



# SYLLABUS

# ENR 7580

Root and Rhizosphere Ecology  
Autumn 2020



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## COURSE OVERVIEW

### Instructor

Instructor: Dr. Christine Sprunger

Email address: [sprunger.29@osu.edu](mailto:sprunger.29@osu.edu) (preferred mode of contact)

Office phone number: 330.263.3916

Office hours: Zoom meetings upon request

## Course meetings

Mondays: 10:05 AM-12:00PM via zoom. Lectures and class discussions will occur live at the scheduled class time. However, all lectures will be recorded for students to revisit at a later date.

## Course description

The rhizosphere mediates plant nutrient acquisition, sustains microbial communities, contributes to disease suppression, and regulates global nutrient cycles, directly impacting crop production and ecosystem services. This course will provide an overview of root morphology, root production and turnover, rhizosphere communities, nutrient cycling and rhizosphere responses to climate change.

## Credit hours

## Course learning outcomes

2 credits

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

- Define and describe root and rhizosphere structure and function
- Relate rhizosphere processes to crop production and ecosystem services
- Critically evaluate different methods and techniques used to measure rhizosphere processes.
- Comprehend and communicate the latest research in rhizosphere ecology
- Develop and expand skills in scientific writing, learn to effectively review and analyze the scientific literature, lead class discussions and present research topics.

# COURSE MATERIALS AND TECHNOLOGIES

## Required Course Materials:

1. The majority of readings will be posted on Carmen.
2. The Hidden Half of Nature: The Microbial Roots of Life and Health by David R. Montgomery and Anne Bikle (can be purchased at any bookstore for \$11 or rented at library on a first come first serve basis). Please contact instructor if you have difficulty accessing book.

## Course technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help/hours>, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** <http://ocio.osu.edu/selfservice>
- **Phone:** 614-688-HELP (4357)
- **Email:** [8help@osu.edu](mailto:8help@osu.edu)
- **TDD:** 614-688-8743

## REQUIRED SOFTWARE

- **Microsoft Office 365:** All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found <https://ocio.osu.edu/kb04733>.

# GRADING AND FACULTY RESPONSE

## How your grade is calculated

ASSIGNMENT CATEGORY	PERCENTAGE
Class preparation and participation	25
Lead class discussion on scientific article	10
Objectives and term paper outline	5
Annotated bibliography	15
Term research paper	30
Oral presentation on research topic	15
<b>Total</b>	<b>100%</b>

## **Class preparation and participation:**

This is a graduate level seminar course, therefore, active participation from all students is crucial and will enhance the learning experience for all. Recognizing that there are multiple ways to participate and contribute toward class discussions, students will be graded on a variety of different activities that assess class preparedness and participation. Such activities will include a mixture of reading reflections, in-class essays, and participation in class discussions. Due to the number of in-class activities, attendance and punctuality is crucial. Peer review evaluations of final oral projects will also count towards your participation grade. Descriptions of all assignments can be found on Carmen.

## **Lead class discussion on relevant peer-reviewed articles:**

One class section a week will be devoted to class discussions, starting in week three. Each student will have the opportunity to lead at least one class discussion over the course of the semester. The discussion leader is responsible for selecting the required reading materials on a relevant topic in rhizosphere ecology. During these discussion sections, we will also read the class 'common book,' The Hidden Half of Nature: The Microbial Roots of Life and Health by David R. Montgomery and Anne Bikle and critically relate this popular non-fiction book to the scientific literature.

## **Term Paper:**

A term paper is required and will be due at the end of the course. The purpose of this term paper is to give each student the opportunity to enhance their understanding of rhizosphere ecology and demonstrate their ability to think critically and synthesize the scientific literature on a given topic. Given that this assignment is a large portion of the total grade, there will be assignments throughout the course that will help with the culmination of this term paper. For instance, an in-class writing activity will be assigned in the first two weeks of class to help identify a topic for the term paper. An outline of the term paper including the objective/hypothesis will be due in the sixth week. An annotated bibliography will be due in the eighth week to help students start the process of gathering information on their topic of choice and to help start with the initial synthesis of the scientific literature.

## **Oral Presentations:**

The oral presentations will be professional society (Soil Science Society of America or Ecological Society of America) style power-point presentations. Each speaker has 12 minutes present with 3 minutes of questions. This exercise will help students practice public speaking skills in addition to synthesizing and communicating the highlights from their term paper.

## Late assignments

Unless granted an extension for extenuating circumstances, all assignments must be turned in by the stated due date by the start of class. Each assignment that is turned in late will be marked down one letter grade every 24-hour period it is overdue.

