



South Carolina State University
Environmental Sciences Field Station at Savannah River
COURSE SYLLABUS

Summer Session I/II 20 __, 9am-5pm, M, W, F or T, TH, SAT
(Instructor to announce daily dorm departure times)

Instructor's Name:

College: Science, Mathematics and Engineering Technology

Department: Biological & Physical Sciences

Course Title & Number: ENV 310: Introduction to Soil Science

Instructor's Office:

Instructor's Office Tel.:

Office Hours:

Email Address:

Classroom:

Required Textbook: The Nature and Properties of Soils by Nyle C. Brady and Ray R. Weil (ISBN: 978-0130167637) Prentice Hall; 13 edition (July 16, 2001).

Teaching Assistant:

Dorm Room:

Phone:

Office Hours:

Email Address:

I. COURSE DESCRIPTION

Prerequisites: All students are required to pass a General Employee Training (GET) multiple choice exam as a condition of retaining your internship. A 3-4 hour training course will precede the exam. Passing the exam is not difficult and only requires your attention during the training course. Consent of Instructor.

ENV 310 - Introduction to Soil Science (4 credits) (2.5, 1.5): Designed for students interested in a comprehensive introduction to soil science from both an environmental and plant management perspective, this course is divided into three units. A unit on soil information introduces students to soil properties, characterization, mapping, classification, and land evaluation. A soil management unit addresses nutrient and water management, water, as well as management of soil biota and soil health. The unit on the role of soils in ecosystems considers topics such as soil erosion, nutrient leaching, soils as sinks and sources of greenhouse gases, and the impact of soils on land use. Labs will initially be field-oriented with an emphasis on learning practical skills needed to evaluate and manage soils. Subsequent labs will focus on accessing, interpreting, and applying soil information. Course will meet three times each week for 4.5 weeks (about 13 meetings) and end with a multimedia final presentation and poster presentation.

II. COURSE OBJECTIVES

The course is designed to acquaint student basic concept of soils, soil origin processes, types of

soils, soil environment including organic matter, organisms, soil temperature, soil moisture, soil nutrients, physical and chemical properties of soils, and soil management.

III. COURSE COMPETENCIES

Upon completion of this course, students should be able to:

- (a) Describe the distribution and variability of soils and their properties across the landscape
- (b) Describe how these properties are created and how they affect landscape processes (both at a large and small scale)
- (c) Analyze soil characteristics and interpret results
- (d) Explain how soils are managed (or not) and their properties for a multitude of objectives

IV. EXPECTED MEASURABLE OUTCOMES

Students will be given individual or group assignments, projects, reports in which they will be required to explain the applications of the techniques and topics learned.

V. OUTLINE OF COURSE CONTENT

Mting #	DATE	TOPIC	SUBJECT AREA	HOME WORK	DEPARTURE TIME	FIELD ACTIVITY AND/OR LAB
1		Landscape of the Finger Lakes	Glaciers and Lakes	Chapter 1		
			Soil Architecture	Texture		
		Color		Chapter 4		
		Structure				
2		Soil Formation	Parent Material	Section 2.2 to 2.7		
			Relief (topography and orientation)			
			Biota			
			Climate			
			Time			
3		Soil Processes	Additions	Section 2.8		
			Losses			
			Translocation			
			Transformation			
		Weathering	Physical	Section 2.1		
			Chemical			
4		Soil Mapping and Soil Information	Soil surveys	Chapter 19		
			Land Evaluation			
			SSURGO and STATSGO Databases			

Mting #	DATE	TOPIC	SUBJECT AREA	HOME WORK	DEPAR TURE TIME	FIELD ACTIVITY AND/OR LAB
5		Soil Morphology	Diagnostic horizons and features	Section 1.10 and Sections 3.1 to 3.4		
			Nomenclature			
		Soil Classification	Classification systems	Chapter 3		
			Soil orders through soil series			
6		Soil Water	Capillary Activity - Adhesion and Cohesion	Chapters 5 & 6		
			Water Potential			
			Water Movement - saturated vs. unsaturated			
			Runoff, Infiltration, Storage and Loss			
			Soil Solution			
7		Soil Air and Temperature	System phases	Chapter 7		
			Reduction/Oxidation Potential (Redox)			
			Soil Aeration			
			Thermal Properties of Soil			
			Solar Energy - adsorption and loss			
8		Colloids	Type: silicate, amorphous and non-silicate	Chapter 8		
			Architecture and Characteristics			
			Genesis & Distribution			
			Charge Potential			
			Cation and Anion Exchange Capacity			
9		Organic Matter (OM)	Carbon cycle	Chapter 12		
			Decomposition			
			Properties of Organic Matter			

