

SYLLABUS

ENR 5260

Soil Landscapes: Morphology, Genesis and Classification
Spring 2022

COURSE OVERVIEW

Instructor

Dr. Brian Slater

Email address: slater.39@osu.edu

Office hours

By appointment: email request

Course meetings

Lecture: Monday and Wednesday	8:00-9:20 AM	370 Kottman Hall
Lab: Monday	2:20-4:20 PM	Agricultural Administration 246

Course description

I. SCOPE

ENR 5260 is a course in *pedology*: the science of soil genesis, classification, and mapping. The emphasis is on concepts of soil variation at the landscape scale, and on evolving methods for understanding, depicting, and modeling soil diversity. Processes resulting in soil variation are critically examined with an emphasis on the development of models for predicting temporal and spatial variation

in soil attributes. The course considers quantitative techniques devised for analyzing the soil continuum and explores major global taxonomic systems for soils.

II. OUTCOMES

In ENR 5260, students will

- a. develop an understanding of the diversity of soils in the landscape.
- b. understand the major genetic processes that generate patterns of soil variation at the landscape scale.
- c. understand the concepts of soil classification.
- d. become familiar with the underlying principles of U.S Soil Taxonomy and the World Reference Base for Soil Classification.
- e. utilize the USDA soil classification system, “Soil Taxonomy” to classify soils to the Soil Family level.
- f. understand concepts of soil variability, soil bodies and units used for depicting soil diversity.
- g. understand the methods used for mapping soils and for analyzing soil landscapes.
- h. develop an understanding of digital soil mapping methods, soil-landscape models, and geospatial tools for efficient soil survey at multiple scales.
- i. gain an appreciation for soil forming processes and the evolution of soils, and to understand methods of modeling soil genesis.
- j. explore the major concepts and models of soil geomorphology.

III. STUDENT LEARNING OBJECTIVES

Students will

- a. recognize the complexity of soil landscapes and their diversity in space and time.
- b. appreciate traditional and new (digital) methods for understanding and depicting soil diversity.
- c. understand of the principles of soil classification.
- d. use the two major global systems – US Soil Taxonomy and the World Reference Base, to classify soils.
- e. learn methods for modeling soil physical, chemical, and biological processes active in soil genesis.
- f. gain experience in digital soil mapping techniques using geographic information systems, remote sensing, and predictive soil-landscape models.

IV. APPROACH

- a. Discussion and practical study of the concepts of soil variability, soil bodies and methods of dividing the soil continuum.
- b. Discussion and application of the soil classification systems developed by the National Cooperative Soil Survey, and the World Reference Base.
- c. Discussion of soil taxa to the Family level, including their morphology, classification, genesis, distribution, and use.
- d. Discussion of soil-forming factors and processes, and quantitative modeling applied to understanding soil evolution.
- e. Field study and description of the geomorphological characteristics of some Ohio soil catenas and an evaluation of these soil landscapes relative to soil-forming factors and processes.

Credit hours

3 credit hours

COURSE MATERIALS AND TECHNOLOGIES

Textbook

The following textbook is highly recommended (not compulsory).

Soils: Genesis and Geomorphology, by R. Schaetzl and M.L. Thompson. Second Edition. Cambridge University Press, 2015

Reference

Soil Genesis and Classification, Fifth Edition, by S.W. Buol, R.J. Southard, R.C. Graham, and P.A. McDaniel. Iowa State Press. 2002.

Soils: A New Global View, by T.R. Paton, G.S. Humphries, and P.B. Mitchell. Yale University Press, 1995.

Additional instructional materials will be posted on Carmen. These additional materials are available in alternate formats upon request.

Course technology

Carmen:

This class will be administrated using **Carmen Canvas**; on the class website you will find the course syllabus, reading list, links to assignments, announcements, and grading points. To gain access to the **Carmen** website, go to <https://carmen.osu.edu>, sign in with your OSU email ID and your password, and navigate to the ENR 5260 website, or visit the Carmen help site: <https://teaching.resources.osu.edu/toolsets/carmencanvas/guides/getting-started-carmen-students>.

You will need to use BuckeyePass multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click "Enter a Passcode" and then click the "Text me new codes" button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application to all of your registered devices for the ability to generate one- time codes in the event that you lose cell, data, or Wi-Fi service.

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help/hours>, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** <http://ocio.osu.edu/selfservice>
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

REQUIRED SOFTWARE

- **Microsoft Office 365:** All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found <https://ocio.osu.edu/kb04733>.

GRADING AND FACULTY RESPONSE

How your grade is calculated

ASSIGNMENT CATEGORY	POINTS
Laboratory Reports	30
Assignments	30
Final Exam	30
Participation, Field Trips	10
Total	100

See course schedule, below, for due dates.

Late assignments

Late submissions will not be accepted. Please refer to Carmen for due dates.

Grading scale

94–100: A
 90–93: A-
 87–89: B+
 84–86: B
 80–83: B-
 77–79: C+
 74–76: C
 70–73: C-
 67–69: D+
 60–66: D
 Below 60: E

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

- **Grading and feedback:** For weekly lab assignments, you can generally expect feedback within **7 days**.
- **E-mail:** I will reply to e-mails within **24 hours on school days**.

PARTICIPATION AND ATTENDANCE

Student participation requirements

Attendance is expected at each class session. Therefore, students are responsible for knowing any changes to the syllabus, for all information presented and discussed in class, for announcements made in class, for materials distributed in class, and for classroom exercises and assignments. Emergency absences will be dealt with on an individual case basis.

