

## **Soils 301** **Ecological Soil Management**

*3 semester credit hours*

[M] Soil and water conservation and management, with emphasis on soil quality and health, Cooperative course taught by WSU, open to UI students. Prereq: Soils 201 (or concurrent), or permission. *(Students who have not already and are not taking introductory soils should go over the “review” materials available in the online space carefully and make sure that they feel capable of understanding the topics to be covered in this class)*

Developed by  
Dr. Catherine A. Perillo

**Contact Information:** The person who developed this course may not be the person currently instructing the course. The current instructor is listed on enrolled students' My DDP course work screens. For further information, contact DDP (800-222-4978 or [distance@wsu.edu](mailto:distance@wsu.edu)).

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**Please Note:** Enrolled students should refer to the syllabus and specific activities in the online course space for additional information not included below.

### Textbooks:

Magdoff, Fred and Harold Van Es. **Building Soils for Better Crops, 2<sup>nd</sup> ed.**, [Sustainable Agriculture Network](#) (available from WSU bookstore)

USDA-NRCS. 1999. Soil Quality Test Kit Guide. Available online at:  
[http://soils.usda.gov/sqi/assessment/test\\_kit.html](http://soils.usda.gov/sqi/assessment/test_kit.html)

An introductory soil science text. If you do not already have one, let me suggest one of the following, which have a range of complexity (obtain from amazon.com or other bookseller):

Brady and Wyle. The Nature and Properties of Soil. 12<sup>th</sup> or later edition. (\$50-130.00. This book will serve as a thorough reference book long into your future. Detailed, excellent and numerous charts, figures, diagrams and data.)

Dubbin, W. 2001. Soils. The Natural History Museum, London. (~\$38.00. This is a very simple, concise introduction to soil science, with nice diagrams and photos.)

# Course Information

## Course Overview

The course is organized into three units:

### **1. Introduction, terminology and the “big picture”**

Includes resources and activities for students to become familiar with soil management information sources and agencies, soil quality concepts, land classification systems (including prime farmland designation and issues), as well as accessing and interpreting the scientific information.

### **2. Soil quality: assessment, monitoring and maintaining/enhancing**

In this unit, we will look more closely at the physical, chemical and biological properties of soil that are most often used as “indicators” of soil quality. We will learn (and in many cases have hands-on-practice with!) several different techniques for measuring soil quality parameters. We will also look closely at soil biodiversity and the addition of soil organic matter – whether being added through soil amendments (such as manure, compost, etc.) or through the use of cover crops.

### **3. Soil Conservation: Issues and practices**

In this unit, we will focus on the processes that lead to soil degradation (such as soil erosion, compaction, acidification, salt build-up, and contamination from added materials) how to mitigate them, building on the material from previous sections of the course.

Beginning a few weeks into the course, you will be working on a semester-long project which involves: becoming connected with a specific piece of land that is being actively managed, making a number of soil quality assessments at this site, and preparing a report of your findings as well as recommendations for the land manager.

You will also be connecting with a variety of land management resources, agencies, and practitioners in your local area – to provide you contacts and information sources that you can use long after the course is finished.

Finally, throughout the course we will examine science-based information sources (including university Extension publications, peer-reviewed journal articles and edited book chapters, and government documents), and practice our

writing skills. Being an online format, much of our communication will by default be written. However, we will also focus on the research and writing styles used in applied science fields, preparing you for professional communications.

## Course Goals

The course has two basic goals:

- 1) *To explore soil management approaches and issues in depth, including the application of basic soil science principles and techniques using ecologically appropriate means.*
- 2) *To increase our ability to find, interpret, and write about science-based information and issues.*

### Specific objectives

- Provide the opportunity for you to develop a practical understanding of *how* and *why* to have, as well as *manage for*, a healthy soil.
  - What does a healthy soil look like in a given environment?
  - How does one manage for a healthy soil?
  - How does one test for and monitor soil health?
  - Why do these management and monitoring approaches work (research and theory behind)?
- Introduce/practice finding and interpreting a variety of science-based information sources including peer-reviewed articles in scientific journals and edited books, as well as information in university extension publications, and government documents.
- Provide the opportunity for you to develop connections with people and agencies that impact soil health in your local area.

### Learning Outcomes

Engaging in the activities and exercises of this class will lead to a number of learning outcomes, including some or all of the following:

- Enhanced ability to find, interpret, and apply information from a variety of scientific and government sources to soil management issues, using ecologically appropriate means.
- The ability to speak knowledgeably about farmland preservation, including understanding relevant definitions of prime farmland and

locating and interpreting statistics on rates of farmland conversion at local and regional levels.

