BIOL 1401, Section 001
BIOLOGY OF PLANTS
Spring 2022

Lecturer
Dr. Nick Smith
Experimental Sciences Building (ESB) II Rm. 402D
806-834-7363
nick.smith@ttu.edu

Office Hours
By appointment (contact Dr. Smith at nick.smith@ttu.edu)

Teaching Assistants (TAs)
Nikki Paulat – nicole.paulat@ttu.edu
Zinny Ezekannagha – eezekann@ttu.edu
Peter Eludini – peludini@ttu.edu
Manuel Hoyos-Rodriguez – mhoyosro@ttu.edu

Time
M/W/F 10:00 – 10:50

Location
Biology 101

Recommended Texts
Stern's Introductory Plant Biology 14th Edition by Bidlack and S.H. Jansky.
A Photographic Atlas for the Botany Laboratory, 7th ed., Rushforth et al.

Lab Manual
Will be sent electronically.

Daily materials
Slides and lecture reviews will be posted on Blackboard.

Grades
Grades will be posted on Blackboard. See scoring breakdown below.

Tutorial Assistance
http://www.depts.ttu.edu/soar/LC/Index.php

Schedule of Topics

Date	**Lecture Topic (Chapter #)**
January	
12	Plant Biology and Nature of Life (1, 2)
14	Plant Cells and Tissues (3, 4)

17	**NO CLASS**
19	Plant Cells and Tissues (3, 4); **Quiz #1**
21	Plant Cells and Tissues (3, 4)
24	Roots and Stems (5, 6)
26	Roots and Stems (5, 6); **Quiz #2**
28	**NO CLASS**
31	Leaves, Flowers, Fruits, and Seeds (7, 8)
February	
2	Leaves, Flowers, Fruits, and Seeds (7, 8); **Quiz #3**
4	Leaves, Flowers, Fruits, and Seeds (7, 8)
7	Exam 1 Review
9	**Exam 1, Wednesday, Feb. 9**
11	**NO CLASS**
14	Water; Transpiration and Translocation (9, 5)
16	Soils and Nutrients (9, 5); **Quiz #4**
18	Photosynthesis (10)
21	Photosynthesis (10)
23	Photosynthesis (10); **Quiz #5**
25	Respiration (10)
28	**NO CLASS**
March	
2	Respiration (10); **Quiz #6**
4	Productivity, Efficiency, and Growth (11)
7	Exam 2 Review
9	**Exam 2, Wednesday, March 9**
11	**NO CLASS**
14	**NO CLASS**
16	**NO CLASS**
18	**NO CLASS**
21	Meiosis and Mitosis (12)
23	Genetics (13); **Quiz #7**
25	Evolution (15)
28	Evolution (15)
30	Seed-free Plant Diversity (20, 21); **Quiz #8**
April	
1	Seed Plant Diversity (22, 23)
4	Plant Ecology (25)
6	Plant Ecology (25); **Quiz #9**
8	Plant Ecology (25)
11	Exam 3 Review
13	**Exam 3, Wednesday, April 13**
15	**NO CLASS**
18	**NO CLASS**
20	Global Change
22	Global Change
25	Global Change

27	Lab Report Discussion/Review; **Quiz #10**
29	Final Exam Review
May	
2	Final Exam Review

FINAL EXAM (Comprehensive, <u>101 Biology</u>), 1:30-4:00 PM, **Monday, May 9. PERMISSION TO TAKE THE FINAL EXAM AT ANY OTHER TIME WILL <u>NOT BE GRANTED</u>.**

Attendance Policy
Attendance is not mandatory, but it is strongly recommended that students participate in all aspects of the course to perform well.

Missing a Quiz or an Exam
If you have a <u>university function or *severe* illness</u> that will cause you to miss a Quiz or exam, **contact Dr. Smith <u>before the quiz/exam</u> or <u>no later than 24 hours following the quiz/exam time</u>**. Make-up exams are usually short-answer/essay questions with some multiple-choice statements.

