

# Lassen Community College Course Outline

## AGR 19- Introduction to Soil Science

3.0 Units

### I. Catalog Description

The study of soil, physical, chemical and biological properties. Soil classification, derivation, use, function 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. This course has been approved for hybrid delivery.

**Prerequisites:** None

Transfer Status: CSU/UC

GE Area A

CSU GE Area B1 B3

IGETC Area 5A

*C-ID AG-PS 128L*

34 hours Lecture, 51 hours Laboratory

Scheduled: Fall (even)

### II. Coding Information

Repeatability: Not repeatable, Take one time

Grading Option: Graded only

Credit Type: Credit - Degree Applicable/Credit

TOP Code: 010100

### III. Course Objectives

#### A. Course Student Learning Outcomes

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

1. Demonstrate a working ability to use soil taxonomy
2. Explain water movement in soil and water holding capacity of soil.

#### B. Course Objectives

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

1. Analyze local soil quality as affected by human and natural activities.
2. Explain local geographical features and their relationship to local soils.
3. Evaluate parent rocks and other soil forming processes influence on local and global soils.
4. 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.
5. Demonstrate an understanding of the classification of local and global soil orders (i.e., soil taxonomy)
6. Discuss and understand the importance of essential plant nutrients.
7. Apply soil nutrient cycles to soil, plant, and soil organism relationships.
8. Demonstrate an ability to use appropriate terminology professionally when discussing soils.
9. Demonstrate practical soil management including soil conservation and sustainability.

10. Analyze a soil's microbiological activity level.
11. Demonstrate an understanding of soil's microbiological activity level.
12. 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.)
13. Demonstrate how to determine a Soil Storie Index Rating and a Natural Resources Conservation Service land capability class.
14. Describe the organic breakdown cycle of a soil and the role of organisms in soil physical and chemical properties.
15. Evaluate a soil's water holding capacity, plant available water, properties and movement of water in soil.

## **IV. Course Content**

### **A. The Soil Around Us**

1. The function of soils in our ecosystem
2. Early agrarian societies and their soil management practices, including significant historical events.
3. The soil as a natural body, an overview of its features and functions.
4. The scientific aspects of soil science, applied research present and future.

### **B. Formation of soils from parent materials**

1. Parent rocks and the influence on soil.
2. Factors influencing soil formation.
3. Soil formation in action.

### **C. Soil classification**

1. Soil orders
2. Categories and nomenclature of soil taxonomy
3. Soil series and textural classes
4. Storie index and land capability classes

### **D. Soil physical properties**

1. Texture
2. Structure
3. Color
4. pH
5. Profiles
6. Bulk Density
7. Particle density
8. Pore space
9. Soil management as applied to physical properties

### **E. Interpretation and use of soil maps**

1. Remote sensing tools for soil investigations
2. Satellite imagery
3. County soil survey reports and utilization
4. Geographic Information Systems (GIS)

### **F. Organic material and microbiology of soils**

1. Influence of organic material in the soil complex
2. Diversity of soil organisms
3. Influence of soil microorganisms
4. The soil environment and organisms and organic matter
5. Soil nutrient cycles

6. Concept of a sustainable soil system

#### **G. Soil moisture**

1. The hydrological cycle
2. The soil plant atmosphere continuum
3. Relation to texture, structure, and organic material in the soil.
4. Retention and movement in the soil
5. Soil drainage
6. Irrigation requirements and practices in relation to soil
7. Water quality influence and assessment
8. Water conservation applications

#### **H. Soil colloids**

1. Properties and type of colloids
2. Genesis of soil colloids
3. Cation exchange capacity
4. Factors influencing the availability of micronutrient cations and anions
5. Soil analysis

#### **I. Soil pH**

1. Assessment
2. Management of acidic soils
3. Management and reclamation of saline-alkaline soils
4. Global soil quality as effected by human activities

### **V. Lab Activities**

#### **Individual Laboratory Activities may include but are not limited to:**

1. Categories and nomenclature of soil taxonomy
2. Particle size distribution
3. Soil Structure, Texture, Color
4. Interpretation and usage of soil maps
5. Organic materials and microbiology of soils
6. Soil Moisture
7. Soil Analysis and Management
8. Soil Ecosystems
9. Soil Chemistry

### **VI. Assignments**

#### **A. Appropriate Readings**

Range magazine, The Nature and Property of Soils

#### **B. Writing Assignments**

All students must write a final paper for the class on soil classification

#### **C. Expected Outside Assignments**

Students must do two reports on current issues in soil topics

Students will be required to complete two hours of outside-of-class homework for each hour of lecture.

#### **D. Specific Assignments that Demonstrate Critical Thinking**

Students will demonstrate critical thinking by analyzing soil chemistry and deciding what will grow

### **VI. Methods of Evaluation**

#### **Traditional Classroom Evaluation**

Student's grades will be determined by tests and quizzes from lectures

Student's grades will be determined by practical application in lab

### **Hybrid Evaluation**

All quizzes and exams will be administered during the in-person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

## **VII. Methods of Delivery**

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery     Correspondence Delivery

Hybrid Delivery                       Online Delivery

### **Traditional Classroom Delivery**

Lecture and Demonstrations.

### **Hybrid Delivery**

A combination of traditional classroom and online instruction will be utilized. Every semester, a minimum of 17 hours of class will be taught face-to-face by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional classroom instruction will consist of lectures, visual aids, discussions and group activities. Online delivery consists of instructor-generated information, readings, news communications, web links and activities as well as facilitation of forum based discussions and communications.

## **VIII. Representative Texts and Supplies**

Plaster, Edward, *Soil Science and Management*, 6<sup>th</sup> edition, 2017, Delmar Publishers, ISBN 9781337904599

Weil, Ray; *Laboratory Manual for Introductory Soils*; 9th edition, 2014, Kendall Hunt Publishing Company, ISBN-13: 978-1465259226

## **IX. Discipline/s Assignment**

Agriculture, Agricultural Production

## **X. Course Status**

Current Status: Active

Original Approval Date: 12/02/2014

Board Approval Date: 01/13/2015

Chancellor's Office Approval Date: 03/26/2015

Revised By: Brian Wolf

Curriculum/Academic Standards Committee Revision Date: 11/03/2020

Revised for IPR, no change: 03/15/2022