

Plant Physiology Laboratory Syllabus
BIOL 4504 - Spring 2026

Teaching Assistants:

Yusuf Mustapha; LSC B330; YusufMustapha@my.unt.edu

Sanchi Dhinoja; LSC B330; SanchiDhinoja@my.unt.edu

Laboratory Supervisor: Matthew Feragne; LSC B330; MatthewFeragne@my.unt.edu

Course Instructor: Brian Ayre; LSC B318; Brian.Ayre@unt.edu

(Please use the CANVAS email tool for all course-related correspondence)

Classroom: LSC A238

Objectives:

BIOL 4504 Plant Physiology Laboratory provides hands-on experience in experimental plant biology while illustrating fundamental principles of plant function. The laboratory is designed to reinforce and supplement core concepts in plant physiology and is intended to be taken concurrently with BIOL 4503 Plant Physiology and Development. By the end of this course students will:

- Examine relationships between plant structure and physiological function.
- Investigate the effects of environmental factors, including light, water, and nutrient availability on plant development and physiology.
- Analyze how biomolecular processes give rise to observable traits, responses, and functions in plants.
- Develop an understanding of the methods and applications of plant biotechnology.
- Formulate and test hypotheses using experimental approaches.
- Strengthen quantitative, analytical, and critical-thinking skills.

Required Materials:

- Laboratory Manual - Available through CANVAS. Print off the Lab Manual Sections for individual labs or print off the Lab Manual.
- Personal Protective Equipment (PPE) - Laboratory Coat and Safety Goggles
- Calculator

Assessment:

Grades assigned in this course are based on the following scale: A (100-90%), B (89-80%), C (79-70%), D (69-60%), F (59-0%)

Participation (11 of 12)	100 pts.	=	25%
Worksheets	100 pts.	=	25%
Exams (2, 100 pts each)	200 pts.	=	50%
Total:	400 pts.	=	100%

Communication:

Clear and timely communication is essential to the success of this laboratory course. Students are responsible for addressing questions, concerns, or potential issues as soon as they arise, rather

than after deadlines have passed or grades have been assigned. Students should first communicate with their assigned teaching assistant regarding routine laboratory questions, attendance issues, and assignment concerns. Issues that cannot be resolved at that level should be directed to the laboratory supervisor. Matters requiring further review may then be escalated to the course instructor. Failure to communicate in a timely and appropriate manner may limit the instructional team's ability to provide accommodation or resolve issues. Please use the CANVAS email tool for all course-related correspondence.

Participation:

Participation is required for all laboratory sessions. Participation credit reflects performance, not merely attendance. Participation is evaluated based on observable behaviors that contribute to a safe, productive, and professional laboratory environment. These include: consistent engagement with laboratory activities; appropriate laboratory technique and working practices; ability to follow instructions; effective and respectful collaboration with group members; adherence to safety protocols; maintenance of a clean workspace; and professional conduct throughout the session. Attending a laboratory session does not guarantee participation credit.

In cases where laboratory work is conducted in groups, participation points will be deducted for all group members when group-level failures occur (e.g., unsafe practices, incomplete setup or cleanup, misuse of shared materials) and individual responsibility cannot be reasonably determined.

Etiquette: Students are expected to always treat instructors and fellow students with respect. Behaviors that disrupt instruction or interfere with the learning of others are not permitted. These include but are not limited to, arriving late or leaving early without prior approval, use of cell phones or other personal electronic devices, and general inattentive or disruptive behavior. Disruptive or unprofessional behavior may result in reduced participation credit and, if necessary, removal from the laboratory session.

Absences: Students should be aware that missing any laboratory session may negatively affect performance on laboratory analyses and practical exams. Laboratory exercises cannot be replicated outside the scheduled sessions and missed laboratories cannot be made up. Each student is permitted one absence without loss of participation points. This allowance applies only to participation credit and does not replace the missed laboratory experience, data collection, or instruction. Unexcused absences beyond this will result in a loss of participation credit for that laboratory session. Regular attendance and preparation for all laboratory sessions is expected.

