SYLLABUS
ENR 5279

Urban Soils and Ecosystem Services: Assessment and Restoration
Autumn 2023
3 credit hours
In person Lectures and Lab sessions

COURSE OVERVIEW

Instructors

Dr. Nicholas Basta (basta.4@osu.edu)

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Teaching Associate: Margaret Borders (borders.52@osu.edu)

Location

Lecture: Kottman Hall 104

Lab: Kottman Hall 403

Prerequisites

None

Course description

A comprehensive study focused on assessment and restoration of urban soils to provide essential ecosystem services. Urban soil laboratory provides hands-on experience with soil assessment methods and restoration planning.

The course focusses on assessment and restoration of urban soils to provide essential ecosystem services. During the course, practical soil assessment at a local field site includes soil sampling and in-field soil health measurements supplemented by laboratory data collection. Soil health assessment targets environmental contaminants as well as morphological, physical, chemical, and biological soil properties. Ecosystem services are assessed for multiple land uses and interventions. Students develop a comprehensive consultancy report detailing soil health and ecosystem service assessments leading to pragmatic restoration and/or remediation recommendations for the site.

Course learning outcomes

By the end of this course, students should successfully be able to:

- conduct field and laboratory soil assessments of an urban site
- conduct field soil investigations
- collect and preserve field soil / water samples based on statistical spatial sampling
- request soil analyses from external sources
- interpret analytical results,
- assess ecosystem services under a variety of management strategies and
- summarize findings and recommendations in a professional report.

HOW THIS COURSE WORKS

Mode of delivery: This course consists of in person presentation sessions and field sampling and measurement sessions.

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Attendance and participation requirements: The following is a summary of students' expected participation:

- **Participating in lecture and laboratory.**
  - Attendance for lectures is mandatory.
  - Field visits to an urban site will be held during September on specified Tuesday and Thursday afternoons (12**:**45-3:45 PM).
    - Missing 2 of the field visits will result in a 20% penalty to your individual grade for the Site Description and Sampling reports.
  - Attendance for laboratory sessions is mandatory
    - Group members will evaluate each other's contributions during the semester; this will factor into the attendance/participation portion of your grade.
    - Excused absences from lab must be discussed with the instructors to determine if make-up work is required. Instructors must be notified within 1 week of the excused absence.

COURSE MATERIALS AND TECHNOLOGIES

Textbooks

- Class notes and other supplementary materials will be available on the class Carmen page.

Recommended/optional

(available as free PDF on Carmen)

- Moebius-Clune, B.N., D.J. Moebius-Clune, B.K. Gugino, O.J. Idowu, R.R. Schindelbeck, A.J. Ristow, H.M. van Es, J.E. Thies, H.A. Shayler, M.B. McBride, K.S.M Kurtz, D.W. Wolfe, and G.S. Abawi, 2016. Comprehensive Assessment of Soil Health – The Cornell Framework, Edition 3.2, Cornell University, Geneva, NY.

Other fees or requirements

- None

Course technology

Technology support

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

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

Technology skills needed for this course

- Basic computer and web-browsing skills
- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)
- Recording a slide presentation with audio narration (go.osu.edu/video-assignment-guide)
- Recording, editing, and uploading video (go.osu.edu/video-assignment-guide)

Required equipment

- Computer: current Mac (MacOs) or PC (Windows 10) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone
- Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Required software

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Full instructions for downloading and installation can be found at go.osu.edu/office365help.
- QGIS: This is an open-source GIS software. It is not required to have on your own computer, but it is required for the course and would be most convenient to have on your own laptop. Free download is available here: https://www.qgis.org/en/site/forusers/download.html (In the installer, select **QGIS LTR** to install the latest long-term release. This is the most stable version!)

Carmen access

You will need to use BuckeyePass (buckeyepass.osu.edu) 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 (go.osu.edu/add-device).
- 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 (go.osu.edu/install-duo) 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

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

ASSIGNMENT CATEGORY	POINTS (UNDERGRAD)	POINTS (GRAD)
Field Site Description Report	10	10
Sampling Design and Processing Report	5	5
Soil Chemical Properties Report	5	5
Physical Properties Report	5	5
Biological Properties Report	5	5
Report Introduction	5	5
Biophysical Tables and GIS Data Layers	5	5
Ecosystem Services report	10	15
Remediation Plan Report	10	10
Final consultancy report (including executive summary)	25	25
Attendance	15	N/A
Consultancy presentation	N/A	15
Total	**100**	**100**

See course schedule below for due dates.

