

Soils and Water, 11:375:360

Course Information

- **Class meets:** Tuesdays and Fridays, 10:55-12:15 pm in Rm 223, ENRS Bldg.
- **Instructor:** Daniel Giménez, Rm 240, ENRS Bldg., email: gimenez@envsci.rutgers.edu, phone: 848-932-5715
- **Text:** Brady, N. C. and R. R. Weil. 2010. *Elements of the Nature and Properties of Soils*. Prentice Hall (recommended)
- **Classroom Remote System:** i-clicker student remote (required)
- **Course web site:** <https://sakai.rutgers.edu>

Course Learning Goals

1. Acquire a basic understanding of soil ecosystems and of the role of soils in environment issues of societal importance. This course goal meets Program Learning Goal # 7 (understand contemporary environmental science issues and the impact of environmental science in a global and societal context).
2. Be able to compute basic soil properties and the outcome of simple soil processes. This course goal meets Program Learning Goal # 1 (apply knowledge from the sciences and mathematics to environmental problems and solutions).
3. Apply theoretical knowledge learned in lecture to the interpretation of empirical results obtained in the laboratory. This course goal meets the following Program Learning Goals: # 2 (use the skills and modern environmental science techniques and tools necessary for a successful career in the field); # 3 (design and conduct experiments, and analyze and interpret data); # 4 (function effectively on multidisciplinary teams); and # 5 (communicate technical information effectively).
4. Provide practical experience on assessing a 'real-world' situation with soil science knowledge. This course goal meets the following Program Learning Goals: # 4 (function effectively on multidisciplinary teams); and # 5 (communicate technical information effectively);

Instructional Activities to Achieve Goals

1. Interactions among soil biological, chemical and physical properties and their impact on contemporary environmental processes will be developed in lecture and in problems sets.
2. Laboratory exercises will reinforce and expand concepts learned in lecture and promote team work.
3. A final project will allow students to analyze soil data from a natural landscape and assess its soil for a specific application (e.g., installation of a septic system).

Assessment of Learning Goals

1. Student responses to in-lecture questions (asked through a ‘classroom response system’) (50%) and questions in three exams (50%).
2. Student performance in in-lecture questions (20%), homeworks (40%) and exams (40%).
3. Group performance in laboratory reports (70%) and final project (30%).
4. Group performance in laboratory reports (50%) and final project (50%).

Distribution of Course Grade

Homeworks	15%
Clicker points	17%
Lab reports	15%
Final project	17%

Tentative Class Schedule

TOPIC (Lectures)	TOPIC (Laboratory)
Introduction to Soils	Review of Basic Concepts, Handout
Soil Physical Properties	Color and Texture
Soil Water, I and II	Saturated and Unsaturated Water Movement-Part 1
The Hydrological Cycle and Soil Erosion	Saturated and Unsaturated Water Movement-Part 2
Soil Colloids, Cation Exchange Reactions	Clay Structure and Chemical Processes
Acidity and Alkalinity	Properties of Clay Minerals
Soil Air	Soil pH and Salinity
Soil Temperature	Make-up lab (selected groups/properties)
Soil Biotic Systems	Quality control, Data Analysis and Interpretation
Nutrient Cycles and Soil Organic Matter	Field sampling Techniques
Soils and Climate Change	Site Evaluation—Field Exercise
Urban Soils	Site Evaluation—Lab Exercise
	Visit to the Soil Testing Laboratory

TOPIC
<i>No lab.</i>
Review of Basic Concepts, Handout
Color and Texture
Saturated and Unsaturated Water Movement-Part 1
Saturated and Unsaturated Water Movement-Part 2
Clay Structure and Chemical Processes—Meet in 323
Properties of Clay Minerals
Soil pH and Salinity
<i>No lab: spring break!</i>
Make-up lab (selected groups/properties)
Quality control, Data Analysis and Interpretation
Field sampling Techniques*
Site Evaluation—Field Exercise*
Site Evaluation—Lab Exercise
Visit to the Soil Testing Laboratory