

ENVS*2060 - Soil Science

Fall 2023 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 is an introduction to the principles of soil science - the origin of soils, their classification and interpretation in natural and modified environments. Soil will be studied as a product of the natural environment, with a focus on formation processes and changes which occur when it is modified through use. A variety of uses including agriculture, forestry, recreation, and urban development will be considered.

Restriction(s): AGR*2320

Department(s): School of Environmental Sciences

Course Description

The course will provide an introduction to the nature and properties of soil, and use this information to understand management practices that will sustain the productivity of these resources and enhance the quality of the ecosystems of which they are a part. The course will be presented in a lecture-lab-tutorial manner, with 3 lectures and a 2-hour lab-tutorial per week. The laboratory will provide an opportunity to reinforce concepts discussed in the lecture through observations, selected exercises and assigned reading.

Lecture Schedule

TuTh 5:30pm-6:50pm in THRN*1200 (9/7 to 12/15)

Lab Sections

Day	Time	Location	Sections
Thursday	1:30-3:20	Alex 030	01
Wednesday	12:30-2:20	Alex 030	02
Wednesday	2:30-4:20	Alex 030	03
Tuesday	8:30-10:20	Alex 030	04
Thursday	8:30-10:20	Alex 030	05

Instructor Information

John Lauzon
Email: lauzonj@uoguelph.ca

Anshu Beri
Teaching Assistant
Email: beria@uoguelph.ca

Samantha Earl-Goulet
Teaching Assistant
Email: searlgou@uoguelph.ca

Noah Potter
Teaching Assistant
Email: npotte03@uoguelph.ca

Kajal Samyal
Teaching Assistant
Email: ksamyal@uoguelph.ca

Mary Thornbush
Teaching Assistant
Email: mthornbu@uoguelph.ca

Textbooks

Group	Title	Author	ISBN
Recommended	Digging into Canadian Soils. An Introduction to Soil Science	Canadian Soil Science Society	https://openpress.usask.ca/soilscience/
Recommended	The Nature and Properties of Soils 15th edition	R.R Weil and N.C. Brady	13:978-0-13-325448-8
Recommended	The Canadian System of Soil Classification 3rd edition	Agriculture Canada	http://sis.agr.gc.ca/cansis/publications/manuals/1998-cssc-ed3/cssc3_manual.pdf

Learning Resources

Required Resources

Please check Course link (Course link (Website) (<https://courselink.uoguelph.ca/>) regularly for course slide sets, lab assignments and other useful materials and information.

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.

Library Course Reserve (Ares)

For this course, you will be required to access course reserve materials through the University of Guelph McLaughlin Library. To access these items, select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve.

For further instructions on accessing reserve resources, visit How to Get Course Reserve Materials (<https://lib.uoguelph.ca/find/course-reserves-ares/how-get-course-reserve-material/>).

If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:

Tel: 519-824-4120 ext. 53621 | Email: libres2@uoguelph.ca | Location: McLaughlin Library, First Floor, University of Guelph

Course Learning Outcomes

1. An introductory understand of how soils develop
2. Have an introductory understanding of the geology of Southern Ontario important for soil formation
3. Be able to describe a soil profile
4. An introductory understanding of the Canadian system of soil classification focusing on the soil orders
5. An introductory understanding of the physical nature of soil

6. An introductory understanding of water behavior, availability and budgeting in soils
7. An introductory understanding of soil chemical properties (clay mineralogy, Cation exchange and pH)
8. An introductory understanding of the nature of soil organic matter and soil organisms
9. An introductory understanding of plant macronutrient cycling in soils
10. An introductory understanding of resource use and management
11. Improved ability to apply mathematical skills to quantify soil processes and/or define management.
12. Improved written communication skills

Lab / Seminar Schedule

1. Soil Formation and Classification
2. Soil Physical Properties
3. Water in Soils
4. Chemical and Mineralogical Characteristics of Soils
5. Plant Nutrients

Not all weeks will be used for the labs. The individual labs will be completed after we have covered the information needed in class. When a lab is required, the assignment sheet and the week the lab will occur in will be posted on course link

Teaching and Learning Activities

Lecture Schedule

The following is a list of lecture topics and recommended corresponding sections in the textbooks. Note that exams will focus on the material covered in lecture, which is not always fully covered in the textbooks.

Unit 1 Introduction:

- Why study soils
- Course outline

Unit 2: Soil Characteristics. References: Weil and Brady Sections 4 – 4.4 , Digging into Canadian Soils Pages 3-4, 278-280

- Composition of soils
- Soil description
- Soils in the landscape

Unit 3: Soil Developments and Classification. References: **Do not use Weil and Brady for this section**, Digging into Canadian Soils chapter 2 and 8, The Canadian system of Soil Classification

- Soil development (5 soil forming factors)
- Principles of soil classification
- The Canadian system of soil classification

Unit 4: Soil Physical Properties. References: Weil and Brady pages 130-155, 161-175, Digging into Canadian Soils Pages 100-114, 116-118

- Texture
- Structure (bulk density, influence of management)
- Implications of physical properties on land use/management options

Unit 5: Soil Water. References: Weil and Brady Sections 5.0-5.9, 6.0-6.3, 6.6-6.7,6.9, Digging into Canadian Soils Pages 114-116,118-132

- Characteristics of water
- Water potential
- Water content
- Water release curve
- hydraulic conductivity
- Water available to plants

- Water budgets
- Implications of water behaviour in soils on land use/management options

Unit 6: Chemical and Mineralogical Characteristics of Soils. References: Weil and Brady Sections 8.1-8.3, 8.6, 8.8,8.9, all of 9 , Digging into Canadian Soils Pages 151-163

- Clay minerals
- Cation exchange capacity
- Soil pH and pH management

Unit 7: Soil Organic Matter. References: Weil and Brady Sections 11.0-11.6, 11.8-11.10, 12.0-12.3, 12.7, Digging into Canadian Soils pages 66 -81, 89-94, 196-209

- Nature of soil organic matter
- Factors influencing the amount of soil organic matter
- Overview of soil organisms

Unit 8: Plant Nutrients. References: Weil and Brady Sections 13.0-13.5, all of 14 , Digging into Canadian Soils all of section 7.

- Macro versus micro nutrients
- Nitrogen cycling in soil
- Phosphorous cycling in soil
- Potassium cycling in soil
- Plant nutrient deficiency symptoms
- Estimating plant/crop requirements
- Implications of nutrient cycling on land use/management options

Unit 9: Resource Use. References: Weil and Brady Sections 13.0-13.5, all of 14 , Digging into Canadian Soils all of section 7.

- Resource concepts
- Soil degradation
- Canada land inventory
- Land use

Assessment Breakdown

Description	Weighting (%)	Due Date
Midterm Exam	25%	Oct. 26 in class
Lab assignments	40%	Due one week after your lab describing it
Final Exam	35%	Dec 4

Final Exam

Date: Dec 4

Time: Mon 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 deadline to drop Fall 2023 courses without academic penalty is the last day of classes: December 01

After this deadline, 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

Lab assignments are due one week after your lab that described the assignment. So if your lab is on Monday, it is due the following Monday. Assignments will be submitted to the appropriate Course link drop box

Late Assignment

Lab assignments will be penalized 15% per week late without an adequate reason. Any assignments not received by the last class day will be assessed a value 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/>)