

# FOR 208 : SOILS: SUSTAINABLE ECOSYSTEMS

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## Transcript title

Soils: Sustainable Ecosystems

## Credits

4

## Grading mode

Standard letter grades

## Total contact hours

60

## Lecture hours

30

## Lab hours

30

## Course Description

Focuses on soil science basics, from physical properties to use and management. Discusses traditional agricultural, wildlands and rangelands, watersheds, and modern environmental perspectives on soil. Reviews new soil applications and soil science to better understand the role soil has in our lives. Includes lab component with indoor and outdoor experience and field trips.

## Course learning outcomes

1. Explain the importance of soil texture and demonstrate methods to determine texture.
2. Explain a soil's classification based on its horizons and profile.
3. Explain the formation of soil using the soil forming factors and processes.
4. Explain the impact of soil compaction on agricultural uses and forest site productivity and describe how to avoid and ameliorate soil compaction.
5. Discuss the management of forest, range, and agricultural soils to promote the conservation of soil and enhance productivity.
6. Sustainability outcome: Explain the interconnectedness of environmental, social, and economic systems in the context of soil ecosystems.

## Content outline

- Introduction and Overview
- Soil Forming Factors and Processes
- Chemistry Review: bonding, ions, pH
- Soil Physical Properties and Description: density, color
- Soil Chemistry: clay formation and types, isomorphic substitution, Cation Exchange Capacity
- Soil Water: plant availability, infiltration and movement
- Rocks, Minerals, and Geology
- Soil Biology: ecto and endomycorrhizas, nitrogen fixation, and soil dwelling organisms

- Soil Fertility and Management: tillage and no-till farming, fertilization, salinization, plant mineral nutrition
- Soil Compaction and Scarification
- Soil Erosion and Mass Wasting
- Soil Conservation
- Soil Classification
- Soil Surveys
- Soil as an Engineering Material: waste water management, roads, landfill liners, and foundations

## Required materials

A textbook, field clothes, and boots are required.

## General education/Related instruction lists

- Science Lab