



BIOL 4411-001 Applied Plant Physiology

Biology Program (Department of Life Sciences)

Instructor: J. Rodolfo Valdez Barillas (Call me Dr. Valdez)

Office: Science & Technology Building 311L, **E-mail:** jvaldezb@tamusa.edu

Office hours: MWF 3-4 pm in Sci & Tech 311L or by appointment via Microsoft Teams

Class meeting format: Face to face **MWF 2:00 to 2:50 pm in CAB 334**

Lab meeting time: M 11:00-1:45 pm in CAB 310

Course Description

Course Description: Throughout history, humans have utilized plants in various ways; however, a more comprehensive understanding of the mechanisms and processes responsible for plant function emerged only in the latter half of the 20th century. This course aims to enhance the student's knowledge of plant function from a practical perspective. We will explore plant function, growth, and development through lectures and laboratory exercises. In the first part of the course, we will examine the structures and functions of plants. The second segment will focus on plant metabolic functions related to water balance, nutrient production, nutrient allocation, and defense mechanisms. The final segment will address the mechanisms and processes involved in the growth and development of different plant tissues, and plant's responses to biotic and abiotic stimuli.

Course Objectives

- Understand the mechanisms that explain how **plants** function and appreciate the diversity of adaptations that help plants cope with different environmental pressures.
- Understand plant function at different levels including a chemical, molecular, cellular, morphological, and from an ecological perspective.
- Understand the applications and links between plant use, plant products, and physiology
- Read and evaluate original literature (including peer-reviewed journals) to gain direct access to historical and modern developments related to Plant physiology.
- Learn different laboratory techniques to address plant physiology questions, emphasizing plant growth, development, and propagation.

Recommended resources

Textbook for Lectures: (Recommended)

- Plant Physiology 7th edition by Taiz, Moller, Murphy, and Zeiger (2022) Sinauer Associates: Oxford University Press. ISBN 9780197577240.
- Plant Physiology 6th edition by Taiz and Zeiger. (2014) Sinauer Associates, Inc. (ISBN-13 9781605352558 ISBN 1605352551).
- Other Recommended books: Emanuel Epstein and Arnold J. Bloom.2005. Second edition. Mineral Nutrition of Plants: Principles and Perspectives. University of California, Davis.
- **Lab handouts: provided by the instructor, and posted on Blackboard on Monday**

Course Policies

Attendance: You are required to attend every lecture and laboratory session.

- For face-to-face lectures attendance during the entire lecture is expected, being no more than 10 minutes late.

Participation: You are expected to have reviewed the course material from previous lectures, so you come to class with questions and ready to participate in collective discussions.

Communication: All communication and inquiries outside lecture time should be e-mailed to jvaldezb@tamusa.edu. This e-mail is intended for communication only. No late assignments will be accepted via e-mail unless the instructor has granted accommodation. All assignments will be submitted using the link provided on Blackboard.

Online etiquette: When sending e-mails please initiate them by addressing me as Dr. Valdez, so I know I am the intended recipient, and try to be specific about your question or comment. Please include your name at the end of your e-mail so I can reply using your name.

Course Changes: The course syllabus, lecture, and lab schedules may be subject to change or updated during the semester; however, students will be notified via e-mail or during class should it change.

Exam Dates: The dates for all the Exams are included in the lecture schedule. However, the date might be changed at least one week in advance when 80% of the class or more students petition to move the date if overloaded with Exams from other courses. Any changes in dates will be submitted to class vote at least one week before the original scheduled date

Make-up Exams: Make-up Exams are granted at the instructor's discretion. Make-up Exams cannot be expected unless you have previously communicated your absence in written form or no later than 24 hours from your absence. Students can only make up one exam, and since one-half of the Exam is completed as a group, you can only receive credit for the individual portion.

Late assignments: I will deduct 10% of the assignment's possible points for each day passed after the due date.

Laboratory sessions: Laboratory activities indoors or outdoors are subject to Texas A&M System regulations and policy. Specific laboratory guidelines will be provided during the first lab session; however, **facemasks** will be required during lab sessions that require sterile conditions. Lab coats will also be used during laboratory sessions in CAB 310 but not outdoors.

Outdoor lab activities: For laboratory activities and group projects in our greenhouse facility, students will be encouraged to dress appropriately for outdoor work, mainly to protect their skin from the sun, minimize heat stroke, and stay hydrated.