Mting #	DATE	TOPIC	SUBJECT AREA	HOME WORK	DEPARTURE TIME	FIELD ACTIVITY AND/OR LAB
		Soil Acidity (pH)	Acidification (chemical and biological)	Chapter 9		
			Pools of Acidity			
			pH buffering			
			Liming			
			Role of Aluminum			
10		Nutrients	N, P, K and S cycling	Chapter 13, 14 and 15		
			Micronutrients			
			pH and redox effects	and skim Chapter 16		
			Deficients and Toxicity			
			Fertilization			
11		Ecology	Ecological Roles	Chapter 11		
			Classification			
			Nutrient Cycling			
			Beneficial and Detrimental Effects			
		Practical Nutrient Management	Agronomic Practices	reread Chapter 16		
			Soil Quality			
			Site and Landscape Management			
			Fertilization			
12		Soil Erosion	Process of Water and Wind Erosion	None		
			Management tools against erosion			
		Soil Quality	Inherent and Dynamic soil characteristics			
			Assessment of Soil Quality			
			Indicators of Soil Quality			

VI. LIBRARY AND INTERNET ASSIGNMENT

In addition to assignments and projects, students will be given library and internet assignments for which they will be required to submit reports.

VII. SPECIAL COURSE REQUIREMENTS

The course is “FIELD ORIENTED”, therefore be prepared to go into the field everyday. Everyday you should bring with you: water, food, a change of clothing, long pants (light weight), field boots, hat, and anything else you think you may need. Each course topic will have a supporting field/hands-on activity scheduled by the instructor.

- A. Attendance: Attendance is mandatory. Excused absences will be permitted. Leave a message on my phone if an emergency arises. For an absence to be excused, it **must** be brought to my attention and discussed/approved by me prior to the day in which you are to miss class, with the exception of emergencies. For every unexcused absence, 1.5% pts will be deducted from your final grade. **Absences and tardiness will negatively impact your stipend.**
- B. Make-up Exams: Make-up exams will be given only if student presents evidence of being excused officially by instructor. There will be no make up for pop quizzes.
- C. Office hours: Instructor will be available during the office hours posted above. However, meeting with the instructor outside of office hours requires an appointment.
- D. Equipment Care: Where applicable, each student is expected to exercise extreme caution and care when using any equipment. No piece of equipment is to be operated by any student until he or she has been thoroughly instructed on the equipment’s use and given permission to do so.
- E. Academic Integrity: All students shall refer to the most current South Carolina State University Handbook for instructions on Academic Integrity.

The highest standards of academic integrity shall be expected of all students. As such, academic dishonesty is prohibited. Academic dishonesty includes, but is not limited to cheating on examinations, unauthorized collaboration on individual assignments, unauthorized access to examination materials, and plagiarism.

Plagiarism is defined as the unauthorized use of ideas and/or phrases and representing the same as your own, intentionally or unintentionally. As such, a writer may not use in his or her writing the language, ideas, phrases, or sentences taken verbatim from another’s writing unless due credit is given to the writer by quotation and citation.

Students found guilty of plagiarism will fail the course. If any student is unsure whether an act may violate integrity policy, please consult with the instructor before engaging in the act.

VIII. METHOD OF EVALUATION

Requirement	Date	Weight
Three (3) one hour lecture tests		
First Lecture Test		15%
Second Lecture Test (Mid Term)		15%
Third Lecture Test (Final Exam)		15%
Unannounced pop quizzes		10%
Assignments & Lab Reports		30%
Final Comprehensive Presentation		10%
Participation		5%
Total		100%

Note: All exam dates are tentative and are subject to change at the instructor's discretion.

IX. GRADING SCALE

Letter Grade	A	B	C	D	F
Score	100-90%	89-80%	79-70%	69-60%	Below 60%

X. REFERENCES

There is a [website](#) associated with the text includes chapter review quizzes that you may find useful.