Expected Learning Outcomes
Biology 1401 satisfies the requirements for a course in the Natural Sciences Core Education Curriculum. Students graduating from Texas Tech University should be able to explain some of the major concepts in the Natural Sciences and demonstrate an understanding of scientific approaches to problem solving, including ethics. In addition, it is expected that a student completing this class should be able to understand, construct, and evaluate relationships in plant science. Specifically, the student should understand:

1. the scientific method and how it is used in plant research
2. plant structure (anatomy) and its relationship to plant functions (physiology)
3. how basic plant functions are regulated by the plant
4. the diversity of plant life on Earth
5. plant interactions with environmental factors and how these factors influence ecosystem function

Specific Methods of Assessing Expected Learning Outcomes
Student performance will be assessed by primarily multiple-choice tests in the lecture. Quizzes will be a combination of short-answer, fill-in-the-blanks, and multiple-choice. In the lecture, selected exam questions will assess for students' critical thinking ability and empirical and quantitative skills. Benchmark: 60% of students scoring correctly on each of those assessments.

1. <u>In the lecture</u>, learning outcomes will be assessed by the administration of three exams, weekly quizzes, and a comprehensive final exam.
2. <u>In the laboratory</u>, learning outcomes will be assessed by the evaluation of a research report, an oral presentation, daily activity assessments, and class participation.

Grading Policy

3 Exams	= 15% each
10 Quizzes	= 1% each
Laboratory	= 30%
Final Exam	= 15%

All quiz and exam scores will be posted on Blackboard

Quizzes
Short quizzes will generally be given each week except when an exam is given (see the schedule, above). Quizzes may consist of a mix of multiple choice and short answer questions.

Exams
Exams may consist of a mix of multiple choice and short-answer questions. The first three exams will cover material covered in lecture since the previous exam.

Final Exam
The final exam may consist of a mix of multiple choice and short-answer questions. The final exam will be comprehensive.

Determining Your Letter Grade:

A = 100-90; B = 89.9-80; C = 79.9-70; D = 69.9-60; F = ≤ 59.9.

Receiving a Failing Score in the Laboratory Portion of the Course: Because BIOL 1401 can serve as partial fulfillment of the laboratory science requirement for the university, *if you receive a score in the laboratory of 55% or lower, you automatically receive a final course grade of F*.

ALL GRADES POSTED AT THE END OF THE COURSE **WILL BE FINAL**, unless an error has been made in their calculation.

BIOL 1401 Is a Core Curriculum Course
BIOL 1401 satisfies one-half of the Texas Tech University Life and Physical Science Core Curriculum requirement. The lecture and especially the laboratory portions of the course satisfy many of the learning outcomes and methods of assessment required of a core curriculum course. The following Learning Outcomes, some from the Texas Higher Education Coordinating Board and some from Texas Tech University, must be included in all Life and Physical Science classes in the Core.

Texas Higher Education Coordinating Board and Texas Tech University Learning Outcomes and Methods of Assessment

Coordinating Board Objective 1. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
Critical thinking involves the careful and thoughtful evaluation of an issue before forming an opinion. The lecture will often provide information about biological processes in a step-wise

manner as examples of how conclusions are reached based on data gathered. In the lab, you will be required to develop an independent investigation of a question or problem that you pose involving plants.

Method of Assessment: Your critical thinking skills will be assessed in lecture by thought-based multiple-choice statements and short-answer questions. In the laboratory the assessment will be based on your presentation to the class of your research findings and on a written and orally presented report.

Coordinating Board Objective 2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication

To be understood and effective in your career endeavors, you must learn and perfect effective oral, visual, and written communication skills.

Methods of Assessment: In lecture, these skills will be assessed through your interaction with the instructor, TAs, and fellow classmates. The BIOL 1401 laboratory provides the mechanism to assess your progress in perfecting communication through your oral and written presentation of your research project.

Coordinating Board Objective 3. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

The analysis of information, such as data from an experiment, and the synthesis of that information into a clear prognosis are critical to be successful in an information-loaded world. In lecture, key topics offer an opportunity for the class to understand the interpretation of information. Also, your research project will require that you not only generate data but also that you must analyze those data and interpret your results.

Methods of Assessment: Key multiple-choice statements in exams and quizzes will test these skills. In the laboratory, weekly lab exercises will provide practice in this endeavor, so that you should have sufficient skills to analyze, interpret, and disseminate your research results.

Coordinating Board Objective 4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

In the laboratory, you will work on weekly exercises and the research project as a member of a group. Thus, it is critical that you attend lab and work well with your fellow group members to accomplish the laboratory goals.

Methods of Assessment: You will be graded in the laboratory not only based on your knowledge of the experiment but on your ability to work with other members of the team. A portion of your grade will be based on your participation within the group based on the group members' assessment.