Attendance:

Attendance and active participation during all scheduled laboratory sessions are required. Students are expected to arrive prepared and remain engaged for the full duration of each laboratory.

Worksheets: Worksheets for each lab assignment are due at the beginning of the following lab, or as indicated by your TA. In-person paper-copy submission of worksheets is expected. Your TA will announce submission changes if classes are disrupted due to winter precipitation. Late

assignments are not accepted without a timely and clearly communicated excused absence approved by the instructional team.

Exams: Two practical exams will assess knowledge and understanding of the laboratory activities and concepts. This includes general plant biology and aspects of experimental design and results.

Academic Conduct:

A professional and respectful learning environment is required at all times. Students are expected to uphold the highest standards of academic, professional, and personal integrity in all aspects of this course. This includes honesty in all coursework and appropriate conduct toward instructors, teaching assistants, fellow students, and the laboratory environment. Suspected or confirmed incidents of academic misconduct, including plagiarism and other forms of cheating, will be handled in accordance with University of North Texas policies. The instructional team reserves the right to report suspected violations to the appropriate university offices. Information regarding academic misconduct policies is available at: <https://studentaffairs.unt.edu/dean-of-students/conduct> through the Office of the Dean of Students.

Disability Accommodation, Including Chronic Illness:

The Department of Biological Sciences, in cooperation with the Office of Disability Accommodations (ODA), complies with Section 504 of the Americans with Disabilities Act in making reasonable accommodations for qualified students. Official written requests for accommodation must be submitted through the ODA as soon as possible so that necessary arrangements can be made. Please note that chronic (ongoing, recurring, or episodic) illnesses must also be documented with official guidelines for accommodation provided through the ODA. If a student fails to properly communicate the need for accommodation accompanied by the appropriate documentation from the ODA in a timely manner, no retroactive accommodation, adjustment of course requirements, or alteration of grades received can be made for any work performed prior to that point to ensure fairness to other students. However, every attempt will be made to accommodate the student moving forward.

Safety Rules and Laboratory Practices:

Safety is of foremost importance in all laboratory activities. Students are required to behave responsibly and to follow all established laboratory safety procedures. Failure to comply with safety requirements may result in removal from the laboratory session, a reduction in participation credit, and/or other academic consequences. These requirements apply to all laboratory activities without exception.

General Safety Requirements:

- Food, drinks, smoking, vaping, chewing gum, applying cosmetics, or storing food or beverages in the laboratory are prohibited due to the risk of contamination and accidental ingestion.
- Personal Protective Equipment (PPE) is required in the laboratory. Students should arrive prepared to meet PPE requirements for the session. Required PPE includes a laboratory

coat extending below the knees, safety goggles, and laboratory gloves. Students who do not have required PPE may be asked to leave the laboratory until properly equipped.

- Proper attire is required. Shorts, open-toed shoes, sandals, and clothing that does not adequately protect the body are not permitted.
- Students must inform the instructional staff of any relevant medical conditions, sensitivities, or allergies (e.g., latex) that may pose a safety concern so that appropriate accommodations can be provided.

Laboratory Conduct and Procedures:

