

Soil Microbiology
SOCR 455
Plant Science W212, MWF, 9:00-9:50 am
Fall 2012

Course Description and Objectives

Students will be educated in soil microbial ecology, including the types of organisms living in soil, growth and survival strategies, biogeochemical functions, and environmental issues involving soil microorganisms.

After completion of the course, students will be able to:

- 1) Describe soil organisms and microbial habitats of soil environments.
- 2) Understand the environmental influences which control microbial distribution, growth, and activity in soil ecosystems.
- 3) Describe critical functional roles of soil microorganisms and processes and interactions affecting ecosystem productivity and environmental quality.
- 4) Apply knowledge of soil microorganisms and their activities to address global issues within environmental quality and agricultural sustainability.

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Textbook: *Principles and Applications of Soil Microbiology 2nd ed.*
by D.M. Sylvia, J.J. Fuhrmann, P.G. Hartel, and D. Zuberer (eds).
Prentice Hall, 2004.

Other readings: Posted on RamCT Blackboard or distributed in class

Prerequisites: SC 240 (Introductory Soil Science) *or* MB 300 (General Microbiology)

Grading policy: Midterm Exams (3): 300 points (100 points each)
Homework (3): 50 points
Final exam: 200 points

Total: 550 points

Statement Regarding Academic Integrity

(modified from SPCM 201 Fall 2011 Syllabus of Professor Greg Dickinson)

Academic integrity means that no one will use another's work as their own. One part of academic integrity is avoiding plagiarism. Plagiarism is the unauthorized or unacknowledged use of another person's academic or scholarly work. It is a theft of intellectual property and a violation of an ironclad rule demanding "credit be given where credit is due."

Source: (Writing Guides: Understanding Plagiarism.

<http://writing.colostate.edu/guides/researchsources/understandingplagiarism/plagiarismoverview.cfm>).

If you plagiarize in your work you could lose credit for the plagiarized work, fail the assignment, or fail the course. Plagiarism could result in expulsion from the university. Each instance of plagiarism, classroom cheating, and other types of academic dishonesty will be addressed according to the principles published in the CSU General Catalog (see page seven, column two: <http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf>).

Academic integrity means **more** than just avoiding plagiarism. It also involves doing your own reading and studying. It includes **regular class attendance, careful consideration of all class materials, and engagement with the class and your fellow students**. Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, I will ask to you sign the CSU Honor Pledge as part of completing all major assignments. While you will not be required to sign the honor pledge, I will ask each of you to write and sign the following statement on your exams:

"I have not given, received, or used any unauthorized assistance."

2012 Lecture Outline and *Tentative* Schedule

<u>Week</u>	<u>Lecture Topic</u>	<u>Book chapter or paper</u>
1.	1. Introduction, Soil diversity 2-3. Historical perspectives	Torsvik et al. 2002 1
2.	4-5. Bacteria and archaea 6. Fungi	5, 7 6
3.	<i>Monday – Labor Day</i> 7. Fungi <i>Friday – No class</i>	6
4.	8-9. Mycorrhizae Homework 1 due Monday 10. Soil fauna Exam 1 (hand out on Friday)	12 8
5.	11. Soil fauna 12-13. Microbial growth and distribution	8 10, 11
6.	14-16. Survival strategies	Schimel et al. 2007
7.	17-18. Microbial metabolism 19. Soil enzymes	3 3
8.	20-21. Carbon transformations Homework 2 due Monday 22. SOM formation and decomposition Exam 2 (hand out on Friday)	13 13
9.	23-24. N cycle; mineralization and immobilization 25. Nitrification I	14 14
10.	<i>Monday and Wednesday – ASA meeting, no classes</i> 26. Nitrification II	
11.	27. Denitrification 28-29. N ₂ fixation	14 15, 16
12.	30-32. S transformations Exam 3 (hand out on Friday)	17

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| 13. | 33. P transformations | 18 |
| | 34-35. Metal transformations | 18 |
| 14. | <i>Fall break – no class</i> | |
| 15. | 36-38. Xenobiotics in the environment | 20, 21 |
| 16. | 39-41. Bioremediation case studies
Homework 3 due Monday
Final Exam (hand out on Friday) | papers to be posted |
| 17. | Final Exam Due
Thursday, Dec. 13, 7:30-9:30 am | |