microbiology and compose a literature review in an appropriate scientific writing style and format.
- Prepare scientific reports of experimental activities in a style and format appropriate to a scientific discipline.
- Give a poster presentation of their research findings in a style and format appropriate to the discipline.
- Gather, interpret, and present their data, in oral and written form.
- Students will critique their own, and their peers' presentations and reports, gaining insight into both sides of the peer review process

Personal Empowerment:

- Students will take responsibility for their learning and put the knowledge and methods of science to immediate use in their projects.
- Students will develop and nurture a deeper understanding of personal motivation
- Students will draw connections between their research, and research in general and real-world problems and issues. Students will understand how research can be an agent for social good.

Course Material:

All laboratory procedures, data collection, and note-taking are kept in manuals and designated notebooks in the lab and on lab computers. All equipment and project reagents are provided in the lab.

COURSE POLICIES

Instructor Expectations: Personal and academic integrity, being open to new ideas, and sharing in a community where individuals from diverse backgrounds and cultures help one another grow intellectually, socially, and personally are expected at all times throughout the course. The faculty and staff of TAMUSA are here to help; however, students must take responsibility for their learning. Students should strive for a high level of academic performance and be responsible, respectful, and contributing citizens within the university and outside communities. Above all, students should develop a love of learning that will last a lifetime, along with a life-long interest in maintaining emotional and physical wellness.

Given that the Smyth lab is a biosafety level 2 laboratory, it is imperative to maintain a safe working environment by adhering to lab protocols and rules, ensuring timely and regular communication with Dr. Smyth throughout the semester, and maintaining responsible behavior in the lab at all times. You cannot be alone in the lab. You must always work in pairs and with the knowledge and/or supervision of Dr. Smyth or her designee.

Assessment: Grades in this course will be based on assessments of student performance, participation, and attendance, as evaluated by the faculty member. If you believe an error was made in grading please do not hesitate to bring it to my attention as soon as possible. If you find yourself struggling with this course, please talk to the instructor as soon as possible and do not wait until the end of the semester. You are always welcome to stop by my office or email me to make an appointment to discuss your concerns.

You will have to:

1. Maintain a Benchling lab notebook and complete entries every week (10%)
2. Conduct a literature review on your topic (10%)
3. Generate an annotated bibliography and contribute to the shared Zotero library (10%)
4. Complete your training in Biosafety and RCR along with Smyth Lab orientation (10%)
5. Participate in lab activities, conduct experiments and follow protocols and instructions (40%)
6. Generate a final poster that describes your work and present it to the lab (20%)

Grade Scale and Points Distribution

A - 90-100

B - 80-89

C - 70-79

Blackboard and Course Communication: All grades will be posted and accessible through the course's Blackboard site. Students must log in regularly to both the Blackboard site and to their TAMUSA email account to keep updated on information or changes related to the class. Each student MUST have an active TAMUSA e-mail account. This will be the e-mail address that is used for any communication between you and your instructor. E-mail may be sent from student-to-student, or student-to-instructor using the e-mail feature in Blackboard's Communication area. Students who e-mail the instructor Monday-Thursday ordinarily can expect a response within 24 hours. Students who e-mail Friday-Sunday

ordinarily can expect a response by Monday morning. The preferred method of communication will always be e-mail or making an appointment (in person or virtually).

IMPORTANT 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. 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, 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

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 including support for in-the-moment distress, an anonymous peer-to-peer support network, mental health screenings, podcasts, and articles to improve your mental well-being.

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, or email with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com/>.

More information about the 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 welcome and encouraged to visit the Office of Military Affairs for any questions 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 diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to

observe religious holidays according to their traditions. Under the policy, students are provided an opportunity to make up any examination, study, or coursework 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, 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 is 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.

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 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, 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>).

Option 3 – Broader Use of Generative AI Permitted Within Guidelines

Use of artificial intelligence (AI) tools, including ChatGPT, is permitted in this course for students who wish to use them. To adhere to our scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to generate content without proper attribution qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.