Course Evaluation

Exams: The Exam format will include multiple choice, true/false questions

- Exams are closed book and most questions will come from or will be like the quiz questions
- The Exam may include figures, tables, diagrams, or articles that will be provided on the day of the Exam
- Each exam will include the material covered during the lecture before the day of the exam
- Exams will normally be on Mondays and require 50 minutes to complete.
- You will be given a paper-printed Exam, you will need a pen or pencil to enter your answers directly on the Exam, and a scantron will be provided.

Quizzes: Quizzes will be available weekly

- Regular quizzes will be available via Blackboard and completed outside of lecture time. You will have 5 days to complete and submit the quiz attempts before the Due date and time.
- However, on the week of the Exam a quiz will be submitted on Wednesday, and you will have 48 hours to complete and submit it before the end of the day
- Your quiz can be taken three times, and the highest score will be added to your grade book.
- Questions will be presented one at a time and no backtracking will be possible; the number of questions may range from 5-10 questions.
- Length of quiz may range from 5 to 10 minutes.

Assignments: This may include a scientific article summary and critiques or in-class activities

- Please read the instructions provided on how to write an article summary and critique.
- Depending on the assignment, the submission may be during or after a lecture.
- You cannot turn in in-class assignments if you were absent the day it was provided.

Extra credit: Extra credit (5 points) will be given to those of you who post a news article.

- The article link needs to be provided and the article posted needs to be related to any topic in conservation or restoration covered during the week. You only need one posting to earn 1 point. Five Extra credit News folders will become available for posting your news during a specific period. You may not post articles for past or future weeks.

- Volunteering and Community Service (5 extra credit points): You will have the chance to earn 5 extra credit points for volunteering at any conservation organization or helping with undergraduate research projects. If interested, come talk to me, please. 1 hour of service = one extra credit point. Additional credit opportunities will be provided
- **Lab notebook:** You will be required to bring a lab notebook during every lab. In it, you will enter preliminary lab information, data collected during lab, data analysis and results, and data interpretation. **(Please read the instructions on how to use your lab book posted under course content on Blackboard)**
- Examples
 - <https://www.walmart.com/ip/National-Brand-Heavyweight-Reinforced-11-x-8-1-2-Filler-Paper-100-Sheets/15079153> (any book like this one works but not smaller versions please)
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- **Group project and presentations:** You will form groups and will work on designing and building plant growth projects. Instructions will be provided during the first week of class.

GRADING (Number of quizzes and assignments may be adjusted based on student course load)

Instruction	Assessment	Cumulative pts
Lecture	Exams (3+final) 100pts/each	400
	Quizzes (11) 10pts/each	110
	Assignments (3) 10pts each	30
	In-class assignments (5) 5 points each	25
Lab	Groups Project Final Report	10
	Group Project Presentation	20
	Lab reports (8) 20pts/each	160
	Total	775

A = 90 – 100 points
 B = 80 – 89.9 points
 C = 70 – 79.9 points
 D = 60 – 69.9
 points F = <59.9
 points

Calculation of Final Grades

- The extra credit earned is added to the 775 total points when calculating your final grade over 100 points

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 following 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 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.

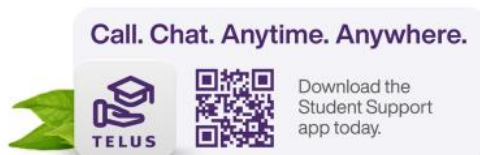
Academic Learning Center: The Academic Learning Center provides free course-based tutoring to all students currently enrolled at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the **Brainfuse** online tutoring platform. **Brainfuse** can be accessed 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 the SCC provides are free and confidential (as the law allows). The Student Counseling Center offers 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 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. The 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 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 including 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 e-portfolios, 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 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 allowed 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, under applicable federal and state law, prohibits discrimination, including harassment, based on 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 are 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 outlined 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, based on race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, gender identity, gender expression, and pregnancy/parenting or veteran status following 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>).

Use of Generative AI Permitted Under Some Circumstances or With Explicit Permission

There are situations and contexts within this course where you may be asked to use artificial intelligence (AI) tools to explore how they can be used. Outside of those circumstances, you should not use AI tools to generate content (text, video, audio, images) that will end up in any student work (assignments, activities, discussion responses, etc.) that is part of your evaluation in this course. Any student work submitted using AI tools should indicate with attribution what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be generated by AI. If any part of this is confusing or uncertain, students should reach out to their instructor for clarification before submitting work for grading. Use of AI-generated content without the instructor's permission and/or proper attribution 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 28-30	Thanksgiving Holiday – No classes
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>.