

Syllabus- SOIL 4463
Soil and Water Conservation and Management
Spring 2012

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Course Website: <http://soilwater.okstate.edu/courses/soils-4463>

Course meeting time and location:

10:30-11:20am MWF, North Classroom Building Room 214

Office Hours:

The best time to talk to me will typically be immediately after class. If that time does not work for you, you may call or e-mail to schedule an appointment. You are also welcome to stop by my office at any time. I can usually make time to talk with you.

Course Description:

Assess the importance, quality and quantity of soil and water as natural resources for ecosystems and societies. Understand the principles of soil erosion processes and management practices to decrease erosion in urban, cropland and rangeland systems. Understand the principles of the soil water cycle to improve water use efficiency of dryland and irrigated systems. Understand how to utilize soil resource assessment tools to make land management decisions. Examine the role of soil management in the mitigation and adaptation to climate change.

Prerequisite:

Fundamentals of Soil Science (SOIL 2124).

Textbook:

Blanco, H. (2010). Principles of Soil Conservation and Management. Springer Science. New York, NY, ISBN 978-90-481-8529-0 (softcover).

This textbook is available electronically through the OSU library at:

<http://argo.library.okstate.edu/login?url=http://dx.doi.org/10.1007/978-1-4020-8709-7>

Additional Resources:

Troeh F.R., Hobbs, J.A., and Donahue R.L. Soil and water conservation. 3rd or 4th edition. Prentice Hall, New Jersey

Various internet links will be provided in class and on the course website.

Performance Evaluation:

Students performance will be evaluated using frequent in-class quizzes, homework assignments, 3 exams and a final exam. Students taking the course for graduate credit will have extra responsibilities. Students enrolled for graduate credit will conduct research projects (more information below). The maximum points that can be earned for each activity are listed below.

Distribution of Points:

Assignment	Quantity	Total points
Quizzes*	10	100
Exams	4	400
Homework assignments*	5	100
TOTAL POINTS POSSIBLE*	--	~600

*The quantity of quizzes and homework assignments are subject to change during the semester, which will cause the total points to change.

Grades will be assigned at the end of the semester using the follow scale:

$\geq 90\%$ = A, 89-80% = B, 79-70% = C, 69-60% = D

Quizzes:

- Quizzes may be announced or unannounced in class. They will cover material from assigned readings or from lectures.
- A missed quiz may not be made up.
- The lowest quiz score will be dropped from the final grade calculation.
- Some quizzes will require you to complete calculations. Therefore, you should bring a calculator (NOT a cell phone) to each class.

Class Policies

1. It will be necessary to attend all scheduled class periods and take all exams at their assigned date and time in order to fulfill the requirements and receive an acceptable grade in this class.
2. Students missing any class period should make arrangements with others students in the class to obtain lecture notes.
3. Make-up exams will be available for officially permitted absences that occur on the scheduled exam dates and times. Valid reasons for absences include, but are not limited to, serious illnesses, death in the immediate family, and university-sanctioned extracurricular activities. Students are responsible for providing valid documentation of the permitted absence. This should be done prior to the date of the exam. If notification cannot be made before the exam date, then validation of the absence must be completed within two class periods of the original exam date.
4. There will be no make-up quizzes, and unexcused absences will result in a score of 0 for that day's quiz. Permitted absences will result in no score, and thus will not count against the student.

Important Dates:

Jan. 30, 2012	Exam 1
Feb. 29, 2012	Exam 2
Apr. 06, 2012	Exam 3
May 4, 10:00-11:50	Final Exam

Special Accommodations for Students:

If you have a disability and need special accommodations of any nature, I will work with you and the Office of Disabled Student Services, 326, Student Union, to provide reasonable accommodation to ensure that you have a fair opportunity to perform in this class. Please let me know of your need for accommodation as soon as possible.

SOIL 4463
Soil and Water Conservation and Management

Course Outline

This outline provides a general description of topics for discussion in this course and is subject to minor changes to improve the course based on student interest. It also provides sources for supplemental information. Reading assignments are subject to change and will be mentioned in class.