TTU Student Learning Objective 1. Demonstrate knowledge of the scientific method and to contrast it with other ways of understanding the world

In lecture, key topics offer an opportunity for the class to understand the scientific method. Early exercises in the laboratory will address the fundamental process of the scientific investigation to gain new knowledge relative to simply knowing or "feeling" what that information might be. You will apply the methodology to your research project.

Methods of Assessment: Key questions/multiple-choice statements in lecture exams will test your understanding of the scientific method. Your research presentation and report will be used to assess your understanding in the laboratory.

TTU Student Learning Objective 2. Demonstrate knowledge of the tools and methods used by scientists to study the natural world

In lecture, key topics offer an opportunity for the class to understand the scientific methodology. In lab, you will use certain tools and methodologies, such as microscopy and some basic biochemical/biophysical analyses, to address some fundamental processes of plant biology.

Methods of Assessment: Your knowledge will be assessed based on key questions in lecture exams and quizzes as well as on your weekly lab assessments and the research report.

TTU Student Learning Objective 3. Explain some of the major theories in the Natural Sciences

In Biol 1401 lecture and lab, you will be exposed to principles of cell and tissue structure/function relationships, the fundamental principle of the control of cellular activity by the genetic code, some basic principles of the control of the interaction of organisms and their environment, and principles of the evolution of species from pre-existing species.

Methods of Assessment: Lecture exams and quizzes focus on these basic principles of biology and their theories.

TTU Student Learning Objective 4. Describe how Natural Sciences research informs societal issues, including ethics

Specific lecture topics relate to how biological research affects people and their societies. Through the process of performing your research project, you will be expected to provide data that you and your group generated. Through this process, you will learn the importance of ethics in science to our ultimate understanding of the natural world. The importance of performing science honestly will not only be stressed but will become quite obvious as the project progresses.

Methods of Assessment: Lecture exams and quizzes focus on these basic principles, and the quality of your lab research report will assess how honest you and your group have been.

Special Considerations

COVID

The following information is the most recent available from the Office of the Provost at the beginning of the 2022 Spring Semester. Please go to https://www.depts.ttu.edu/provost/ for additional guidance.

- Although COVID-19 vaccinations are not mandated, Texas Tech is **strongly recommending that all students be vaccinated for COVID-19.** The vaccines are safe and effective and will protect the student and other members of the Texas Tech community.
- **Masks will not be required for either indoor or outdoor activities on campus, however, all visitors to the Student Health Clinic will be required to wear a mask.** The wearing of masks while in public indoor settings and frequently washing your hands has proven to be effective at preventing the spread of COVID-19.

- The CDC recommends that both vaccinated and unvaccinated individuals wear a face mask indoors after a known exposure.
- Prior to arrival on campus, all **students** in university housing should develop an action plan in the event they are required to self-isolate or quarantine due to a positive COVID-19 diagnosis or exposure. This plan should include a location to complete the self-isolation/quarantine period, access to groceries/meal delivery, access to necessary medications, numbers of emergency contacts, and contact information for their preferred healthcare provider.
- **Fully vaccinated students (including those with medical or religious exemptions)** who aren't experiencing symptoms will not be required to quarantine following an exposure to a COVID-19 positive person, including roommates. Following a known exposure, students should monitor for symptoms over the course of 14 days and quarantine if symptoms develop.
- **Any student,** regardless of vaccination status, who receives a positive diagnosis for COVID-19 will be required to self-isolate and must use this link to report. Please refer to the checklist on the COVID-19 page (https://www.depts.ttu.edu/communications/emergency/coronavirus/) for step by step instructions.
- Unvaccinated or undisclosed students who have been identified as having a known exposure to a COVID-19 positive person will be required to quarantine for a minimum of 7 days or longer depending upon testing. If a student is unvaccinated and can prove a COVID-19 diagnosis and recovery in the last three months, quarantine will not be required. Please refer to the checklist on the COVID-19 page (https://www.depts.ttu.edu/communications/emergency/coronavirus/) for step by step instructions.
- Students who have a high-risk exposure to someone with confirmed or suspected COVID-19 in the last two weeks should access the online reporting platform (https://ttucovid19.ttu.edu/User/Consent) to take a "quick assessment" or "full self-screening." Based on responses, automated messages provide contact information for campus/clinic resources, emergency room precautions, or planning observation.

In the event of university-mandated move to online instruction, your instructor will provide course content through Blackboard. This may include synchronous and asynchronous modes of content delivery. The basic outline of the course and the associate learning objectives will not change.

