

BIO300: Drought Ecology and Climate Change
Summer Session II 2020

Instructor:

Robert Griffin-Nolan, PhD

Department of Biology

Email: robertgn13@gmail.com (preferred) OR rjgriffi@syr.edu

Office Hours: Tuesday 11am – 1pm, or by appointment

Course description:

This course provides an overview of the ecological consequences of drought and explores recent research advances in understanding and predicting how climate change will shape future ecosystems. Drought is characterized by the absence of life-giving water. As Earth's climate changes due to anthropogenic carbon emissions, droughts will become more frequent, more severe, and longer lasting than they've been in the past. The consequences of drought for natural ecosystems are likely to be extreme given the rapid pace at which the global climate is changing. In this class, students will be encouraged to think broadly about how droughts of the future will interact with other ongoing global change factors (e.g., rising temperatures, elevated CO₂ concentrations, pollution, habitat destruction) to affect plant ecology and ecosystem function.

Course objectives:

By the end of this course, students should be able to:

1. Identify, evaluate, and think critically about credible sources of information (i.e. peer-reviewed articles) in the field of drought ecology and climate change; and
2. Demonstrate an understanding of the key ecological adaptations of plants for coping with drought as well as the consequences of climate change for ecosystem function.

Course format:

This six-week course will be taught entirely online in an asynchronous format. This means that no "live" in-person meetings are required for this course. Weekly course content will be made available online for students to access on their own time. Assignments (e.g., quizzes, journal reflections, and discussion board postings) will be due weekly to maintain student participation and immersion in online materials.

Grading elements (with % of grade):

1. Weekly quizzes – 15%
2. Weekly journal reflections – 15%
3. Participation – 20%
4. Final term paper – 25%
5. Final exam – 25%

Grade descriptions:

1. Weekly quizzes – 15%

There will be a quiz each week to verify that students have read and understood the assigned readings and online lecture materials. All quizzes are open book/note. *A total of 6 quizzes will be offered and the lowest quiz score will be dropped.*

2. Weekly journal reflections – 15%

One of the most important skills in scientific research is being able to think critically about peer-reviewed literature and extract important/relevant information. To practice this skill, students will be expected to submit weekly journal reflections (1 per week) based on a peer-reviewed article that they've read. Each week, a list of potential articles to read will be posted based on that week's course topic and students will select one to read and reflect on (total of six reflections for the course). These writing assignments must be in your own words and should not simply re-state the abstract of the article. Weekly journal reflections should briefly (< 300 words) touch on the following points:

- What was the rationale for the study? What questions did the researchers aim to answer?
- What methods did they use to answer these questions?
- What were the main results and conclusions of the study?
- What did you find most interesting about the study? What could have been improved?

3. Participation in class discussions (20%)

Student participation will be assessed through an online discussion board. Each week, students will submit one discussion question to the weekly discussion board and submit two replies to other students' questions. Discussion questions should not be yes/no questions with right/wrong answers. Rather, the discussion board is meant to facilitate conversation about course content or the rigor of scientific articles that we read. I will post example discussion questions each week to facilitate discussion.

4. Final term paper (25%)

Students are expected to write a final term paper which will be due the week after classes end (**August 12th**). This paper is meant to be a literature review on a topic of your choice that is approved by the instructor. Students will identify what they believe to be the top 5 *most influential/important* peer-reviewed publications on the topic published in the last 10 years. The review should briefly, in a paragraph or two, summarize the historical context for the ideas presented and justify the importance of the topic to ecology. It should end with an equally brief look forward towards the future of the topic. Much of the text should be devoted to reviewing the top 5 foundational papers selected; however, additional citations may be needed to support your claims. The Syracuse University library's liaison to the biology department (Emily Hart) will provide an online lecture on accessing peer-reviewed literature from the library databases. Submission of term papers will be in two phases:

