

ENVS*4390 - Soil Variability and Land Evaluation

Fall 2024 Course Outline

Section: 01

Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

Calendar Description

This course integrates formal in-field (including a four-day camp/excursions during orientation week) and laboratory training, with classroom discussions of concepts, to guide the gathering and interpreting of soilscape information. The principal focus is on soil, as a spatially- and temporally-variable product and component of ecosystems; special consideration is given to the factors controlling soil processes, from local to global scales. An examination of methods, for describing and quantifying the distribution of soils, includes survey and sensor-based techniques, in conjunction with data trend analysis and modelling.

Prerequisite(s): 10.00 credits including (1 of AGR*2320, ENVS*2060, ENVS*2310, ENVS*2340)

Restriction(s): ENVS*3120, ENVS*4150, ENVS*4250, SOIL*4250

Department(s): School of Environmental Sciences

This course integrates formal in-field (including excursions held over two weekends during the semester, dates to be determined considering weather conditions) and laboratory training, with classroom discussions of concepts, to guide the gathering and interpreting of soilscape information. The principal focus is on soil, as a spatially- and temporally-variable product and component of ecosystems; special consideration is given to the factors controlling soil processes, from local to global scales. An examination of methods, for describing and quantifying the distribution of soils, includes survey and sensor-based techniques, in conjunction with data trend analysis and modelling.

Lecture Schedule

MonWed 1pm-2:20pm in MCKN*310 (9/5 to 12/13)

Lab / Seminar Sections

Day	Time	Location
W	11:30am - 12:20pm	MCKN 310

Instructor Information

Richard Heck

Email: rheck@uoguelph.ca

Textbooks

Group	Title	Author	ISBN
Required	"Characterizing Sites, Soils & Substrates in Ontario Volume 1- Field Description Manual" School of Environmental Sciences, University of Guelph. - copies will be provided for use.	Heck, R.J., Kroetsch,D.J., Lee,H.T., Leadbeater,D.A, Wilson, E.A. & Winstone, B.C. 2017	

Required	"Characterizing Sites, Soils & Substrates in Ontario Volume 2-Compendium of Interpretive Frameworks" - pre-published version - copies will be provided for use.	Heck, R.J., Kroetsch, D.J., Warren, C.J. & Wilson, E.A. 2017
Required	"The System of Soil Classification for Canada" Publication 1646. Canada Department of Agriculture. NRC Research Press, Ottawa - electronic copies available at https://sis.agr.gc.ca/cansis/	Soil Classification Working Group. 1998-revised.
Recommended	"Soil: Morphology, Genesis and Classification" Wiley - will be requested on reserve at Library	Fanning, D.S. & Fanning, M.C.B. 1989.
Recommended	"Digging into Canadian Soils - An Introduction to Soil Science" - available at https://openpress.usask.ca/soilscience/	Krzic, M., Walley, F.L., Diochon, A., Pare, M.C. & Farrell, R.E. 2021
Suggested	"Soils: Genesis and Geomorphology" Cambridge University Press. - will be requested on reserve at Library	chaetzi, R. & Anderson, S. 2005.
Suggested	"Manual of Methods for Soil and Land Evaluation" Science Publishers. - will be requested on reserve at Library	Constantini, E.A.C. 2009.

Learning Resources

Required Resources

Students will need to access online information, and specific apps (non-commercial), for completing assignments. Details will be provided as appropriate for each assignment.

Course Resources

Copies of necessary field manuals, forms and complementary information will be provided to students for the field camp/excursion.

Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor (<https://www.uoguelph.ca/uaic/programcounsellors/>) in your degree program. If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons (<https://www.lib.uoguelph.ca/using-library/spaces/learning-commons/>) including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

Course Learning Outcomes

1. Comprehend the techniques for in-field description of soils and their landscape setting
2. Recognize the major types of landforms and soils in SW Ontario, under both natural and managed ecosystems.
3. Understand principal controls on the distribution of soils and dynamics of the dominant processes occurring in them.
4. Be acquainted with both traditional and evolving approaches gathering, processing and interpreting soilscape information.
5. Use the Canadian System of Soil Classification and recognize the main international systems
6. Apply major national systems/frameworks to evaluate and rate land capability or suitability