- The ability to conduct and interpret the results of several simple but useful tests for soil physical, chemical, and biological quality using the Soil Quality Toolkit.
- The ability to develop soil management plans that address soil physical, biological and chemical aspects for at least several different scenarios in agriculture, forestry, landscaping, and other soil-related fields.
- The ability to calculate carbon and nutrient additions to soil from a variety of sources, including compost, manure, biosolids, and cover crops.
- The ability to recognize and take steps to mitigate soil degradation due to wind or water erosion, compaction, salt buildup, or acidification.
- A beginning ability to calculate the relative amount of soil erosion expected under a range of scenarios using R\USLE
- The ability to describe the relative effect of different tillage approaches on soil physical and biological properties
- The ability to monitor the amount of plant residue present on the soil surface.
- Be able to navigate various certification benchmarks (e.g., USDA organic standards for soil building, The Food Alliance eco-label for ‘sustainable practices’, Demeter, etc.)
- Understand the relative rate at which water and dissolved substances move through the soil profile, and be able to use a simple model for chemical leaching.
- Be able to identify the key agencies involved in a particular soil management arena (e.g., USDA-Forest Service, USDA-NRCS, state dept. of ecology, etc.)

## Course Outline

This is a general outline of course topics, including several of the activities students will be doing. Refer to the COURSE SYLLABUS in the course space for exact sequences, activities and dates.

### **Unit I. Introduction, terminology and the “big picture”**

#### **Week 1**

#### **Introduction to Course and Information Sources**

**Week 2**

**Soil Quality Concept and Indicators**

**Week 3**

**Land Classification**

**Week 4**

**Finding and Reading Scientific Papers**

## **Unit II. Soil quality: Assessment, monitoring and maintaining/enhancing**

**Week 5**

**SQ – Physical & Chemical Properties**

**Week 6:**

**SQ - Biological Properties**

**Soil Biodiversity**

**Week 7:**

**Changing soil organic matter levels**

**-with *soil amendments* (manure, compost, biosolids)**

**Week 8:**

**Cover crops – OM additions and other benefits**

## **Unit III. Soil Conservation**

**Weeks 9 & 10:**

**Soil Erosion – Water erosion & Conservation tillage**

**Week 11:**

**Soil Erosion – Tillage erosion**

**Soil Erosion – Wind Erosion**

**Week 12:**

**Compaction and its mitigation**

**Week 13:**  
**Soils and chemical pollution**

**Week 14:**  
**Irrigation, Salinity and Sodicty (salt-affected soils)**

**Week 15:**  
**Reports and Reviews of semester projects**  
**Closing**

**Week 16:**  
- turn in final version of SQ Scorecard project

## **Course Work**

### **Weekly discussions**

Each week (or nearly so) we'll have a discussion in the online course space. Typically the discussion topic will focus on your reaction to or learning from one of the readings and/or activities for the week. Your input in these discussions will comprise a majority of the 'participation' portion of the total course grade. You will have to post your assignments to the course space, read the postings of other students, and respond to what they have said in their assignments and what they have said about your posting. The discussion space is your opportunity to interact with other students, to exchange information, ideas and critiques. These will be graded based on participation, and fully engaging in them will be key to your learning the course material.

### **Formal Assignments**

There will be 5-6 of these throughout the course, including reviewing and summarizing one or more readings, calculations, interim and final reports for your soil quality management project site, and a final group project in which you will design a soil quality score card.

## Exams:

There will be no proctored exams in this class. The course activities you do are designed to 'test' your knowledge and understanding of the course materials. Having said that, the material of the course builds on previous material, so it is important to ensure that you have a good understanding as you go along. (This approach, perhaps, requires more self-discipline in terms of keeping up and asking questions as we go, since there are no 'exam deadlines' to meet.)

## Grading

Activities	Percent of Final Grade
Weekly discussions	30%
Assignments	
SQ Management Project	20%
Group scorecard project	20%
Others (3-4)	30%
TOTALS	100%

Grade	Percentage	Grade	Percentage
A	94–100	C	73–76
A–	90–93	C–	70–72
B+	87–89	D+	66–69
B	83–86	D	60–65
B–	80–82	F	59 & Below
C+	77–79		

## **Incomplete Policy**

Incompletes are granted only with permission of the instructor and are subject to the following guidelines:

1. Students must request an incomplete in writing or by e-mail from the instructor before the end of the semester.
2. The request must be signed and dated by the student (or identified by student's e-mail address), and must explain the reasons behind the request for the incomplete.
3. In order to be considered for an incomplete, there are two main conditions:
  - o the student must have completed at least 75% of the coursework to date,
  - o the student must have a mathematical possibility of passing the class. A passing grade is 60 percent or above for the entire course.
4. If extraordinary circumstances (e.g., family emergency, serious illness) are involved and are documented to the instructor's satisfaction, the professor/ instructor retains the discretion to grant an incomplete even if the minimum conditions outlined above are not met.