<p>1. The soil and water resources and need to conserve them (Chapter 1, Blanco and Lal, Sections 1.1-1.4, 1.7-1.9)</p> <ul style="list-style-type: none"> a. The soil resource (http://soils.usda.gov/use/worldsoils/papers/pop-support-paper.html) b. Our water resources <p>2. Historic perspective of erosion (Chapter 2 and 4, Troeh et al.)</p>	<p>Week 1 (Jan 9-13)</p>
<p>3. Erosion by Water (Chapter 2, Blanco and Lal)</p> <ul style="list-style-type: none"> a. Types of erosion (Section 2.1) b. Processes (Section 2.2) c. Rainfall erosivity (Sections 2.2-2.5) d. Runoff erosivity (Section 2.6) e. Soil erodibility (Section 2.7) f. Models for estimating losses (Section 4.1-4-7) <ul style="list-style-type: none"> i. USLE (Section 4.3) ii. Revised USLE (Section 4.5) iii. Water Erosion Prediction Project (Section 4.7) 	<p>Week 2 (Jan. 18-20)</p>
<ul style="list-style-type: none"> g. Water erosion control in cropland <ul style="list-style-type: none"> i. Soil management and cropping systems ii. Structural controls 	<p>Week 3 (Jan. 23-27)</p>
<p>4. Erosion by Wind (Chapter 3 and 4)</p> <ul style="list-style-type: none"> a. Processes (Section 3.1) b. Factors (Section 3.2) c. Wind erosivity (Section 3.3) d. Soil erodibility (Section 3.4) e. Models for estimating losses (Section 4.10) <ul style="list-style-type: none"> i. Wind erosion equation (Section 4.11) ii. Revised wind erosion equation (4.12) iii. Wind erosion prediction systems (Section 4.14) f. Erosion control in cropland (Section 3.6) <ul style="list-style-type: none"> i. Windbreaks (Section 3.7) ii. Crop residues (Section 3.8) iii. Conservation tillage (Section 3.10) 	<p>Week 4 (Jan. 30-Feb. 3) Exam 1: Jan. 30</p>
<p>5. Tillage erosion (Chapter 5 Sections 5.1, 5.3-5-9, and 5-12)</p> <p>6. Erosion in range and pasture Systems (Chapter 12)</p> <ul style="list-style-type: none"> a. Rangelands vs. pastures b. Degradation of grazing lands c. Impact of grazing on soil properties d. Grazing systems e. Conversion of cropland to and from pasture 	<p>Week 5 (Feb. 6-10)</p>
<p>7. Erosion in Forested systems (Chapter 12)</p> <ul style="list-style-type: none"> a. Deforestation b. Causes of erosion in managed forest systems. c. Erosion control in managed systems <p>8. Erosion in Urban/suburban systems (http://soils.usda.gov/sqi/management/urban_mgmt.html)</p>	<p>Week 6 (Feb. 13-17)</p>

9. Soil Quality a. Concept (Sections 18.1-18.4) b. Soil Quality indicators (Section 18.5) c. Soil Quality assessment (Sections 18.6-18.7) d. Soil quality and erosion (Sections 18.8)	Week 7 (Feb. 20-24)
10. Restoration of degraded soils(Chapter 15) a. Saline and Sodic Soils (Sections 15.5-15.6) i. Causes ii. Remediation b. Mined Soils (Sections 15.7-15.8)	Week 8 (Feb. 27-Mar. 2) Exam 2: Feb 29
11. Soil Resource Assessment a. Soil survey (Chapter 7 Troeh et al.) b. Websoilsurvey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm) c. Other on-line tools (http://casoilresource.lawr.ucdavis.edu/drupal/node/902) d. Precision Ag techniques	Week 9 (Mar.5-9)
12. Dryland soil water management a. Water cycle b. Water conservation (Chapters 14, Troeh et al.) c. Water drainage (Chapters 15, Troeh et al.)	Week 10 (Mar. 12-14)
Spring Break	Mar. 19-23
13. Irrigation (Chapters 16, Troeh et al.) a. Crop water use b. Irrigation systems	Week 11 (Mar. 26-30)
14. Water quality (Chapter 14) a. Nonpoint source pollution (Section 14.3-14.7) b. Mitigating water pollution (Section 14.10) i. Utilization of precision ag technology ii. Systems Management	Week 12 (Apr. 2-6) Exam 3: Apr. 6
15. Climate Change a. Climate change and soil erosion risk (Chapter 20 sections 20.2-20.5) b. Impacts of climate change on crop production (Chapters 20 section 20.9) c. Soil carbon Cycling (Chapter 17) d. Nitrous Oxide Emissions (Supplemental materials will be provided)	Week 13 (Apr. 9-13)
16. Graduate student Presentations	Week 14 (Apr. 16-20)
Dead week, Open for additional topics	Week 15 (Apr. 23-27)