- **Library research activity:** In week 3, you will be provided with educational materials and assignments from the Syracuse University Science Librarian, Emily Hart. Completion of these activities will kick start your research and greatly improve your ability to find and evaluate credible peer-reviewed research articles.
- **Initial proposal:** prior to writing the review paper, student will submit a proposal for the review. Proposals will consist of a working title, a short paragraph outlining the importance of the topic, and a list of the 5 manuscripts that will be reviewed. This proposal will be due at the halfway point of the course: **July 20th** (early submissions are welcome)

- **Final submission:** Final terms papers should be no more than 2500 words (~10 pages double spaced) and will be submitted to Turnitin via Blackboard to check for plagiarism (*see Academic Integrity Statement below*). A more detailed rubric will be distributed to the class.

5. Final exam (25%)

The final exam will consist of a mix of multiple choice and short answer questions designed to test the student’s understanding of materials learned over the 6-week course. The final exam will be made available online during the last week of class and will need to be completed no later than **August 14th**. The exam will be open book/note.

Course outline (*topics are subject to change and updated regularly*):

Week	Topics	Assignments Due
Week 1 (June 29 th – July 3 rd)	Hydrologic cycle; Definitions of drought; Predicted changes in precipitation with climate change; “How to read a scientific article”	<ul style="list-style-type: none"> • Quiz #1 • Journal Reflection #1 • Discussion Board posting #1
Week 2 (July 6 th – July 10 th)	Plant physiology; soil-plant water relations; ecological drought adaptations	<ul style="list-style-type: none"> • Quiz #2 • Journal Reflection #2 • Discussion Board posting #2
Week 3 (July 13 th – July 17 th)	Consequences of extreme precipitation for ecosystem function	<ul style="list-style-type: none"> • Quiz #3 • Journal Reflection #3 • Discussion Board posting #3 • Library research activity (DUE 7/17/20)
Week 4 (July 20 th – July 24 th)	Biodiversity and ecosystem/community drought resistance and resiliency	<ul style="list-style-type: none"> • Quiz #4 • Journal Reflection #4 • Discussion Board posting #4 • Initial proposal for term paper (DUE 7/24/20)
Week 5 (July 27 th – July 31 th)	Drought and global change interactions; Rising CO ₂ concentrations; Nitrogen pollution; Rising temperatures;	<ul style="list-style-type: none"> • Quiz #5 • Journal Reflection #5 • Discussion Board posting #5
Week 6 (Aug 3 rd – Aug 7 th)	Drought case studies; future research directions; engineering plants and ecosystems for a drier world	<ul style="list-style-type: none"> • Quiz #6 • Journal Reflection #6 • Discussion Board posting #6
Week 7 (Aug 10 th – Aug 14 th)	No class – submit remaining assignments	<ul style="list-style-type: none"> • Final term paper (DUE: 8/12/20) • Final exam (DUE: 8/14/20)

Office hours policy

Although this class is asynchronous, I am more than happy to meet with students via Zoom/Skype/Blackboard to discuss lecture materials, readings, assignments, or any questions related to the course. My office hours (Tuesday, 11am-1pm) are a time slot that I've dedicated to being logged into the course "Office Hours Room" on blackboard to meet with students on a "walk-in" basis. I am also available by appointment. I encourage students to reach out to me if they have any questions at all.

Diversity and Inclusion Statement

I value the voice of every student. The diversity amongst us – in race, gender, sex, religion, orientation, language, ability, veteran status, place of origin, and other characteristics – is an asset that enhances opportunities for all of us to learn. I strive to design inclusive lessons and assignments that provide you with the opportunity to voice your opinion and be heard and explore your own understanding. I welcome all students to share their viewpoints but will not tolerate explicitly or implicitly discriminatory behavior that impacts the learning experience of others. If you feel that lines have been crossed by your classmates, or me, please do not hesitate to bring up these concerns with me or a third party.

Academic Integrity Statement:

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level. *The Syracuse University Academic Integrity Policy can be found on the Blackboard webpage under the "Course overview tab".*