

BIOL 5310 - Graduate Scientific Scholarship--Fall 2026 Syllabus

Texas A&M University-San Antonio

Instructor: Dr. Elizabeth Borda

Office Borda: Scitech 311P

Office hours: Thursdays, 10:00-11:30 pm; Hours also available by appt.

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Course Description and Prerequisites: This course provides graduate students with an introduction to biological research methods including scientific ethics, writing, and citation, and grant writing. Prerequisite: Graduate-level status.

Course meeting time:

Mondays & Wednesdays, 5:30-6:45 pm, hybrid

Madla 207 or via Zoom (available in Blackboard)

Course objectives:

- **Critically read and evaluate primary scientific literature**, including the interpretation of research questions, methods, evidence, conclusions, and limitations.
- **Locate, evaluate, organize, and appropriately cite scientific information** using scholarly databases and other research resources.
- **Develop focused scientific questions or problems and construct evidence-based approaches for addressing them**, appropriate to research, applied, or professional contexts.
- **Communicate scientific ideas effectively in written, oral, and professional formats** for appropriate scientific and non-scientific audiences.
- **Apply principles of responsible and ethical scientific scholarship**, including research integrity, authorship, data management, citation practices, and responsible use of generative AI.
- **Engage effectively in mentoring, collaboration, peer review, and professional scientific relationships**, including working constructively with individuals with different backgrounds, perspectives, and experiences.
- **Identify and articulate the developing scientific and professional identity**, including their skills, areas for growth, career goals, and strategies for continued professional development.
- **Develop professional materials and practices appropriate for participation in the scientific community**, including a curriculum vitae, professional profile, networking strategies, and communication of scientific expertise.

Course Resources

All course material is to be provided in Blackboard.

Course Policy

Course 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 own learning. Students should strive for a high level of academic performance and to 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.

Active Participation: Students are expected to actively participate during class. It is recognized that students learn in a diversity of ways, thus diverse teaching strategies will be implemented as part of the course (e.g., discussion, reading, writing, individual reflection, presenting, and collaboration). There are multiple ways to demonstrate active learning engagement in this course and the intention is for students to strive beyond their preferred ways of learning and comfort zones, as dissonance can promote new learning. Students are highly encouraged to contribute thoughtful comments and questions, as well as to listen carefully to their peers' contributions and respectfully respond to others' comments. The success of mutual learning depends upon preparation and active participation in all aspects of the course.

Attendance: This is a discussion-based and community-oriented learning environment. Your attendance is very important to the functioning of this course. If you must be absent from a class due to illness or other obligations, please send the instructor an email or leave a voicemail prior to the start of class. As stated above, if you must miss a class session you are responsible for all material covered and any handouts given during that class session.

Grading: 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.

To be successful in this course you are expected to complete all assignments on time.

Blackboard and Course Communication: All grades will be posted and be 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 email 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 email feature in Blackboard's Communication area. Students who email 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 via Telegram first (link to be provided in Blackboard), then e-mail or making a virtual appointment.

Grade Scale and Points Distribution

A = >90.0

B = 80.0 – 89.9

C = 70.0 – 79.9

D = 60.0 – 69.9

F = <59.9

Assignments	% of Grade
Individual Development Plan	5%
Article Critique	15%
Scientific Abstract	15%
Scientific Scholarship Final Project	25%
ePortfolio	20%
Scholarship Activities & Participation	20%
Total	100%

Major Assignments

Individual Development Plan (IDP)

The Individual Development Plan is designed to help students identify their current strengths, areas for growth, professional interests, and goals for graduate study. Students will reflect on their existing skills and experiences, identify competencies they would like to develop, and establish specific short- and longer-term goals. The IDP should also identify resources, experiences, mentors, or other opportunities that can help the student make progress toward these goals. The IDP is intended to be a working document rather than a fixed career plan. Students will revisit their IDP near the end of the semester to reflect on their development and identify priorities for continued professional growth.

Article Critique

Students will select and critically evaluate a peer-reviewed primary research article in an area of biological science relevant to their interests. The purpose of this assignment is to develop skills in reading scientific literature critically rather than simply summarizing its content. The critique should identify the primary research question or objectives of the study, evaluate the appropriateness of the methods and evidence used to address those questions, assess whether the authors' conclusions are supported by the results, and identify important strengths, limitations, and unanswered questions. Students should distinguish clearly between summarizing what the authors did and providing their own critical evaluation of the study.

Scientific Abstract

Students will prepare a concise scientific abstract describing the scientific question or problem developed during the semester. The abstract should clearly establish the scientific context, identify the question or problem being addressed, describe the proposed approach or basis of the scholarly work, and communicate its anticipated significance. Students pursuing a thesis or research-oriented project may prepare an abstract describing proposed research. Students pursuing a non-thesis or professionally oriented project may prepare an abstract describing an evidence-based scientific, applied, methodological, educational, conservation, or other scholarly

project. An initial draft will be developed and reviewed during the semester. Students will use feedback and the continued development of their Scientific Scholarship Project to prepare a revised final abstract. Emphasis will be placed on clarity, concision, organization, and communicating scientific significance to a biological audience.

Scientific Scholarship Project

The Scientific Scholarship Project is the culminating scholarly assignment for the course. Students will use scientific literature and evidence to develop a focused biological question or problem and construct a well-supported approach for addressing it. The project will be developed incrementally throughout the semester through literature searching, identification of scientific gaps or problems, development of questions and objectives, project planning, writing activities, and peer feedback.