Descriptions of major course assignments

Reports

The goal is to develop a professional quality consultancy report detailing soil health assessments and soil restoration recommendations for the field site. Individual reports will be prepared, though students will work in pairs. Each student will compose an executive summary to be used with the final report. A format template along with example reports can be found on

the class Carmen page. The format template is for the final report, so it is not expected that all of these sections be completed for the Introductory Report and subsequent reports. More detailed instructions for each report will be provided on Carmen.

REPORT CONTENTS – Shaded areas indicate work completed with partner		
SECTION	***MAX* LENGTH**	**SUBSECTIONS/CONTENTS**
Title Page	1 page	Title, date, author information (name, degree, school, address), client information (name, address, phone number)
Contents	No limit	Report contents including main sections & all subsections with page numbers
List of Tables	No limit	Table numbers, titles, and page numbers
List of Figures	No limit	Figure numbers, captions, and page numbers
Executive Summary	2000 words	- Background Information - Technical Approach - Results & Discussion - Recommendations & Conclusion
Introduction	1000 words	- Background Information (what are urban soils? Why are they important?) - Project Objectives

Technical Approach	8000 words	- Site Description & Characterization (~1800 words), includes site history & soil morphology
		- Sampling Design (~300 words)
		- Soil Processing & Preparation (~200 words)
		- Physical Properties (~1500 words)
		  - Texture, penetrability, bulk density, hydraulic conductivity, aggregate stability, available water content
		- Chemical Properties (~2300 words)
		  - pH, EC, total carbon & total nitrogen, soil organic matter & soil organic carbon, nutrients, contaminants
		- Biological Properties (~1200 words)
		  - Earthworm density, respiration, active carbon, soil protein index
		- Ecosystem Services (~700 words)
		  - Pick 2: urban stormwater retention, carbon storage & sequestration, crop production

Results & Discussion	4000 words	- Physical Properties (~1200 words)
		  - Texture, penetrability, bulk density, hydraulic conductivity, aggregate stability, available water content
		- Chemical Properties (~1300 words)
		  - pH, EC, total carbon & total nitrogen, soil organic matter & soil organic carbon, nutrients, contaminants
		- Biological Properties (~1000 words)
		  - Earthworm density, respiration, active carbon, soil protein index
		- Ecosystem Services (~500 words)
		  - Pick 2: urban stormwater retention, carbon storage & sequestration, crop production

Remediation Plan & Future Use	1500 words	- Assessment Summary (~200 words)
		- Remediation Plan (~800 words)
		  - Remediation Considerations
		  - Specific Recommendations
		- Plan for Future Use (~500 words)
		  - Map of Planned Land Use
		  - Ecosystem & Community Impacts

Conclusion	500 words	Summary of report (who, what, when, where, why, results, recommendations, outcomes)
References	No limit	Contains ***all references*** referred to in-text in SSSA format
Appendices	No limit	Data layers generated for InVEST, biophysical tables, any other maps not included in-text which you wish to include

Academic integrity and collaboration:

Written assignments: Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow the Soil Science Society of America style to cite the ideas and words of your research sources. A copy of the Tri-Societies Style Manual will be posted on Carmen. 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 the instructors.

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 an assignment is not permitted. If you're unsure about a particular situation, please ask ahead of time.

Group projects: This course includes 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.

Late assignments

In this class, work is cumulative. Because of this, it is critically important that work be submitted on time. In general, late submissions will not be accepted. Exceptions due to situations with serious, extenuating circumstances, such as documented medical emergencies, may be granted after discussion with the instructors. Any assignments submitted after their due date will be graded as usual then incur a penalty. Within one week of the due date, students will receive a 10% grade reduction for the assignment. Assignments turned in more than one week after the due date will incur a 20% reduction. Students should submit late work to the assignment's drop- box on Carmen and send an email notifying the instructors that the assignment has been submitted. Please refer to the syllabus and Carmen for due dates.

Grading scale

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70–72.9: C-
67–69.9: D+
60–66.9: D
Below 60: E

Instructor 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 **614-688-4357(HELP)** at any time if you have a technical problem.)

- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days**.
- **Email:** I will reply to emails within **24 hours on days when class is in session at the university**.
- **Discussion board:** I will check and reply to messages in the discussion boards every **24 hours on school days**.

