Virtual Office Hours: NCSU Blackboard Collaborate. Regularly scheduled office hours are determined each spring semester when the course is offered and by appointment.

Course Prerequisites: BIO 181, SSC 200 or equivalent

Course Catalog Description: This course is designed to cover the effects of soil environments on microbial occurrence; relationships and significance of microbes to mineral transformations, plant development, environmental quality; and management of soil microorganisms in different ecosystems.


Additional reference books:


Course Delivery: The Moodle learning management system provides a set of instructional tools to facilitate learning, communication, and collaboration between an instructor and students that will most often be asynchronous in nature. Moodle is a password-protected learning environment, and students login to http://moodle.wolfware.ncsu.edu using their Unity ID and password to access their courses. Students new to Moodle should complete the orientation module that is available on the Moodle login page. If students ever have a problem accessing this course, contact the Help Desk at 919-515-HELP or help@ncsu.edu.

The University's Blackboard Collaborate groupware system for two-way audio conferencing will be used to facilitate live discussions.

No campus or site visits are required. All work will be completed and submitted online.
**Technology Requirements:** Students must have internet access and access to a Web browser (e.g., Safari, Firefox, Internet Explorer) to participate in this course. The Moodle course site and web-based software used to complete course activities may only be accessed online. Further, it is strongly recommended that students have high-speed internet access (DSL or cable modem). The ability to open a few supplemental readings in PDF format is also required. Free PDF reader software is available for download online. To participate in the Blackboard Collaborate sessions, each student must have a computer with speakers or a jack/port that accepts a standard headset or ear buds. It is strongly recommended that students purchase headsets with built-in microphones (~ $20-30).

**Determine Final Course Grade:**
* Completion of 4 exercises based on practical questions and class readings, 20%
* One midterm exam, 30%
* One final exam, 30%
* One 10-15 page report summarizing the latest research findings on a group of microorganisms or microbial process of interest to the student, 20%

**Grading Scale:** A+ (98-100), A (94-97), A- (90-93), B+ (87-89), B (84-86), B- (80-83), C+ (77-79), C (74-76), C- (70-73), D+ (67-69), D (64-66), D- (60-63), F (59 or less)

**Virtual Class Sessions (Discussion Forums):** A discussion forum is associated with each chapter. Students with questions about any of the chapter material should first go to the related chapter’s forum to see if the question has been asked by another student. I will check the discussion boards daily (Monday – Friday) to answer discussion board questions. Students may also respond to other students’ questions – but, make sure that you have read through all of the threads associated with a discussion in case a later clarification has been made.

**Writing:** Writing is used to express ideas and allows instructors to assess student understanding. When you read scholarly articles, books and other materials for content and ideas, read multiple sources, then take notes and put the collective ideas into your own words. Your writing will include a 10-15 page report and 4 exercises based on practical questions and class readings. The 4 exercises will require a response of 4-5 pages.

**Other:**

A. This course is not self-paced. It is structured for the convenience of the distance learner and for the rigor in the curriculum.

B. Assignments are due by 11:59 pm eastern standard time on the due date unless otherwise noted. All assignments are submitted via the Moodle assignments tool.

C. Students are encouraged to login to Moodle on a daily basis (Monday – Friday) to check for announcements. Likewise, I will login everyday (Monday– Friday, 8 am – 5 pm) to answer e-mail or to address forum questions. As a general rule, I will not check e-mail or discussion board questions between the hours of 5:00 pm and 8:00 am the following morning or on the weekends.
D. Audits and Credit Only: If you are auditing this course or taking it for credit only, the minimum requirements are that you earn at least a C- in the class. If you have signed up to take this class as an “audit” but you do not earn a C- or above in the class, a grade of “NR” (no recognition given for an audit) will be given.

E. Incomplete: Only considered for a serious documented personal problem which prevents completion of the semester work. An incomplete may not be used as a substitute for a failing grade. It is only considered if making satisfactory progress in the class (C- or better).

**Academic Integrity:** Students are bound by the academic integrity policy as stated in the code of student conduct. Therefore, students are required to uphold the university pledge of honor and exercise honesty in completing any assignment. See the website for a full explanation: [http://studentconduct.ncsu.edu/policies-and-procedures](http://studentconduct.ncsu.edu/policies-and-procedures)

**University Non-Discrimination Policies:** It is the policy of the State of North Carolina to provide equality of opportunity in education and employment for all students and employees. Accordingly, the university does not practice or condone unlawful discrimination in any form against students, employees or applicants on the grounds of race, color, religion, creed, sex, national origin, age, disability, or veteran status. Further, North Carolina State University regards discrimination on the basis of sexual orientation to be inconsistent with its goal of providing a welcoming environment in which all its students, faculty, and staff may learn and work up to their full potential.

**Disabilities:** Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. [http://www.ncsu.edu/provost/offices/affirm_action/dss/](http://www.ncsu.edu/provost/offices/affirm_action/dss/)

**Class Evaluations.** Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. Evaluation Website: [https://classeval.ncsu.edu](https://classeval.ncsu.edu)
Student help desk: classeval@ncsu.edu
More information about classeval: [http://www2.acs.ncsu.edu/UPA/classeval/index.htm](http://www2.acs.ncsu.edu/UPA/classeval/index.htm)
SSC 532 SOIL MICROBIOLOGY—COURSE MAP

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COURSE GOALS

Develop an understanding of soil as a unique habitat for microorganisms as well as larger organisms.

COURSE OBJECTIVES

Each student will be able to:
1. Differentiate major groups of soil microorganisms.
2. Summarize the factors that influence the environmental distribution of soil microorganisms and how they interact with higher organisms.
3. Describe culture-based and culture-independent microbiological methods.

Each student will be able to:
1. Summarize the roles that microorganisms play in soil formation.
2. Outline and explain the roles of microbes in nutrient cycling (Carbon, Nitrogen, Phosphorus, and Sulfur).
3. Explain the agricultural and environmental implications of soil microorganisms used in bioremediation.

CHAPTERS AND TOPICS

1. Introduction and Historical Perspective
2. The Soil Habitat
3. Microbial Metabolism
4. Microbial Genetics
5. Bacteria and Archaea
6. Fungi
7. Cyanobacteria and Algae in Soils
8. The Soil Fauna
9. Viruses
10. Microbial Ecology
11. The Rhizosphere
12. Mycorrhizal Symbioses
13. Carbon Transformations and Soil Organic Matter Formation
14. Transformations of Nitrogen
15. Biological Dinitrogen Fixation: Introduction and Nonsymbiotic
16. Biological Dinitrogen Fixation: Symbiotic
17. Transformation of Sulfur
18. Transformation of Phosphorus
19. Global Gases
20. Microbiology and Biochemistry of Xenobiotic Compound Degradation
21. Bioremediation of Contaminated Soils
22. Biological Control of Soil born Plant Pathogens and Nematodes
23. Composting of Organic Wastes

ACTIVITY/DUE DATES

WEEK 1
WEEK 2-3
WEEK 4-5
WEEK 6
WEEK 7
WEEK 8: MIDTERM EXAM
WEEKS 9-10
WEEKS 11-12
WEEK 13
WEEK 14
WEEK 15: DEAD WEEK
WEEK 16: FINAL EXAM