- Students are expected to know the location and proper use of emergency equipment, including the eyewash station, emergency shower, fire extinguisher, and first aid kit.
- All accidents, injuries, spills, or unsafe conditions must be reported to the instructor immediately, regardless of severity. In emergency situations (fire, flooding, medical emergencies), notify the instructor at once and follow emergency procedures.
- Experiments must never be left unattended.
- Volatile, hazardous, or organic solvents must be handled in a fume hood as directed by the instructional staff.
- Chemical exposure response:
 - **Eye exposure:** Use the eyewash immediately and flush for at least 15 minutes.
 - **Skin exposure:** Flush the affected area with water and notify the instructor.
 - **Biohazard contact:** Wash thoroughly with soap and water and notify the instructor.
- Chemical and biohazard spills must be immediately contained and reported. Spill kits are available in the laboratory.
- Hot glassware must be handled with appropriate tools (e.g., tongs or clamps). Never look directly into or point heated containers toward yourself or others.
- Chemicals must not be directly smelled or inhaled. Use the wafting technique when instructed.
- Sharp objects (e.g., scalpels, razor blades, glass pipettes) must be handled with extreme care and used only as instructed. Mouth pipetting is strictly prohibited.
- Students must remain alert to physical, chemical, and biological hazards and comply with all posted warnings, lab manual instructions, and verbal directions.
- Broken glass and microscope slides must be disposed of only in designated glass disposal containers. Biohazardous waste must be disposed of only in designated biohazard containers.
- All instruments must be turned off at the end of the laboratory session unless directed otherwise.
- Non-enrolled individuals, including children and guests, are not permitted in the laboratory.
- Hands must be washed before leaving the laboratory.
- Professional and responsible behavior is required at all times.

Important Laboratory Practices:

- Chemicals must be disposed of according to laboratory instructions. Students must not pour chemicals down the sink unless explicitly directed. Labeled waste containers will be provided for appropriate disposal.
- All chemical and reagent containers must be securely closed immediately after use.
- The laboratory workspace must be kept clean, organized, and free of unnecessary materials at all times.
- Students are expected to be familiar with the experimental procedures before arriving to the laboratory and must bring the lab manual or required printed materials to each session.
- Instructions must be followed carefully. Students should ask questions whenever procedures or expectations are unclear.
- Students are expected to work conscientiously and deliberately, maintaining awareness of their surroundings and the actions of others.
- Reagent stocks must not be contaminated.
- Students are expected to exercise good judgment and think critically before acting during laboratory activities.

SCHEDULE OF LABORATORIES***

Date	Laboratory	Due Dates
Mon, Jan 12	No lab meeting on the first day of the Spring semester	
Mon, Jan. 19	Martin Luther King Day – University closed	
Mon, Jan. 26	Laboratory 1 - Syllabus; Expectations & Safety; Fundamentals of Scientific Measurement & Liquid Handling.	
Mon, Feb. 2	Laboratory 2 - Plant Anatomy I & II: Gross Morphology and Microscopic Analysis	Lab 1 Due
Mon, Feb. 9	Laboratory 3 - Water Tissue Relations	Lab 2 Due
Mon, Feb. 16	Laboratory 4 - Whole Plant Water Relations and Transpiration	Lab 3 Due
Mon, Feb. 23	Laboratory 5 - Mineral Nutrition and Nitrogen Fixation	Lab 4 Due
Mon, Mar. 2	Laboratory 6 - Photosynthesis Analysis and Influence of Light Intensity on Starch Production; Initial Analysis of Hydroponics Results	
Mar. 9-13	Spring Break – No Classes / Laboratories	
Mon, Mar. 16	EXAM #1; Evaluation of Hydroponics Lab Results	Lab 6 Due
Mon, Mar. 23	Finish Hydroponics Lab Analysis; Analyze Nitrogen Fixation and Nodulation Experiment	
Mon, Mar. 30	Laboratory 7 - Plant Pigment Analysis	Lab 5 Due
Mon, Apr. 6	Laboratory 8 - Plant Hormone Analysis	
Mon, Apr. 13	Laboratory 9 - Biotechnology and Transgenic Plants	Lab 7 Due
Mon, Apr. 20	Laboratory 10 - Plant Bioinformatics	
Mon, Apr. 27	Exam #2; Turn in final assignment(s)	Labs 8, 9, and 10 Due
May 4	Last Week of Classes – Labs do not meet	

***Schedule is subject to change – plants don't always cooperate! ***

***Changes to the published laboratory manual will be explained at the beginning of each laboratory session – students are expected to read the laboratory manual in advance and pay close attention to any changes at the beginning of each laboratory. ***