

BIOL 4300-029

Undergraduate Research
Spring 2024

1 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.

2 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

3 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)

3.1 Class Time and Location

Day and time: TBD

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

3.2 Instructor

Dr. Nick Smith

ESB II Room 402D

806-834-7363

nick.smith@ttu.edu

Meetings by appointment

3.3 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

4 Mode of Instruction

All instruction will be done face-to-face unless the university directs classes be taught online.

5 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/biol4300_spring2024.

6 Attendance Policy

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

7 Course Assessment

7.1 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.

7.2 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.

7.3 Final report

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

8 Grading

Participation and Engagement: 50%

Lab journal: 25%

Final report: 25%

9 Grading Scale

A: $\geq 90\%$

B: 80 – 90%

C: 70 – 80%

D: 60 – 70%

F: $\leq 59.9\%$

10 Missing In-class Activities

Students will be required to be in class to receive in-class activity points. Please contact Dr. Smith if you plan to miss class for a university function *prior to class*. If class is missed due to an illness, please let Dr. Smith know as soon as possible.

10.1 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. After hours and on weekends contact TTU COVID-19 Helpline at [TBA].
- Self-report as soon as possible using the Dean of Students COVID-19 webpage. 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, all remaining documentation and communication will be handled through the Office of the Dean of Students, including notification of your instructors of the period of time you may be absent from and may return to classes.
- If your illness is determined not to be COVID-19-related, please follow steps below.

11 Special Considerations

Texas Tech Policies Concerning Academic Honesty, Special Accommodations for Students with Disabilities, Student Absences for Observance of Religious Holy Days, Accommodations for Pregnant Students, and other policies may be found on at this link: <https://www.depts.ttu.edu/tlpdc/RequiredSyllabusStatements.php>.

12 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.