

**COURSE OUTLINE**  
**ENST-200**  
**Fundamentals of Soil Science**  
**4 Credits**

**HOWARD COMMUNITY COLLEGE**

**Description**

This course provides an introduction to the basic principles of soil science. The physical, chemical and biological properties of soils will be emphasized and soil classification, genesis, distribution, ecology and plant-soil relationships will be examined. The laboratory component will introduce students to field methods used in soil science, including soil survey, soil analysis and soil management. Field trips to local sites will be included. Prerequisite: CHEM-101. (3 hours lecture, 3 hours lab)

**Overall Course Objectives**

Upon completion of this course, the student will be able to:

1. Describe the physical, biological and chemical properties of soils and explain the role of soils in a variety of ecosystems.
2. Discuss how soils are formed and how they are classified.
3. Describe the Global Hydrologic Cycle, and discuss the characteristics and behavior of soil water.
4. Identify irrigation and drainage principles and practices.
5. Identify the organisms that are found in soil and discuss soil ecology.
6. Describe how soil and plant communities interact.
7. Explain the process of soil aeration and describe the relationship of soil aeration to plant management.
8. Understand the importance of soil pH and pH management.
9. Discuss the factors that lead to soil erosion and land degradation and identify mechanisms used for soil conservation.
10. Demonstrate an understanding of the role that soils play in environmental quality and sustainability.

**Major Topics**

- I. Soil Formation
  - A. Parent Materials and Weathering
  - B. Soil Formation Factors
- II. Soil Taxonomy
  - A. Classification Systems
  - B. Classification Hierarchy
  - C. Soil Survey
- III. Physical Properties
  - A. Soil Phases
  - B. Soil Color, Texture and Structure
  - C. Soil Temperature
  - D. Soil Aeration

- IV. Soil Water
  - A. Types of Soil Water
  - B. Moisture Constraints
  - C. Hydrologic Cycle
  - D. Irrigation and Drainage
  
- V. Soil Chemistry
  - A. Soil pH
  - B. Ion Absorption and Exchange
  - C. Organic Matter
  
- VI. Soil Biology
  - A. Major Groups of Soil Organisms
  - B. Microbial Processes
  - C. Nitrogen and Other Nutrient Cycles
  - D. Nutrient Management
  
- VII. Soil and the Environment
  - A. Soil Erosion
  - B. Soil Degradation
  - C. Soil Contamination

### **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of lecture and lab exams and quizzes, written assignments and projects. This course includes a comprehensive final exam.

### **Other Course Information**

This course is a Science elective and an Arts and Sciences elective.