Schedule of Topics and Assignments

Day	Date:	Topic	Activities	Due
Mon	9/9	1.1 Soil & the Pedosphere	Lecture	topic on Midterm Exam
Wed	9/11	1.2 Field Characterization of Soilscales	Lecture	topic on Midterm Exam
Mon	9/16	2.1 Controls on Soil Variability - Natural Site Factors	Lecture	topic on Midterm Exam
Wed	9/18	2.2 Controls on Soil Variability - Natural Flux Factors	Lecture	topic on Midterm Exam
Mon	9/23	3.1 Soil Development - Gains & Losses	Lecture	topic on Midterm Exam
Wed	9/25	3.2 Soil Development - Translocations & Transformations	Lecture	topic on Midterm Exam
Mon	9/30	3.2 Soil Development - Morphogenesis	Lecture	topic on Midterm Exam
Wed	10/2	3.3 Soil Development - Soils Through Time	Lecture	topic on Midterm Exam
Mon	10/7	4.1 Soil Classification - General Concepts	Lecture	topic on Midterm Exam
Wed	10/9	4.2 Soil Classification - Canadian Orders & Great Groups	Lecture	topic on Midterm Exam
Mon	10/14	Thanksgiving Holiday		
Wed	10/16	4.3 Soil Classification - Canadian Subgroups, Families & Series	Lecture	topic on Midterm Exam
Mon	10/21	4.4 Soil Classification - Canadian Soils Illustrated	On-line Material	topic on Midterm Exam
Wed	10/23	Midterm Examination (Units 1, 2, 3 & 4)	Lecture	due at end of period
Mon	10/28	5.1 Land Evaluation - Canada Land Inventory	Lecture	topic on Final Exam
Wed	10/30	5.2 Land Evaluation - Land Suitability Rating Systems	Lecture	topic on Final Exam
Mon	11/4	5.3 Land Evaluation - Ecological Land Classification	Lecture	topic on Final Exam
Wed	11/6	6.1 Soilscape Inventory - Conventional Soil Surveys	Lecture	topic on Final Exam
Mon	11/11	6.2 Soil Inventory - Remote Sensing Technologies & Techniques	Lecture	topic on Final Exam
Wed	11/13	6.3 Soil Inventory - Proximal Sensing Technologies & Techniques	Lecture	topic on Final Exam
Mon	11/18	6.4 Soil Inventory - Landform Quantification	Lecture	topic on Final Exam
Wed	11/20	7.1 Mapping Soils - Legacy Mapping Concepts & Techniques	Lecture	topic on Final Exam
Mon	11/25	8.1 The Future of Our Soils - Human Impacts on Soil Systems	Lecture	topic on Final Exam
Wed	11/27	7.2 Mapping Soils - Predictive Digital Soil Mapping	Lecture	topic on Final Exam
Mon	12/2	8.2 The Future of Our Soils - Tracking Soil Quality	Lecture	ACTUALLY Friday, November 29th topic on Final Exam
Wed	12/4	No Class		
Mon	12/9	No Class		
Wed	12/11	No Class		

Lab / Seminar Schedule

Assignment #1 - Hand Texturing of Soil

Training materials to be provided (laboratory TBD) for independent practicing. **Opens:** Monday, September 9th. **Closes:** Friday, September 13th. Hours of availability TBD

Assignment #2 - Geology of Ontario

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, September 16th. **Closes:** Thursday, September 19th.

Assignment #3 - Ecology of Ontario

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, September 23rd. **Closes:** Thursday, September 26th.

Assignment #4 - Geomorphology of Ontario

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, September 30th. **Closes:** Thursday, October 3rd.

Assignment #5 - Land Capability & Suitability in Ontario

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, November 4th. **Closes:** Thursday, November 7th.

Assignment #6 - Remote Sensing Imagery of Ontario

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, November 11th. **Closes:** Thursday, November 14th.

Assignment #7 - Landform Segmentation & Analysis

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, November 18th. **Closes:** Thursday, November 21st.

Assignment #8 - Legacy Soil Surveys of Ontario

Assignment to be completed through the Quizzes tool on the CourseLink webpage using internet-based information. **Opens:** Monday, November 25th. **Closes:** Thursday, November 28th.

Assessment Breakdown

Description	Weighting (%)	Due Date
Field Technologies & Techniques Training Camp	8	Sep 14
Ontario Soilscales Excursion Day #1	6	Nov 09
Ontario Soilscales Excursion Day #2	6	Nov 10
Assignment #1 - Hand Texturing of Soils	2.5	Sep 13
Assignment #2 - Geology of Ontario	2.5	Sep 19
Assignment #3 - Ecology of Ontario	2.5	Sep 26
Assignment #4 - Geomorphology of Ontario	2.5	Oct 03
Assignment #5 - Land Capability & Suitability in Ontario	2.5	Nov 07
Assignment #6 - Remote Sensing Imagery of Ontario	2.5	Nov 14
Assignment #7 - Landform Segmentation & Analysis	2.5	Nov 21
Assignment #8 - Legacy Soil Surveys of Ontario	2.5	Nov 28
Midterm Examination (Units 1, 2, 3 & 4)	30	Oct 23 (in-class)
Final Examination (Units 5, 6, 7 & 8)	30	Dec TBD

Assessment Details

Participation

Field Camp & Excursions - field forms & notes

20

Course Learning Outcomes Assessed: 1, 2, 3, 4, 5, 6

Assignment

Assignments

20

Course Learning Outcomes Assessed: 2, 3, 4, 5, 6

Exam

Midterm Examination

30

Course Learning Outcomes Assessed: 3, 4

Final Examination

30

Course Learning Outcomes Assessed: 4, 5, 6

Final Exam

Date: Dec 13

Time: Fri 8:30am-10:30am

Location: TBA *Please see Web Advisor closer to the date of scheduled final for location.*

To understand rules and regulations regarding Examinations students are encouraged to read Student's Responsibilities (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/examinations/>)

If the student is unable to meet the final exam requirements due to medical, psychological or compassionate circumstances they are encouraged to review Student's Responsibilities in the Academic Consideration, Appeals and Petitions (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>) section of the Academic Calendar.

Last Day to Drop Course

The final day to drop Fall 2024 courses without academic penalty is the last day of classes: November 29

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

Field Forms & Notes are to be submitted in paper format. Assignments are administered through the Quizzes tool in CourseLink.

Late Assignment

Items submitted after the established deadline, but within one week of the established deadline will normally be assessed a penalty of 10 percentiles. Items not submitted, or submitted more than once week after the established deadline, will be normally be assessed a score of zero.

Standard Statements for Undergraduate Courses

Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>) is outlined in the Undergraduate Calendar.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to make a booking at least 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas/>)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/>).

Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all undergraduate students except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in the Undergraduate Calendar - Dropping Courses (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>).

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigators/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (<https://wellness.uoguelph.ca/shine-this-year/>). The Student Wellness team are here to help and welcome the opportunity to connect with you.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

Recording of Materials

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>)