

NRES 251 - INTRODUCTION TO SOIL AND WATER RESOURCES
SPRING 2019

Lecture: TNR 170 Mon, Wed, Fri 12:00–12:50PM

Instructor: Jacob Prater, Assistant Professor of Soil and Waste Resources
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office: 274 CNR, tel: 346-4180

Office Hours: 8-10 am Friday, or by appointment

Lab Sections Tues. 8-9:50 am (Gunderson), Wed. 10-11:50 am (Scharenbroch), Thurs. 8-9:50 am (Miller), 10-11:50 am (Prater), 12-1:50 pm (Prater)
Lab room CNR 262

COURSE DESCRIPTION: Integrated concepts of soil and water resources at the landscape level: physical, chemical, and biological interactions in soil and water relating to watershed processes and response to land use and management.

COURSE OBJECTIVES:

This course is designed for undergraduate students in natural resources. The overall objectives of the course are that by the end of the semester the student should be able to:

1. Define soil and water along with their physical expressions (basic morphology)
2. Demonstrate understanding of the important roles that soil and water play as components of natural ecosystems
3. Describe how soil and water interact in a watershed framework or landscape unit
4. Define the important physical and chemical properties of soil and water
5. Describe how the management of soil and water resources affects:
 - a. land use planning
 - b. erosion
 - c. nutrient cycling and nutrient management
6. Perform basic field techniques used to measure physical and chemical properties of soil and water
7. Perform some analyses using the applications of EXCEL (spreadsheet) and GIS as tools in the management of soil and water information

READING MATERIALS:

Text Rental:

Brady, Nyle, C. and Ray R. Weil. 2010. Elements of the Nature and Properties of Soils. 3rd edition. Prentice Hall, NY.

Supplemental Handouts and On-line Resources:

As directed during semester.

Lab:

NRES 251 lab exercises found in the lab manual. The lab manual purchased through the book store costs \$13.33.

COURSE REQUIREMENTS:

Lecture requirements: (~480 points, ~75% of grade)

Exams: Four 100 point exams: three in-class 1-hour exams and the final exam (during final exam week)

Quizzes: There will be approximately 8 quizzes (announced) during the semester on D2L that will come from the readings and previous lecture material (10 points each).

Lecture material: Lecture material [not all content is contained in lecture slides!] will be posted on D2L when applicable (There may be some items that are not parts of posted materials! If you miss class please get notes from another student.)

Laboratory requirements: (~150 points, 25% of grade)

There will be a lab midterm (given in lab) worth 25 points. There will be a lab final worth 25 points given together with the lecture final. Lab assignments and quizzes will make up the rest of your grade.

Weekly readings and written assignments : Assignments will include (1) preparatory readings and written assignments that are due during the lab period and (2) lab exercises and assignments that will be due the following lab period or on a specified date.

Lab quizzes: Each lab will have a quiz associated with it, which you should take prior to coming to lab. The content will be based on the lab manual (**READ THE LAB MANUAL FIRST!**)

Policy on lab attendance: Attendance is mandatory. There are no makeup labs. Failure to attend lab will result in grade reduction.

EXTRA HELP:

Extra help is available in the following ways: (1) meeting with the instructor during scheduled office hours or by appointment, (2) asking questions prior to, during or right after class, (3) email exchange with the instructor, and (4) tutoring.

EXCEL SPREADSHEET AND GIS APPLICATIONS:

Some of the laboratory exercises will require EXCEL spreadsheet (graphing and calculations) and GIS map production and data analysis. There will be tutorials provided during the semester for help on these assignments.

EXTRA CREDIT:

You will have the opportunity to obtain extra credit points by hand texturing unknown soils in room 262 (10 samples throughout the semester).

LECTURE SCHEDULE

Spring 2019

WEEK #	LECTURE TOPICS	READINGS
1	Introduction to the course; overview of soils; the soils around us	Brady Chap 1
2	Formation of soil from parent material	Brady Chap 2
3	Soil architecture and physical properties	Brady Chap 4
4	Soil architecture and physical properties EXAM 1 Friday 2/15	Brady Chap 4
5	Soil water: characteristics and behavior	Brady Chap 5
6	Soil and the hydrologic cycle	Brady Chap 6
7	Soil aeration and temperature; soil colloids	Brady Chap 7, 8
8	Soil Acidity: Organisms and ecology of the soil EXAM 2 Wednesday 3/13	Brady Chap 9,10
	Spring Break	
9	Soil organic matter; the nitrogen cycle	Brady Chap 11, 12
10	Soil erosion and its control	Brady Chap 14
11	Hydrologic cycle; chemical and physical properties of water	
12	Precipitation. Water use concepts, water quality EXAM 3 Wednesday 4/19	
13	Watersheds and their characteristics,	
14	Groundwater/ Surface waters interactions	
15	The river channel	