Illness Based Absence Policy

If at any time during this semester you feel ill, in the interest of your own health and safety as well as the health and safety of your instructors and classmates, you are encouraged not to attend face-to-face class meetings or events. Please review the steps outlined below that you should follow to ensure your absence for illness will be excused. These steps also apply to not participating in synchronous online class meetings if you feel too ill to do so and missing specified assignment due dates in asynchronous online classes because of illness.

If you are ill and think the symptoms might be COVID-19-related:

- Call Student Health Services at 806-743-2848 or your health care provider.

- Self-report as soon as possible using COVID-19 management system (https://ttucovid19.ttu.edu/User/Consent). This website has specific directions about how to upload documentation from a medical provider and what will happen if your illness renders you unable to participate in classes for more than one week.
- If your illness is determined to be COVID-19-related, remaining documentation and communication will be handled through the Office of the Dean of Students, including notification to your instructors.
- If your illness is determined not to be COVID-19-related, please follow the steps below.

If you are ill and can attribute your symptoms to something other than COVID-19:

- If your illness renders you unable to attend face-to-face classes, participate in synchronous online classes, or miss specified assignment due dates in asynchronous online classes, you are encouraged to visit with either Student Health Services at 806-743-2848 or your health care provider. Note that Student Health Services and your own and other health care providers may arrange virtual visits.
- During the health provider visit, request a "return to school" note.
- E-mail the instructor a picture of that note.
- Return to class by the next class period after the date indicated on your note.

Following the steps outlined above helps to keep your instructors informed about your absences and ensures your absence or missing an assignment due date because of illness will be marked excused. You will still be responsible to complete within a week of returning to class any assignments, quizzes, or exams you miss because of illness.

Accommodations for disabilities
Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students must present appropriate verification from Student Disability Services, 130 Weeks Hall, 806-742-2405. No requirement exists for accommodations to be made prior to completion of this approved process.

Absence due to religious observance
A student shall be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.

Absence due to officially approved trips and other activities
The person responsible for a student representing the University on officially approved trips should notify the instructor of the departure and return schedules in advance. For other University-approved curricular and extracurricular activities, the instructor must be presented

with verifiable documentation prior to the first absence. The student will not be penalized for the absence, but is responsible for the material missed.

Valid reasons for missing an exam
Illness or injury, family emergencies, certain University-approved curricular and extra-curricular activities, and religious holidays can be legitimate reasons to be excused from a scheduled examination. In the case of illness or injury, confirmation from a physician, physician's assistant, a nurse-practitioner, or a nurse is required. Barring extraordinary circumstances, confirmation must be presented **prior to** the missed exam. With regard to family emergencies, you must provide verifiable documentation of the emergency. Unless the emergency is critical you should notify the instructor in advance. In cases of critical emergencies, you must notify the instructor within one week of your absence.

Civility in the Classroom
Students are expected to assist in maintaining a classroom environment that is conducive to learning. To ensure that all students have the opportunity to gain from time spent in class, unless otherwise approved by the instructor, students must refrain from non-class related activities during class time that would create a distraction for other students and/or limit their ability to engage in the course. Inappropriate behavior in the classroom and/or online shall result, minimally, in being dismissed for the remainder of the class period.

Academic Integrity
"Academic dishonesty" includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor(s) or the attempt to commit such an act). Any person becoming aware of alleged violations of academic integrity should report the allegation to the instructor of record in the course. The instructor in a course is responsible for initiating action in each case of dishonesty or plagiarism that occurs in that class. The Texas Tech University Catalog should be consulted for further information. Any student who is found guilty of scholastic dishonesty in academic work required for this course may be given a failing grade on the assignment, a failing grade in the course, or be referred to the Dean of Students Office for disciplinary action.

Policy on Copying on Quizzes and Exams
When it has been determined during a lecture quiz or exam that a student has been viewing or exchanging answers with another student, the students in violation will receive a grade of 0 for that exam.

