# BIOL 4300-029

Undergraduate Research

Fall 2022

## Course Description

This course focuses on the approaches, techniques, and methodologies required to examine plant physiological and terrestrial ecosystem responses and feedbacks to the environment. The specific tools taught will be dependent on student interest, but may include literature review, experimental design, measurements of plant and soil gas exchange and environmental manipulation, regional- and global-scale modeling, as well as large data extraction, analysis, and dissemination. The 4300 course is recommended for students with previous laboratory experience and, ideally, for those with experience in the Smith lab. Less experienced students should consider taking the 4100-029 course. The course will have somewhat of a concentration on the Nutrient Network experiment.

## Expected Learning Outcomes and Objectives

Upon completion of this class, students are expected to be able to:

(1) Read, review, and discuss past and present scientific literature

(2) Design a scientific experiment(s)

(3) Disseminate scientific ideas

## Responsibilities of the Student

Each student is expected to:

(1) Perform 3-6 hours of lab/field work a week

(2) Attend the 1-hour small group meeting each week (time TBD)

(3) Maintain an electronic journal

(4) Adhere to the safety instructions at all times

(5) Attend the 1-hour lab meeting each week if your course schedule allows (time TBD)

### Class Time and Location

Day and time: TBD

Experimental Sciences Building II (ESB II) Room 409 or or otherwise agreed upon.

### Instructor

Dr. Nick Smith

ESB II Room 402D

806-834-7363

nick.smith@ttu.edu

*Meetings by appointment*

### Recommended Texts

Plant Physiological Ecology (2nd Edition; 2008) by Lambers, Chapin, and Pons

The book can be accessed from Springer here: https://www.springer.com/us/book/9780387783406. Click on "Access this title on SpringerLink." It can also be accessed through the TTU library.

Plant Physiology and Development (6th Edition) by Taiz, Ziegler, Moller, and Murphy

## Mode of Instruction

All instruction will be done face-to-face unless the university directs classes be taught online (see next section).

## Contingency Statement

This course is being taught primarily in the face-to-face learning mode. The University will continue to monitor CDC, State, and TTU System guidelines in continuing to manage the campus implications of COVID-19. Any changes affecting class policies or delivery modality will be in accordance with those guidelines and announced as soon as possible. If Texas Tech University campus operations are required to change because of health concerns related to the COVID-19 pandemic, it is possible that this course will move to a fully online delivery format. Should that be necessary, students will need to have access to the Internet, a webcam, and microphone for remote delivery of the class.

## Course Materials

All course materials, including lecture slides, readings, activities, and code will be posted to a GitHub repository for the course. The primary repository address is https://github.com/SmithEcophysLab/biol4100_fall2021.

## Attendance Policy

Attendance is strongly recommended. Course assessments will be done during class (see below).

## Course Assessment

### *Participation and Engagement*

Being an active and engaged participant in the class will benefit your understanding of material as well as your peers'. Examples include asking questions, providing feedback, and facilitating discussion. Participation and engagement of each student will be monitored during each class period.

### *Lab journal*

Every Friday after 4 pm, your electronic lab journal will be checked to ensure that it is up-to-date. The content of the lab journal will vary by week. Each week, a brief oral report of work done is required. In weeks where data is taken, methods, data, and metadata should be uploaded to the lab journal. Enough information must be written in the laboratory journal to enable independent reproduction and use of the data.

### *Final report*

The final report will consist of a fully-cited, journal-style article based around the student's independent project.

## Grading

Participation and Engagement: 50%

Lab journal: 25%

Final report: 25%

## Grading Scale

A: $\geq$ 90%

B: 80 – 90%

C: 70 – 80%

D: 60 – 70%

F: $\leq$ 59.9%

## Missing In-class Activities

Students will be required to be in class to receive participation and engagement points. Please read below if class is to be missed due to an officially approved trip, illness, or special circumstance:

### Officially Approved Trips

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.

### 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 notify your instructors as soon as possible to ensure your absence for illness will be excused. You are strongly encouraged to visit with either Student Health Services at (806) 743-2848 or your health care provider. A "return to school" note from your provider will be required to return to class. You will still be responsible to complete within a week of returning to class any assignments, quizzes, or exams you miss because of illness.

### Special Circumstance Absence

There may be special circumstances that render missing class unavoidable. If this arises, please let Dr. Smith know of the situation as soon as possible, so that the loss of point due to the absence can be discussed.

## TTU COVID-19 Policy Reminders

- Although COVID-19 vaccinations are not mandated, Texas Tech strongly recommends that all students be vaccinated and receive a booster when eligible. The vaccines are safe and effective.
- Please visit the university's coronavirus (COVID-19) page for additional information about on-campus vaccination and testing schedules, reporting a positive test result, and submitting vaccination records: https://www.depts.ttu.edu/communications/emergency/coronavirus/.
- Face masks are strongly encouraged in classrooms and other public indoor settings on campus, including the Student Wellness Center.
- If you are sick or not feeling well, you should stay at your place of residence and wear a mask when around others. Do not attend class, work, or social functions. If you brought a COVID-19 home test kit, please use it to determine whether you are positive for the virus.
- For students living in an on-campus residence, a limited number of tests are available from Community Advisors in residence halls. Please reach out to yours virtually to request one.
- Students can also be tested at an on-campus site.
- Students who meet the qualifications can contact Student Health Services to schedule an appointment to be tested. All students in university housing should develop an action plan in the event they are required to self-isolate

due to a positive COVID-19 diagnosis. This plan should include a location to complete the self-isolation, access to groceries/meal delivery, access to necessary medications, numbers of emergency contacts, and contact information for their preferred healthcare provider.