OTHER COURSE POLICIES

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style**: Consultancy reports will model real-world professional scientific work. You should remember to write using good grammar, spelling, and punctuation.
- **Tone and civility**: Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.
- **Citing your sources**: When we have academic discussions, please cite your sources to back up what you say. For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.
- **Backing up your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Academic integrity policy

See **Descriptions of major course assignments**, above, for specific guidelines about collaboration and academic integrity in the context of this online class.

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* (studentconduct.osu.edu), 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:

- Committee on Academic Misconduct web page (go.osu.edu/coam)
- Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)
- Eight Cardinal Rules of Academic Integrity (go.osu.edu/cardinal-rules)

Copyright for instructional materials

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.

Statement on 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 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.

Commitment to a diverse and inclusive learning environment

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.

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. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, on-demand resources are available at go.osu.edu/ccsondemand. 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. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

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 Avenue.

Accessibility of course technology

This course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Canvas accessibility (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- CarmenZoom accessibility (go.osu.edu/zoom-accessibility)
- Collaborative course tools
- QGIS

COURSE SCHEDULE

Refer to the Carmen course for up-to-date assignment due dates. Field lab, analytical lab and discussion sessions have two sections a and b; students will be assigned to lab groups.

See following page for schedule.

SCHEDULE – Gray boxes indicate work submitted with partner				
WEEK	**TUESDAY LAB**	**WEDNESDAY LEC**	**THURSDAY LAB**	**ASSIGNMENT**
1 8/22 - 26	TA introduction; lab safety; report formatting & schedule; MS Word tools	Course introduction; Urban Soils	TA introduction; lab safety; report formatting & schedule; MS Word Tools	Intro survey, due week 2
2 8/29 – 9/2	Intro to GIS, mapping of site, develop sample plan	Soil Sampling and Spatial Variation	Intro to GIS, mapping of site, develop sample plan	Site description report, due week 4
3 9/5 – 9	OPTIONAL IN-LAB WRITING DAY	Soil Morphology	ONSITE: site characterization, develop sample plan	Site description report, due week 4
4 9/12 – 16	ONSITE: field measurements, sampling	Soil Health Concepts and Assessment	ONSITE: field measurements, sampling	Sampling design and processing report, due week 6
5 9/19 – 23	ONSITE: field measurements, sampling	Soil Physical Properties	Lab demos & calculations (physical)	Sampling design and processing report, due week 6
6 9/26 – 30	Lab demos & calculations (physical)	Soil Chemical/Biological Properties 1	Lab demos & calculations (chemical)	Physical properties report, due week 7
7 10/3 – 7	Lab demos & calculations (chemical)	Soil Chemical/Biological Properties 2	Lab demos & calculations (biological)	Chemical properties report, due week 8
8 10/10 - 13	Lab demos & calculations (biological)	Intro to GIS and Mapping	**NO LAB – FALL BREAK**	**Work on report**
9 10/17 – 21	**NO LAB – SOIL JUDGING :)**	Limitations and Recommendations	**NO LAB – SOIL JUDGING :)**	Biological properties report, due week 10
10 10/24 – 28	GIS mapping of field data results	Ecosystem Services 1	GIS mapping of field data results	Introduction, due week 11
11 10/31 – 11/4	LULC classification, creation of biophysical tables	Ecosystem Services 2	LULC classification, creation of biophysical tables	Biophysical tables & GIS data layers, due week 12
12 11/7 – 11	Modeling using INVEST	Final Plan; Management & Mapping	Modeling using INVEST	Ecosystem services report, due week 13
13 11/14 – 18	Presentations or In-lab writing day (mandatory)	Final Report, Executive Summary	Presentations or In-lab writing day (mandatory)	Remediation plan, due week 14
14 11/21 – 25	OPTIONAL IN-LAB WRITING DAY	**NO LEC - THANKSGIVING BREAK**	**NO LAB – THANKSGIVING BREAK**	Final report, due December 7
15 11/28 – 12/2	Presentations or In-lab writing day (mandatory)	Final Report Writing	Presentations or In-lab writing day (mandatory)	Final report, due December 7
16 12/5 - 9	OPTIONAL IN-LAB WRITING DAY	**FINAL PLAN PRESENTATIONS**	NO LAB	Final report, due December 7