TTU Resources for Discrimination, Harassment, and Sexual Violence
Texas Tech is committed to providing its students, faculty, and staff with an educational and workplace environment free from any form of unlawful discrimination. The Texas Tech community is dedicated to fostering and supporting a culture of mutual respect and communication. Texas Tech University does not tolerate discrimination or harassment of students based on or related to sex, race, national origin, religion, age, disability, protected veteran status, or other protected categories, classes, or characteristics. While sexual orientation

and gender identity are not protected categories under state or federal law, it is Texas Tech University policy not to discriminate on this basis. Actions related to admission, discipline, housing, extracurricular and academic opportunities shall not be made based on a student's protected status. Discriminatory behavior is prohibited regardless of the manner in which it is exhibited, whether verbally, in writing, or electronically displayed or conveyed. Individuals who violate these policies and laws are subject to disciplinary action, up to and including expulsion. Report any incidents to the Office for Student Civil Rights and Sexual Misconduct, 806-834-1949, or file a report online at titleix.ttu.edu. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are: **TTU Student Counseling Center**, 806-742-3674, *(provides confidential support on campus)*. The **Texas Tech Crisis HelpLine**, 806-742-5555, *(available 24/7 for any student in immediate mental health crisis; if you call the helpline, you will speak with a mental health counselor)*. **Voice of Hope Lubbock Rape Crisis Center**, 806-763-7273, voiceofhopelubbock.org *(24-hour hotline that provides support for survivors of sexual violence)*. The **Risk, Intervention and Safety Education (RISE) Office**, 806-742-2110, rise.ttu.edu *(provides a range of resources and support options focused on prevention education and student wellness)*. **Texas Tech Police Department**, 806-742-3931, *(to report criminal activity that occurs on or near Texas Tech campus)*.

LGBTQIA

I identify as an ally to the lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) community, and I am available to listen and support you in an affirming manner. I can assist in connecting you with resources on campus to address problems you may face pertaining to sexual orientation and/or gender identity that could interfere with your success at Texas Tech. Please note that additional resources are available through the Office of LGBTQIA within the Center for Campus Life, Student Union Building Room 201, www.lgbtqia.ttu.edu, 806.742.5433.

Creating Livable Futures

This class is part of a campus-wide initiative called Creating Livable Futures, which is sponsored in part by the Texas Tech Center for Global Communication. As such, one of our objectives is to prepare you to communicate, in a fully interdisciplinary and global way, the challenges posed by pressing issues that speak to our collective wellbeing and sustainability. You will be asked to translate and communicate the work of leading thinkers on sustainability, and to expand discussing those materials through research experience and experiential learning. These objectives will be met through your lab semester project.

Your progress in communicating about global issues will be evaluated according to the Center for Global Communication rubric, so you will be invited to participate in one or more Creating Livable Futures activities outside of class that will complement class content. Planned Creating Livable Futures activities include participating in and attending speaker events and conferences, edit-a-thons, blogging and publication opportunities, student organizations, a book club, and even small scholarship opportunities for research.

You'll be informed of relevant opportunities and activities as they arise over the course of the semester.

Online Classroom Decorum
Texas Tech University is a community of faculty, students, and staff sharing an expectation of cooperation, professionalism, respect, and civility in all forms of university communication and business. This expectation applies to all interactions in a classroom setting where an exchange of ideas and creative thinking should be encouraged and where intellectual growth and development are fostered.

As we consider ways in which we maintain a productive and cooperative online environment, many of the same standards from a face-to-face instruction transfer to the online setting. In this way, at the instructor's discretion, disruptive behavior may result in disciplinary referrals pursuant to the Texas Tech University Code of Student Conduct. Students are expected to maintain online behaviors that are conducive to learning.

Examples of behavior that may be considered disruptive include:

- Disrupting the flow of a class session(s) by making off-topic comments.
- Enabling or participating in online classroom hijacking ("Zoombombing") by participating in online classroom streams without being enrolled in the course or by sharing streaming classroom links with parties not enrolled in the course.
- Spamming, hacking, or using TTU or Blackboard platforms for commercial purposes.
- Cyberbullying or online harassment.
- Habitually interfering with or stopping instructional delivery.

Expectations for Student Participation in Online Synchronous Courses
This course is NOT designated as an online synchronous course, but may move to this modality in the event of university mandate. If that is the case, the following expectations will be applied.

To ensure that you are fully engaged in class discussions and account team meetings during class time, you are expected to do the following:

- Maintain the same level of civility and professionalism that would be expected in a face-to-face classroom setting.
- Attend all classes regularly.
- Log into the video conference on time and remain logged in for the duration of the class period.
- Activate your camera so that you are visible to the instructor and other students in the class. If you have concerns about leaving your camera on (such as childcare obligations, privacy issues, or a particular circumstance during a class period), please talk to the instructor.
- Refrain from engaging in non-class related activities during class time that create a distraction for other students in the class and/or limit your ability to engage in the course.