- All students (both vaccinated and unvaccinated) who have been identified as having a known exposure to a COVID-19 positive person should follow CDC guidance (https://www.cdc.gov/coronavirus/2019-ncov/your-health/quarantine-isolation.html), which says:
  - If you are exposed but not vaccinated or up to date on vaccinations and boosters:
    - Quarantine for at least five days.
    - Wear a well-fitting (preferably N95 or KN95) mask if you must be around others.
    - Do not travel.
    - Get tested at least five days after exposure.
  - If you are exposed and are up to date on vaccinations and boosters:
    - No quarantine is necessary unless you develop symptoms.
    - Get tested at least five days after exposure.
  - If you exposed and have had confirmed COVID-19 within the past 90 days:
    - No quarantine is necessary unless you develop symptoms.
- Self-isolation for five days is required for all students (vaccinated or unvaccinated) who test positive for COVID-19. After the five-day isolation period, if the student is asymptomatic or their symptoms are resolving (fever free without the use of fever reducing medication for 24 hours), they may return to class/activities but should wear a face mask for an additional five days.
- Students who are positive should report the result. This generates a letter that you can provide to your professors and instructors, notifying them of your positive diagnosis.

# Special Considerations

## Accommodations for Disabilities

Any student who, because of a disability, may require special arrangements to meet the course requirements should contact the instructor as soon as possible

to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact the Student Disability Services office in 130 Weeks Hall or call 806-742-2405.

### Religious Holy Days

"Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. 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. A student who is excused may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

## Academic Integrity

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 offenses liable to serious consequences, possibly suspension." This statement applies to cheating in whatever manner, including plagiarism.

## TTU Resources for Discrimination, Harassment, and Sexual Violence

Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the Office for Student Rights & Resolution, (806)-742-SAFE (7233), or file a report online at https://www.depts.ttu.edu/titleix/. 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, https://www.depts.ttu.edu/scc/ (provides confidential support on campus). TTU Student Counseling Center 24-hour Helpline, 806-742-5555, (assists students who are experiencing a mental

health or interpersonal violence 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, Safety and Education (RISE) Office, 806-742-2110, https://www.depts.ttu.edu/rise/ (provides a range of resources and support options focused on prevention education and student wellness). Texas Tech Police Department, 806-742-3931, http://www.depts.ttu.edu/ttpd/ (to report criminal activity that occurs on or near Texas Tech campus).

## LGBTQIA

Please contact the Office of LGBTQIA, Student Union Building Room 201, 806-742-5433, www.lgbtqia.ttu.edu. Within the Center for Campus Life, the Office serves the Texas Tech community through facilitation and leadership of programming and advocacy efforts. This work is aimed at strengthening the lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) community and sustaining an inclusive campus that welcomes people of all sexual orientations, gender identities, and gender expressions.

## Classroom Civility

Texas Tech University is a community of faculty, students, and staff that enjoys an expectation of cooperation, professionalism, and civility during the conduct of all forms of university business, including the conduct of student–student and student–faculty interactions in and out of the classroom. Further, the classroom is a setting in which an exchange of ideas and creative thinking should be encouraged and where intellectual growth and development are fostered. Students who disrupt this classroom mission by rude, sarcastic, threatening, abusive or obscene language and/or behavior will be subject to appropriate sanctions according to university policy. Likewise, faculty members are expected to maintain the highest standards of professionalism in all interactions with all constituents of the university (www.depts.ttu.edu/ethics/matadorchallenge/ethicalprinciples.php).

## Academic Integrity

Academic integrity is taking responsibility for one's own class and/or course work, being individually accountable, and demonstrating intellectual honesty and ethical behavior. Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect.

Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are a device used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Reference: Texas Tech University Quality Enhancement Plan, Academic Integrity Task Force, 2010].

## 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 discussion leads and the review paper.

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.

## Schedule of Topics by Week

*subject to change based on student interests*

29/08/21 – Introductions, semester planning, and goals

05/09/21 – Plants and ecosystem services

12/09/21 – Introduction to the Nutrient Network

19/09/21 – Nutrient Network visit and sampling

26/09/21 – Eutrophication and biomass

03/10/21 – Eutrophication and plant diversity

10/10/21 – Eutrophication and leaf traits

17/10/21 – Eutrophication and gas exchange

24/10/21 – Eutrophication and herbivory

31/10/21 – Eutrophication and soil processes

07/11/21 – Proposal writing brainstorm

14/11/21 – Proposal writing workshop

21/11/21 – NO CLASS

28/11/21 – Proposal presentations