

BUTTE COLLEGE

COURSE OUTLINE

I. CATALOG DESCRIPTION

AGS 50 - General Soils

4 Unit(s)

Prerequisite(s): NONE

Recommended Prep: Reading Level IV; English Level III; Math Level II

Transfer Status: CSU/UC

51 hours Lecture

51 hours Lab

The study of soil physical, chemical and biological properties. Soil use and management including erosion, moisture retention, structure, cultivation, organic matter and microbiology. Laboratory topics include soil type, classification, soil reaction, soil fertility and physical properties of soil. (C-ID AG-PS 128L).

II. OBJECTIVES

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

- A. Analyze local soil quality as affected by human and natural activities.
- B. Explain local geographical features and their relationship to local soils.
- C. Evaluate parent rocks and other soil forming processes influence on local and global soils.
- D. Demonstrate the determination of the following soil physical properties: textures (two methods), use of texture triangle, bulk density, particle density, pore space, organic content, color, pH, structure, conductivity and reactivity.
- E. Demonstrate an understanding of the classification of local and global soil orders (i.e., soil taxonomy).
- F. Discuss and understand the importance of essential plant nutrients.
- G. Apply soil nutrient cycles to soil, plant, and soil organism relationships.
- H. Demonstrate an ability to use appropriate terminology professionally when discussing soils.
- I. Demonstrate practical soil management including soil conservation and sustainability.
- J. Analyze a soil's microbiological activity level.
- K. Demonstrate an understanding of a soil food web.
- L. Describe the Demonstrate how to read a soil map, explain the importance of soil mapping and how to locate a specific site using both township/range and GIS (Geographic Information Systems).
- M. Demonstrate how to determine a Soil Storie Index Rating and a Natural Resources Conservation Service land capability class.
- N. Describe the organic breakdown cycle of a soil and the role of organisms in soil physical and chemical properties.
- O. Evaluate a soil's water holding capacity, plant available water, properties and movement of water in soil.

III. COURSE CONTENT

A. Unit Titles/Suggested Time Schedule

Lecture

Topics

Hours

1. The soil around us	6.00
A. The function of soils in our ecosystem	
B. Early agrarian societies and their soil management practices, including significant historical events	
C. The soil as a natural body, an overview of its features and functions	
D. The scientific aspects of soil science, applied research present and future	
2. Formation of soils from parent materials	6.00
A. Parent rocks and the influence on soil	
B. Factors influencing soil formation	
C. Soil formation in action	
3. Soil classification	6.00
A. Soil orders	
B. Categories and nomenclature of soil taxonomy	
C. Soil series and textural classes	
D. Storie index and land capability classes	
4. Soil physical properties	5.50
A. Texture	
B. Structure	
C. Color	
D. pH	
E. Profile	
F. Bulk density	
G. Particle density	
H. Pore space	
I. Soil management as applied to physical properties	
5. Interpretation and use of soil maps	5.50
A. Remote sensing tools for soil investigations	
B. Satellite imagery	
C. County soil survey reports and their utilization	
D. Geographic Information Systems (GIS)	
6. Organic material and microbiology of soils	5.50
A. Influence of organic material in the soil complex	
B. Composting	
C. Diversity of soil organisms	
D. Influence of soil microorganisms	
E. The soil environment and organisms and organic matter	
F. Soil nutrient cycles	
G. Concept of a sustainable soil system	
7. Soil moisture	5.50
A. The hydrological cycle	
B. The soil plant atmosphere continuum	
C. Relation to texture, structure, and organic material in the soil	
D. Retention and movement in the soil	
E. Soil drainage	
F. Irrigation requirements and practices in relation to soil	
G. Water quality influence and assessment	
H. Water conservation applications	

8. Soil colloids	5.50
A. Properties and type of colloids	
B. Genesis of soil colloids	
C. Cation exchange capacity	
D. Factors influencing the availability of micronutrient cations and anions	
E. Soil analysis	
9. Soil pH	5.50
A. Assessment	
B. Management of acidic soils	
C. Management and reclamation of saline-alkaline soils	
D. Global soil quality as affected by human activities	
Total Hours	51.00

Lab

<u>Topics</u>	<u>Hours</u>
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IV. METHODS OF INSTRUCTION

- A. Lecture
- B. Field Trips
- C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- D. Discussion
- E. Problem-Solving Sessions
- F. Laboratory Experiments

V. METHODS OF EVALUATION

- A. Quizzes
- B. Homework
- C. Lab Projects
- D. Mid-term and final examinations

VI. EXAMPLES OF ASSIGNMENTS

- A. Reading Assignments
 - 1. Read the section of your text dealing with the soil forming process. Be prepared to discuss the five soil forming factors.
 - 2. Read the section of your text focusing on soil nutrient cycles. Be prepared to discuss

nutrient cycling in soils and the relationship to plant growth and soil micro organisms.

B. Writing Assignments

1. Write a 5 page research paper on sustainable soil management. Identify practices than degrade and enhance soil productivity.
2. Using the online soil survey, identify the soil map for the Butte College vineyard. Write a two page description of the soil, including profile characteristics, limiting factors, and best management practices.

C. Out-of-Class Assignments

1. Attend our field trip to the Durham area. Identify the soil forming processes responsible for this soil.
2. Attend our field trip to a commercial compost facility. Describe how soil micro organisms breakdown organic matter and the key factors controlling this process.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

- A. Plaster, E.. Soil Science and Management. 6th Edition. Delmar, 2014.
- B. Brady, N., Weil, R.. Elements of the Nature and Properties of Soils. 10th Edition. Pearson/Prentice Hall, 2009.

Created/Revised by: Bruce Hicks

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