Failure to meet these expectations may result in the following consequences:

- Being counted as absent for the class meeting.
- Not receiving credit for class participation for that class period.

- Other consequences as stipulated in the syllabus, *Texas Tech Code of Student Conduct*, or other university policy.

Repeated failure to meet expectations (e.g., attendance, participation in class, etc.), in addition to the above consequences, may result in the one or more of the following consequences:

- Referral to the appropriate Associate Dean.
- Academic penalty, ranging from a warning to failure of the course.

BIOL 1401
BIOLOGY OF PLANTS
Spring 2022
LAB SYLLABUS

Lecturer
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Teaching Assistants (TAs)
Nikki Paulat – nicole.paulat@ttu.edu
Zinny Ezekannagha – eezekann@ttu.edu
Peter Eludini – peludini@ttu.edu
Manuel Hoyos-Rodriguez – mhoyosro@ttu.edu

Location
BIOL 015 (basement of Biology building)

Section Information
Section 501: Tuesday 11:00 AM – 12:50 PM, Instructor: Zinny Ezekannagha
Section 502: Tuesday 2:00 PM – 3:50 PM, Instructor: Peter Eludini
Section 503: Wednesday 11:00 AM – 12:50 PM, Instructor: Manuel Hoyos-Rodriguez
Section 504: Wednesday 2:00 PM – 3:50 PM, Instructor: Manuel Hoyos-Rodriguez
Section 505: Thursday 11:00 AM – 12:50 PM, Instructor: Zinny Ezekennagha
Section 506: Thursday 2:00 PM – 3:50 PM, Instructor: Peter Eludini

Lab Coordinator
Nikki Paulat (nicole.paulat@ttu.edu)

Office Hours
By appointment

Communication
Periodically, you will receive emails about important lab updates and reminders from your TA. These will be sent to your @ttu.edu email address. Please use this email address for all correspondence with your instructor.

Required Materials
1. *Lab Manual*. The lab manual will be digital this semester and each day's manual entry will be posted to Blackboard prior to the week's lab section.
2. *Lab Coat*. Lab coats can be rented from the Texas Tech Association of Biologists at https://techassobio-labsales.weebly.com/#/. Rented coats will stay in the lab room.
3. *Laptop or other personal computational device*. At least one group member, but ideally all members, should bring a laptop or tablet to each class to help with completion of the

activities. Please let your instructor know if this will be an issue for your group. A smartphone may be used on some days.

Course Delivery Method
The lab course will be taught face-to-face in BIOL 015.

Attendance
Attendance is *the key factor* to success in the lab section of this course. Most assignments and activities will be administered and evaluated during class time. Unexcused absences will result in the loss of all points for that lab section. Excused absences can be made up. Excused absences include religious days, a death in the family, illness, mandatory attendance at a university extra-curricular function, or other serious instances. You must notify your lab TA *prior* to a planned absence. If you are suddenly ill, you must contact your TA the day you become ill. To be excused, you must present to your lab TA required documentation from your doctor, coach, dean, counselor, minister, funeral director, etc. on official letterhead. To receive credit for the lab, you must make it up. Please coordinate with your TA if you will need to make up that week's lab. Labs can only usually be made up during the Friday of the week the lab was given.

Late Work
All assignments are due on the date assigned by your lab TA. Late assignments will not be accepted unless you have instructor permission.

Special Needs
Please notify your TA if you need any special accommodations in class such as preferential seating, note taking, extra time on exams, etc. Students will need to present appropriate verification from Student Disability Services. Students will be granted an excused absence for any religious holiday, but you must contact your TA beforehand in order to make arrangements to make up any work.

Academic Dishonesty
Dishonesty will not be tolerated. All students are expected to abide by the Code of Student Conduct (see your student handbook for the definition of cheating). As stated in the Texas Tech University catalog, "The attempt of any students to present as their own work that they have not honestly performed is regarded by the faculty and administration as a serious offense and renders the offense liable to serious consequences, possibly suspension."

Classroom Regulations
All students are expected to conduct themselves in a proper manner to provide a good learning environment for everyone. Any disruptions will not be tolerated. Such disruptions include but are not limited to: arriving late or leaving early; reading material not required for class; talking to neighbors or on phones; texting; eating or drinking; playing games on the computer or phone. Any disruptions will be dealt with immediately and reported to the proper authorities.

