

GREAT PLAINS FIELD PEDOLOGY
NRES 477/877, SOIL 477, AGRO 477/877, GEOG 476/867
Spring Semester 2012

Instructor: Dr. Mark Kuzila
Phone: 472-7537
Email: mkuzila1@unl.edu
Office: 619 Hardin Hall
Office hours: Open door policy. Call to make sure I am in or make an appointment

Classroom: Hardin Hall Rm. 023
Lab: Hardin Hall Rm. 023

I appreciate the assistance of Dr. R.M. Joeckel, Dr. Terry Cooper, Univ of Minn. and Dr. Gene Kelly, Colo. State Univ. for providing resources and experience in order to prepare for this course.

Prerequisites: AGRO/SOIL 153 or permission. Students must be enrolled in both lecture and lab.

Other requirements: Students will be required to engage in walking and moderately strenuous outdoor activity. Some time outside of scheduled class time may be needed to complete field projects. One or two weekend field excursions may be scheduled with four or more weeks of notice.

Primary objectives:

1. Understand and apply general principles of soil morphology and genesis.
2. Relate soil bodies to parent materials and landscape positions in a variety of geographic settings.
3. Interpret soil morphology and properties in terms of soil genesis, landscape history, and current land use.
4. Describe soil morphology and make a basic soil survey.
5. Evaluate soil surveys in terms of land use and other applications.
6. Classify soils using USDA/NRCS Soil Taxonomy and understand the application of that system of classification.

In order to achieve the objectives, the course of study may include the following topics:

Soil-forming factors--

- Predict how the five main soil forming factors influence soil development at any one site.
- Understand potential interactions between/among factors.
- Recognize the importance of hydrology in soil formation.
- Predict other possible soil-forming factors.
- Know, name, and understand the ranges, origins, and relationships of soil parent materials and evaluate the effect of parent materials on soil properties.
- Identify the parent materials at a site and explain what they tell you about the geologic history of that site
- Evaluate geologic processes and synthesize a concept of how these processes affect soil properties.

Physiographic positions and slope components of the landscape--

- Associate parent materials with these landscape features
- Construct and be able to interpret block diagrams that graphically relate physiographic positions, slope components, parent materials, and soils.
- Predict the occurrence of soils with various properties on various parts of the landscape.

Evaluation of soil profiles and soil properties--

- Identify and name textural classes, structural types and grades, horizon boundaries, soil colors, consistence, redoximorphic features, and other factors pertinent to the recognition and description of soil horizons.
- Use pedon (i.e., soil-body) chemical, physical, and mineralogical properties as well as morphology to apply the principles of classification (Soil Taxonomy) to soils.

Recognize, name, and use diagnostic soil properties and other differentiating criteria to place soil in its proper category.
Understand, appreciate, and apply the terminology and principles of Soil Taxonomy.

Field studies of soils--

Evaluate soil properties, determining taxonomic categories, and interpreting soil genesis. Construct a soils map or maps using skills gained in the classroom and laboratory.

Lecture Outline/Schedule (Approximate and subject to change):

Week 1 (Jan. 9, 11):	Review and Overview of Soils and Pedology;
Week 2 (Jan. 16 holiday, 18):	Soils and Landscapes
Week 3 (Jan. 23, 25):	Soil Morphology and Description
Week 4 (Jan 30, Feb. 1):	Soil Processes and Genesis
Week 5 (Feb. 6, 8):	Soil Processes and Genesis <i>Exam 1</i>
Week 6 (Feb. 13, 15):	Soil Processes and Genesis;
Week 7 (Feb. 20, 22):	Soil Mineralogy, Hydrology, and other properties
Week 8 (Feb 27, 29):	Classification and USDA/NRCS Soil Taxonomy
Week 9 (Mar. 5, 7):	USDA/NRCS Soil Taxonomy
Week 10 (Mar. 12, 14):	Soil Mapping and Survey <i>Exam 2</i>
Week 11 (Mar. 19, 21):	<i>Spring Break; no classes</i>
Week 12 (Mar. 26, 28):	Work on “research paper” Due April 2
Week 13 (Apr. 2, 4):	Field work—mapping project
Week 14 (Apr. 9, 11):	Field work—mapping project
Week 15 (Apr. 16, 18):	Field work—mapping project
Week 16 (Apr. 23, 25):	Field work—mapping project
Week 17:	Finals Week; mapping Project Due

Text:

Buol, S.W., et al. 2003. *Soil Genesis and Classification* (Fifth Edition). Iowa State/Blackwell. ISBN 0-8138-2873-2. 494 p.

Essential resources from USDA/NRCS website:

Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys.
<http://soils.usda.gov/technical/classification/taxonomy/>

Keys to Soil Taxonomy Tenth Edition, 2006.
http://soils.usda.gov/technical/classification/tax_keys/keys.pdf

National Soil Survey Handbook, 2005, Title 430-VI.
<http://soils.usda.gov/technical/handbook/>

Soil Survey Manual.
<http://soils.usda.gov/technical/manual/>

Field Book for Describing and Sampling Soils (Version 2.0).
<http://soils.usda.gov/technical/fieldbook/>

Web Soil Survey
<http://websoilsurvey.nrcs.usda.gov/app/>

Some good web references:

Soil Science Society of America Glossary of Soil Science Terms
<https://www.soils.org/sssagloss/?check>

Soil Science Society of America Soil Micromorphology Home Page
<https://www.soils.org/divisions/s09/micromorph/>

Soil Micromorphology Home Page
<http://www2.env.uea.ac.uk/gmmc/soilmicro/iwmmain.html>

The Twelve Soil Orders
<http://soils.ag.uidaho.edu/soilorders/>

NB: In addition to the textbook, there will be assigned readings from journal articles, websites, and other sources. You will be responsible for the contents of all assigned readings.

Evaluation:

Class participation and quizzes	10%
Research paper	20%
Two exams	40%
Lab/field/mapping exercises	30%

A+ = 98+	B+ = 88-90	C+ = 76-80	D+ = 67-70	F = <60
A = 94-98	B = 84-88	C = 74-78	D = 63-67	
A- = 90-94	B- = 80-84	C- = 70-74	D- = 60-63	

Late assignments or rescheduled exams: Prior arrangements must be made with instructor.

Attendance: Regular attendance required; arrive on time, in the classroom and the field.

Preparedness: Read/review assigned material prior to class and be prepared to contribute to any discussion. Anticipate weather conditions and be dressed appropriately for scheduled field work; bring needed tools.