Attendance and participation are very important for your success in this course. If you have a situation that might cause you to miss class, discuss it with me *as soon as possible*. The following is a summary of everyone's expected participation:

- **Classroom attendance: 2 LECTURES and 1 LAB PER WEEK**
Complete all required readings and assignments before coming to class. Get the most out of every lecture by following [the study cycle](#).
- **Classroom participation: EVERY CLASS SESSION**
In class, we have frequent opportunities to discuss course topics. Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably.
- **Logging in: AT LEAST ONCE PER WEEK**
Be sure you are logging in to the course in Carmen each week, including weeks with holidays or weeks with minimal course activity. (During most weeks you will probably log in many times.)

Field Trips:

Three Saturday field trips will be taken to describe and classify representative Ohio soil landscapes and to consider the factors responsible for their formation. Each student must attend at least two of the three field trips. However, participation in all three field trips is strongly encouraged. Some exam questions will be drawn from information provided on the field trips.

OTHER COURSE POLICIES

Academic integrity policy

POLICIES FOR THIS COURSE

The university states that it is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee

(Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct: <http://studentconduct.osu.edu/page.asp?id=1>

It is our intent to treat each of you as if you are honest. We assume that whatever you say or do is done in good faith. If we suspect that you have breached that trust, our intention is to report any suspected academic misconduct through appropriate channels to the University Committee on Academic Misconduct. The Ohio State University Student Handbook covers the subject should you not understand what academic misconduct is.

Of course, we will be happy to discuss the topic with you on a no fault basis if we are consulted before the fact. For additional information, see the Code of Student Conduct at the link listed in the previous paragraph.

- **Quizzes and exams:** You must final exam yourself, without any external help or communication.
- **Written assignments:** Your lab reports written assignments, should be your own original work, unless assignment specifies team work. In formal assignments, you should follow **Soil Science Society of America** style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in--but no one else should revise or rewrite your work.

- **Reusing past work:** In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Falsifying research or results:** All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.
- **Collaboration and informal peer-review:** The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or assignment is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.
- **Group projects:** This course may include group projects, which can be stressful for students when it comes to dividing work, taking credit, and receiving grades and feedback. I have attempted to make the guidelines for group work as clear as possible for each activity and assignment, but please let me know if you have any questions.

OHIO STATE'S ACADEMIC INTEGRITY POLICY

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassed or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu. Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit equity.osu.edu or email equity@osu.edu.

Your mental health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and

Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614.292.5766 and 24 hour emergency help is also available through the 24/7 National Prevention Hotline at 1.800.273.TALK or at suicidepreventionlifeline.org.

Diversity

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TD 292-0901; <http://www.ods.ohio-state.edu/>.

Requesting accommodations

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307, 098 Baker Hall, 113 W. 12th Ave.

COURSE SCHEDULE

2 hours of lecture per week and a two hours laboratory/discussion period.

Readings refer to Schaetzl and Thompson, 2nd Edition.

Sessions	Topics	Readings
1	Course objectives, requirements, grading History of the science of Pedology	Chapter 1
1	Concepts of soil and soils, soil units and entities and bodies, pedons and horizons	Chapters 2, 3
3	Soil morphology (color, structure, texture etc), soil constituents, soil components, field soil description	Chapters 2, 3
4	Soil properties: mineralogical, chemical, physical, biological	Chapters 4, 5, 6, 7
8	Soil classification: principles, Soil Taxonomy, World Reference Base, numerical techniques	Chapter 8
2	Soil Genesis –Weathering processes	Chapter 9
2	Genesis: Parent Materials	Chapter 10
1	Genesis: Pedoturbation	Chapter 11
1	Genesis: Pedological Models	Chapter 12
2	Soil Profile Development Processes	Chapter 13
2	Soil Geomorphology: catenas and landscape models	Chapter 14
1	Models and dating for soil chronology and paleopedology	Chapters 15, 16

Laboratory Sessions

Week	Activity	Objective
1	Soil and landscape interpretation Using traditional techniques.	To gain experience in using a pocket stereoscope to identify cultural, landscape, and soil characteristics.
2	Web Soil Survey, Soil Web, and Soil Explorer.	To gain experience in accessing and using online soil information.
3	Soil Texture Determination.	To develop proficiency in the determination of soil texture by “feel”.
4	Soil Color.	To gain experience in the determination of soil color using Munsell Soil color Book, chroma meter, and mobile sensor.
5	Soil Descriptions.	To gain experience in the delineation of soil horizons and in describing soil color, texture, structure, consistence and ped surface features.
6	Landscape Transect.	To gain experience delineating soil boundaries based on evaluations of parent materials, landforms, landscape position, slope, wetness class, erosion class, and soil depth.
7	Mapping Project	Soil mapping in the real world.
8	Urban soils	To gain experience in identifying horizons, layers, and other features unique to

		anthropogenic soils.
9	Soil Classification through Great Group Level.	To gain experience classifying pedons using Soil Taxonomy.
10	Soil Classification through Family Level.	To gain experience classifying pedons using Soil Taxonomy
11	Describe and Classify Soil.	To demonstrate proficiency in the description and classification of soils using the World Reference Base
12	Mapping Project (continued)	Soil mapping in the real world.
13	Use of Soil Survey Information in a GIS Format.	To demonstrate the use of Geographic Information Systems to store, visualize and model soil survey information.