Per university policy, no food, drinks, or tobacco is allowed in the lab, even in waste bins. Your TA will check the lab tables before and after class. If drink bottles or food wrappers are found at your table, all lab members will receive a penalty in that day's participation points.

Per university policy, students must wear long pants, closed toe shoes, and lab coats while in the lab.

Expected Learning Outcomes
The course will be taught as a course-based undergraduate research experience (CURE) revolving around the role that plants play in the global climate system. For the CURE, students will work on finding an answer to the question "Do plants matter for climate?" It is expected that a student completing this laboratory class should be able to understand:

1. the scientific approach to developing knowledge
2. variability in data and methods for evaluating it
3. trends in environmental changes and drivers of these trends
4. the role plants play in the environment
5. the importance of and strategies for disseminating knowledge

Groups
Throughout the semester students will work in groups of 4. Groups will be maintained over the course of the semester. Please see your TA if there are issues among the group.

Methods of Assessing Learning Outcomes
Learning outcomes will be assessed by the following (percentages reflect percentage of total lab score):

1. **Daily Assignments** (50%). Throughout the semester students will be given 10 Daily Assignments, each of which will constitute 5% of the total lab grade. *These assignments are to be done individually.* They are each designed to be completed during the lab period with assistance from the TA and other lab members. The nature of these assignments will vary from week to week. Assignments will be due at the start of the following week's lab section.
2. **Section Drafts** (20%). Throughout the semester students will be asked to produce 4 Section Drafts, each of which will constitute 5% of the total lab grade. *These drafts are to be completed by the lab group.*
3. **Final Paper** (20%). At the end of the semester students will use their section drafts to build a complete research paper. *Students will turn in one paper per group.*
4. **Final Presentation** (5%). At the end of the semester students will give a ~10 minute presentation of their final project. Each group will give a single presentation.
5. **Group member assessment** (5%). Each group member will be asked to assess the effort and contributions from the other group members to the section drafts, final paper, and final presentation.

Schedule
The course will be taught as a CURE divided into 4, 3-week modules grouped around the main sections of a scientific paper (Introduction, Methods, Results, Discussion).

- January 18-20 (Lab 1): "Meet and greet" and syllabus discussion
    - Assignment: pre-assessment survey (**Daily Assignment #1**)

Module 1: Introduction

- January 25-27 (Lab 2): Introduction to global change and the class experiment, reading and searching for scientific literature
    - Assignment: literature summary and search (**Daily Assignment #2**)
- February 1-3 (Lab 3): Continued discussion of global change and the class experiment, developing a question and hypothesis
    - Assignment: Draft of a question and hypothesis (**Daily Assignment #3**)
- February 8-10 (Lab 4): Writing your Introduction section
    - Assignment: Introduction draft (**Section Draft #1**)

Module 2: Methods

- February 15-17 (Lab 5): Techniques to measure plant traits part 1
    - Assignment: in-lab questions (**Daily Assignment #4**)
- February 22-24 (Lab 6): Techniques to measure plant traits part 2
    - Assignment: in-lab questions (**Daily Assignment #5**)
- March 1-3 (Lab 7): Experimental design and writing your Methods section
    - Assignment: Introduction + Methods draft (**Section Draft #2**)

Module 3: Results

- March 8-10 (Lab 8): Experimental measurement day
    - Assignment: data spreadsheet (**Daily Assignment #6**)
- March 15-17 (Lab 9): NO CLASS, SPRING BREAK
- March 22-24 (Lab 10): Data analysis and visualization
    - Assignment: figures and tables (**Daily Assignment #7**)
- March 29-31 (Lab 11): Writing your Results section
    - Assignment: Introduction + Methods + Results draft (**Section Draft #3**)

Module 4: Discussion

- April 5-7 (Lab 12): Connecting your Introduction and Results sections, What have we found and what does (and doesn't) it mean?
    - Assignment: draft connection of hypotheses and results, list of limitations and directions for future research (**Daily Assignment #8**)
- April 12-14 (Lab 13): Writing your Discussion section
    - Assignment: Introduction + Methods + Results + Discussion draft (**Section Draft #4**)
- April 19-21 (Lab 14): The why and how of knowledge dissemination
    - Assignment: slide outline of final presentation (**Daily Assignment #9**)
- April 26-28 (Lab 15): Final presentations
    - Assignment: post-assessment survey (**Daily Assignment #10**) and **Final Paper**