Students may complete the project through one of two pathways:

Research Proposal Pathway: Students will develop a concise proposal for an original research project. The proposal will establish the scientific background and knowledge gap, clearly state the research question and appropriate hypotheses or objectives, describe a feasible approach for addressing the question, discuss anticipated outcomes, and explain the significance of the proposed work.

Evidence-Based Scientific Project Pathway: Students will identify an applied, professional, methodological, educational, conservation, or other biological problem and use scientific literature to critically evaluate the available evidence and develop a scientifically justified approach, recommendation, or conclusion.

Students may select either pathway regardless of whether they are enrolled in the thesis or non-thesis degree option. Both pathways emphasize critical evaluation of scientific literature, evidence-based reasoning, clear scientific communication, and graduate-level scholarship.

Professional ePortfolio

Students will develop a professional electronic portfolio that communicates their developing identity, expertise, experiences, and accomplishments as a biological scientist or scholar. The ePortfolio is a semester-long project that will be introduced early in the course and developed as students complete other course activities and assignments. The portfolio will include a professional introduction or statement of scientific interests, a current curriculum vitae, evidence of relevant scientific or professional skills and experiences, and selected examples of scholarly work. Students may also include research experiences, presentations, technical skills, teaching or outreach activities, professional experiences, certifications, or other materials relevant to their individual goals. The organization and emphasis of the portfolio should reflect the student's intended professional direction. Thesis and research-oriented students may emphasize research interests, projects, methods, and scholarly products, while non-thesis students may emphasize applied scientific expertise, technical skills, professional experiences, and career-relevant accomplishments. Students will prepare a complete draft of the ePortfolio for structured peer review and will use feedback from their peers and instructor to revise the portfolio before final submission. The final ePortfolio should present a coherent and professional representation of the student's developing scientific identity rather than simply serving as a collection of course assignments.

Detailed Schedule

Class schedule is subject to changes; Changes will be announced during class on *Blackboard*.

Week	Topics/Activities	Week	Topics/Activities
WEEK 1 Aug. 24, 26	Entering Graduate Research What graduate-level scholarship means; scientific identity; expectations Activity: Scientist/Scholar Asset Mapping	WEEK 9 Oct. 19, 21	Scientific Communication Technical writing; abstracts; communicating significance Activity: Bad Abstract Surgery + peer workshop Assignment: Scientific Abstract Draft (Due Oct. 25)
WEEK 2 Aug. 31, 2	Mentoring & Graduate Relationships Mentors, communication, expectations, asking for help Activity: Mentoring Expectations + Support Network Map	WEEK 10 Oct. 26, 28	Developing a Scholarly Project Building an argument; background; objectives; approach; expected outcomes Activity: Proposal/project-building workshop Assignment: Project One-Pager (Due Nov. 1)
WEEK 3 Sept. 7, 9	Planning Your Development LABOR DAY - NO CLASS (Sept. 7) Asset mapping, IDP, career goals, funding / opportunities. Activity: IDP Workshop; ePortfolio overview Assignment: IDP (Due Sept. 13)	WEEK 11 Nov. 2, 4	Research Practice Documentation, data management, reproducibility, collaboration Activity: Research Folder/Data Management Challenge; ePortfolio checkpoint II
WEEK 4 Sept. 14, 16	Reading Scientific Literature How to read papers efficiently; figures; evidence vs. interpretation Activity: Article Anatomy / Paper Dissection; ePortfolio development	WEEK 12 Nov. 9, 11	Ethics & Responsible Scholarship Misconduct, plagiarism, authorship, AI, data integrity, conflicts Activity: Ethics Case Conference + Authorship Court Assignment: Final Scientific Abstract (Due: Nov. 15)
WEEK 5 Sept. 20, 23	Finding & Managing Literature Databases, search strategies, citation management Activity: Database Search Challenge Assignment: Article selected for critique (Due Sept. 27)	WEEK 13 Nov. 16, 18	Science as a Collaborative Enterprise Diversity, teamwork, conflict, communication, scientific culture Activity: Team Science / Conflict Case Study

WEEK 6 Sept. 28, 30	Critically Evaluating Science Study design, evidence, limitations, scientific critique Activity: Critique workshop / Reviewer exercise; ePortfolio checkpoint I Assignment: Article critique (Due Oct. 4)	WEEK 14 Nov. 23, 25	Professional Scientific Identity STUDY DAY - NO CLASS (Nov. 25) CV, networking, communicating expertise, ePortfolio Activity: CV + ePortfolio Peer Review Assignment: ePortfolio final (Due Nov. 29)
WEEK 7 Oct. 5, 7	Asking Good Scientific Questions Knowledge gaps; questions; scope; feasibility Activity: Known → Unknown → Gap/Problem → Question workshop Assignment: Project Question/Problem Statement (Due: Oct. 11)	WEEK 15 Nov. 30, Dec. 2	Scientific Scholarship Showcase Communicating what you've developed; reflection; revisit IDP Activity: 3-Minute Scientific Scholarship Pitch Assignment: Final Scientific Scholarship Project (Due Dec. 4)
WEEK 8 Oct. 12, 14	Evidence, Hypotheses & Approaches Hypotheses, predictions, objectives, appropriate evidence Activity: Project Logic Map		