## Grading scale

93–100: A  
90–92.9: A-  
87–89.9: B+  
83–86.9: B  
80–82.9: B-  
77–79.9: C+  
73–76.9: C  
70 –72.9: C-  
67 –69.9: D+  
60 –66.9: D  
Below 60: E

## Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days**.
- **E-mail:** I will reply to e-mails within **24 hours on school days**.

# PARTICIPATION AND ATTENDANCE

## Student participation requirements

Attendance and participation are very important for your success in this course. If you have a situation that might cause you to miss class, discuss it with me *as soon as possible*. The following is a summary of everyone's expected participation:

- **Classroom attendance: 1 TIME PER WEEK**  
Complete all required readings and assignments before coming to class. Get the most out of every lecture by viewing the provided pdf on Carmen.
- **Classroom participation: EVERY CLASS SESSION**  
In class, we have frequent opportunities to discuss course topics. Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably.
- **Logging in: AT LEAST ONCE PER WEEK**  
Be sure you are logging in to the course in Carmen each week, including weeks with holidays or weeks with minimal course activity. (During most weeks you will probably log in many times.)

## OTHER COURSE POLICIES

### Academic integrity policy

#### POLICIES FOR THIS COURSE

- **Group Discussions:** Please come to class having read the assigned readings. In order to foster fruitful discussions please come to class with two questions about the readings in addition to two findings that you found noteworthy or puzzling.
- **Written assignments:** Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow **[MLA/APA]** style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in--but no one else should revise or rewrite your work.
- **Reusing past work:** In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Falsifying research or results:** All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.

#### OHIO STATE'S ACADEMIC INTEGRITY POLICY

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will

complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

**If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct.** If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* ([www.northwestern.edu/uacc/8cards.htm](http://www.northwestern.edu/uacc/8cards.htm))

## Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

## Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at [titleix.osu.edu](http://titleix.osu.edu) or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)." Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit [equity.osu.edu](http://equity.osu.edu) or email [equity@osu.edu](mailto:equity@osu.edu).

## **Your mental health**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting [ccs.osu.edu](http://ccs.osu.edu) or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614.292.5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1.800.273.TALK or at [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org).

## **Diversity and Inclusion**

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

# **ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

## **Requesting accommodations**



The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slids@osu.edu](mailto:slids@osu.edu); 614-292-3307, 098 Baker Hall, 113 W. 12<sup>th</sup> Ave.

## COURSE SCHEDULE

WEEK	MODULES
1	No class (only meet Mondays)
2	Overview of course; introduction to rhizosphere ecology
3 (LABOR DAY)	Read on your own: The Hidden Half of Nature: The Microbial Roots of Life and Health by David R. Montgomery and Anne Bikle
4	<p style="text-align: center;"><b>Root Structure and Function</b></p> <p style="text-align: center;">DISCUSSION</p>
5	<p style="text-align: center;"><b>Chemical forces of the rhizosphere and root exudation</b></p> <p style="text-align: center;">DISCUSSION</p> <p style="text-align: center;">(Obj and hypotheses/Term Paper Outline Due Sept. 21)</p>

6	<p style="text-align: center;"><b>Physical forces of the rhizosphere</b></p> <p style="text-align: center;">DISCUSSION</p>
7	<p style="text-align: center;"><b>Root Microbiome</b></p> <p style="text-align: center;">DISCUSSION</p>
8	<p style="text-align: center;"><b>Legume-rhizobia symbiosis</b></p> <p style="text-align: center;">DISCUSSION</p>
9	<p style="text-align: center;"><b>Mycorrhizal fungi and nutrient acquisition</b></p> <p style="text-align: center;">DISCUSSION (Annotated Bibliography Due Oct. 19<sup>th</sup>)</p>
10	<p style="text-align: center;"><b>BNPP, turnover, and nutrient cycling in managed landscapes</b></p> <p style="text-align: center;">DISCUSSION</p>
11	<p style="text-align: center;"><b>Plant biodiversity and belowground niche complementarity</b></p> <p style="text-align: center;">DISCUSSION</p>
12	<p style="text-align: center;"><b>Plant competition, Root Foraging</b></p> <p style="text-align: center;">DISCUSSION</p>

<b>13</b>	<b>Root Traits and Soil Health</b>  DISCUSSION
<b>14</b>	<b>Global climate change impacts on roots</b>  DISCUSSION
<b>15</b>	<b>In class paper work session</b> (Term papers due Dec. 4 <sup>th</sup> )
<b>FINALS WEEK</b>	<b>CLASS PRESENTATIONS</b> (Wednesday Dec. 9 <sup>th</sup> , at 10am-11:45am)