If an incomplete is granted, the standard WSU policy applies (i.e., ALL work must be completed within one full year from the end of the enrollment semester at issue. Otherwise, an automatic grade of "F," or failing, will be entered on the student's transcript).

## **Online Collaboration**

### **Netiquette:**

Threaded discussion posts in online course spaces are an integral part of online learning environments. A feeling of safety is basic for any collaborative dialogue. An overview of the process of creating and participating in a safe discussion environment is provided in the online course space, if applicable.

### **Critical Engagement Criteria:**

In addition to the netiquette guidelines for online collaboration, you will be expected to participate in the online discussions in a way that engages with the topic and with the other participants. An overview of the criteria used in this course to evaluate your participation through your original and response posts is provided in the online course space, if applicable.

## **Critical Thinking**

The ability to think and write critically are essential skills in many walks of life. Critical thinking skills are developed and refined through practice, self-reflection, and the critique and support of peers and instructors. Throughout this course you will have many opportunities to exercise your analytical thinking, synthesize information, and apply knowledge to real-life situations. To help facilitate your thinking and writing, an adaptation of the WSU "Critical Thinking Rubric" is provided in the online course space, if applicable, to assess your own writing and that of other students. Please review it carefully before completing each activity.

## **WSU Policy Information**

### **Academic Regulations**

Students enrolled in distance courses are subject to the same WSU academic regulations as on-campus students. A complete listing of the WSU academic regulations are available online ([Academic Regulations](#); select "Printable" next to "List All Academic Regulations" to view a printable list of all regulations).

### **Academic Integrity**

You are expected to uphold the WSU standard of conduct relating to academic integrity ([Academic Integrity Standards and Procedures](#)). You assume full responsibility for the content and integrity of the academic work you submit. The guiding principle of academic integrity shall be that your submitted work, examinations, reports, and projects must be your own work.

### **Disability Accommodations**

DDP and the Disability Resource Center (DRC) work together to provide reasonable accommodations for students who have documented disabilities and who are registered both with DDP and the DRC. DDP's liaison to the DRC will assist you in getting started. To begin this process, contact DDP (800-222-4978 or [distance@wsu.edu](mailto:distance@wsu.edu)). It is important that you notify DDP

as soon as possible of your needs or that you suspect that you may need accommodation so DDP can initiate the process with DRC and facilitate accommodation. Late notification may cause the requested accommodations to be unavailable. All accommodations must be approved through Disability Resource Center ([DRC](#)).

## Resources

### SCS Technical Support

If you have problems with computer issues related to your online courses, you can request help online from SCS ([Student Computing Services Online Help](#)). You can also contact SCS through their toll-free number, 800-608-3839. They will attempt to solve your problem or direct your help request to the appropriate staff person. SCS staff are NOT able to answer questions about course content or procedures (e.g., assignments, grades); please contact DDP (800-222-4978) with those questions.

### Library Support

All students enrolled in Washington State University distance courses can use the WSU Libraries online databases and receive reference and research assistance from the Distance Degree Library Services (DDLS). Enrolled students can also borrow books and other circulating material and receive photocopies of journal articles.

Visit the DDLS Web page ([DDLS](#)) for links to the WSU online database and library support information, including specific information and resources for select courses (see the list of courses using the drop down menu on the left hand side of the page under "Find Your Course").

### Online Writing Lab (OWL)

WSU's On-line Writing Lab (OWL) is an asynchronous service that connects you with a trained WSU writing tutor who will provide narrative feedback to help you improve your writing. The OWL tutors are trained to respond to the conceptual and structural issues of your writing before they

comment on issues of convention and correctness. Expect that the tutor's comments will primarily be about the focus of your essay, the supporting details you have provided, and the organization of those details. Tutors will comment on issues of proofreading, convention and correctness if there are obvious patterns of error, but they will not correct your essay for you. To share a piece of writing on the OWL, go to the Owl Web page ([OWL](#)) and select "Introduce Yourself (login)" in the list of options.

## **DDP Student Handbook**

Students enrolling in courses through DDP are responsible for reading and following the procedures outlined in the online DDP Student Handbook ([Handbook](#)). Please pay close attention to the "Enrollment Status/Fees" and "Taking Courses" sections. WSU policies that apply to WSU on-campus courses also apply to semester-based distance learning courses and are explained in detail in the handbook. A careful reading of the handbook, especially the two sections mentioned, will give you a good head start in assuring success with your course(s).