

Soil and Society

11:776:102 (3 credits)

Fall Semester (yearly)

CONTACT INFORMATION

Instructor: Dr. Stephanie Murphy
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Office Hours: by e-mail appointment

COURSE DESCRIPTION

This introductory level course examines the roles of soil in the environment to support and enrich society, basic soil processes and management principles, soil quality and concerns in relation to ecosystem functioning, and global implications. Class format includes two 80-minute lectures per week, with demonstrations and discussions supplementing the material. Guest lecturers will be invited to provide their expertise for specific topics. One or two field trips (on-campus walks) during the class-time are mandatory, weather permitting with appropriate wear, to view soil types and management *in situ*, provide realistic scenarios or problems, and consider possible solutions. Textbook and other readings will be assigned weekly, and three cumulative (related) homework assignments will be announced.

COURSE WEBSITE, RESOURCES AND MATERIALS

- Course website: Canvas
- Required textbook: “Out of the Earth: Civilization and the Life of the Soil” by Daniel Hillel. 1991. UC Press (Berkeley, Los Angeles)
- Supplemental materials that support specific topics and laboratory activities will be provided as needed or placed on reserve at Chang Library

PREREQUISITE

None

COURSE LEARNING GOALS (link to Plant Biology Undergraduate Program Goals:

<http://plantbiology.rutgers.edu/undergrad/plantbiology/>)

By the end of this course, the student will be able to:

1. Demonstrate a full appreciation of society's dependence on soil (addresses program goal 2)
2. Comprehend the factors that determine the variability of soil across landscapes, regions, etc. (addresses program goal 1)
3. Demonstrate an understanding of the complexity of soil and its place in the environment (addresses program goal 2)
4. Recognize the impact of society on soil and the need for educated management (addresses program goal 2)

ASSIGNMENTS/RESPONSIBILITIES AND ASSESSMENT

Grading: Grades will be determined based on class participation (15%), homework (15%), quizzes (20%), and mid-term (20%) and cumulative final (25%) exams.

Grades will be classified based on Rutgers approved system: A, B+, B, C+, C, D, and F.

Learning goals assessment: Specific questions on exams and quizzes and a personal project presentation to the class will be used to assess student knowledge of course learning goals. Specifically, completion of a custom soil report (that includes an interpretive survey) for designated areas and uses will be used to assess course learning goal 2, and demonstration of an understanding of accumulated information about soil and its relevance in society will be assessed by specific questions on the mid-term and final (cumulative) exam (learning goals 3 and 4). The percentage score on these assessments will determine the level of mastery: >90% outstanding; 80-89% good; 70-70% satisfactory; <69% unsatisfactory.

PARTICIPATION GRADE AND ABSENCE POLICY

Class participation is essential in this course: students are expected to attend all classes; attendance and class participation constitutes 15% of final grade. The instructor will also evaluate student participation in class discussions and interactions with invited speakers. In addition, attendance and engagement in activities during on-campus field trips is required and will be assessed as part of the participation grade.

Students who expect to miss class may contact the instructor via e-mail prior to the missed class or may use the University absence reporting website (<https://sims.rutgers.edu/ssra/>) to indicate the date and reason for the absence. An e-mail is automatically sent to the instructor.

COURSE SCHEDULE

Week	Topics
1	Introduction, definitions, and societies' concepts of soil The functions of soil in the environment
2	Soil science history and civilization, and current perspective Variability of soils, genesis and morphology, classification of soils
3	Mineral components of soil, structure, porosity Physical degradation of soil: compaction, etc. Quiz 1
4	Soil aeration, processes, status, implications Field trip (on campus)
5	Soils within the hydrologic cycle, soil water retention/drainage and movement Soil-plant-atmosphere continuum
6	Soil degradation: erosion, soil conservation efforts Quiz 2 Soil as habitat for organisms. Primary production and energy transfer
7	Mid-term exam Nutrient cycling, carbon cycle, the organic component of soil

Week	Topics
8	Soils of New Jersey and beyond Soil mapping: USDA-NRCS Web Soil Survey
9	Soil fertility, supporting vegetation, essential plant nutrients Field trip (on campus)
10	Soil reaction (pH): factors, importance, management Quiz 3 More geo-chemical cycling: P, K, and selected micronutrients (for comparison)
11	Soil degradation: nutrient depletion, chemical contamination Soil degradation: desertification, salinity/sodicity, irrigation
12	Heat transfer in soil; soil and climate Value of soils' ecosystem services, societal costs of degradation
13	Soil for infrastructure support, urban soil, use for waste disposal Thanksgiving Recess
14	Soil loss to population/infrastructure, effect on food security, soil resiliency Quiz4 Efforts to protect soils, soil's relation to human/animal health, environmental quality Review of soil management for sustainability (BMPs), soil quality restoration/remediation
15	Class presentations

Final exam (comprehensive, date to be determined)

FINAL EXAM/PAPER DATE AND TIME

The final exam is comprehensive and constitutes 25% of the total grade. The Online Final exam Schedule: <http://finalexams.rutgers.edu/>

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/>

The principles of academic integrity require that a student:

- Properly acknowledge and cite all use of the ideas, results, or words of others.
- Properly acknowledge all contributors to a given piece of work.
- Make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- Obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.

- Treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- Uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that:

- Everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- All student work is fairly evaluated and no student has an inappropriate advantage over others.
- The academic and ethical development of all students is fostered.
- The reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

STUDENT WELLNESS SERVICES

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in

your courses as possible. To begin this process, please complete the Registration form on the ODS web site at:
<https://ods.rutgers.edu/students/registration-form>.

Scarlet Listeners

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.