

# ENVS\*4160 - Soil and Nutrient Management

## 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 consists of the same lectures and seminars as (ENVS\*4090 or SOIL\*4090), but with an additional laboratory. The laboratory portion will focus on the regulatory requirements as stated under the Nutrient Management Act, 2001. Students will discuss nutrient management issues and gain practical experience using the NMAN software program.

**Prerequisite(s):** 1 of AGR\*2301/2, AGR\*2320, ENVS\*2060, SOIL\*2010

**Restriction(s):** ENVM\*1070, (ENVS\*4090 or SOIL\*4090)

**Department(s):** School of Environmental Sciences

## Course Description

Soil management / nutrient management are lecture-tutorial based courses on the practical aspects of soil management for crop production as they relate to the physical, chemical and biological properties of soils. The major emphasis is placed on soil fertility as related to field soil properties, fertilizer, lime and manure use, as well as soil and plant testing for mineral nutrients. Due regard is given to both economic and environmental aspects of soil management practices. The laboratory portion (Soil Nutrient Management course only) will focus on the regulatory requirements as stated under the Nutrient Management Act, 2001. Students will discuss nutrient management issues and gain practical experience developing a nutrient management plan. Although not part of the course requirements, students are required to write an exam scheduled with the Ontario Ministry of Agriculture Food and Rural Affairs for certification to develop nutrient management strategies/plans for farms under the Nutrient Management Act, 2001.

**Please note that although ENVS\*4090 and ENVS\*4160 use the same lectures and seminars they are different courses, as such changing from one to the other requires adding one and dropping the other like any other course change.**

## Lecture Schedule

MonWedFri 10:30am-11:20am in MCKN\*121 (9/7 to 12/15)

## Lab / Seminar Sections

Please note that not all weeks are required for the seminars in the second table. In the weeks a seminar is needed the assignment with a date will be posted in courselink.

Day	Time	Location
Friday	2:30 - 5:20	GRHM 2302

Day	Time	Location	Sections
Wednesday	1:30 - 2:20	MACS 129	01
Wednesday	11:30 - 12:20	MACS 129	02

Please note that not all weeks are required for the seminars in the second table. In the weeks a seminar is needed the assignment with a date will be posted in courselink.

Day	Time	Location
Friday	2:30 - 5:20	GRHM 2302

Day	Time	Location	Sections
Wednesday	1:30 - 2:20	MACS 129	01
Wednesday	11:30 - 12:20	MACS 129	02

## Instructor Information

John Lauzon  
 Email: lauzonj@uoguelph.ca

## Additional Support

**Dale McComb** (*Lab instructor for ENVS\*4160*)

Email: dale.mccomb@ontario.ca

## Textbooks

Group	Title	Author	ISBN
Recommended	Soil fertility handbook, 3rd ed	OMAFRA, 2018	available online as a PDF PDF <a href="http://omafra.gov.on.ca/english/crops/pub611/pub611.pdf">http://omafra.gov.on.ca/english/crops/pub611/pub611.pdf</a>
Suggested	Soil Fertility and Fertilizers 8th ed.	Havlin, J.L., J.D. Beaton, S.L. Tisdale, and W.L. Nelson	10: 0-13-503373-X

## Learning Resources

### Required Resources

*Note that course link will be used to indicate when a seminar is required by posting the seminar assignment with the date the seminar describing it will occur:* Course link (Website) (<https://courselink.uoguelph.ca/>)

### Additional reading

*These are additional resources that some may choose to review.*

Barber, S.A., 1995, Soil Nutrient Bioavailability : a Mechanistic Approach. 2nd ed. Wiley, Toronto.

Brady, N.C. and R.R.Weil. 2017. The Nature and Properties of Soils. 15th ed. (any edition back to 12th ed are OK) Prentice-Hall of Canada, Toronto.

Follett, R.H., L.S. Murphy and R.L. Donahue. 1981. Fertilizers and Soil Amendments. Prentice-Hall of Canada Ltd., Toronto.

OMAFRA, 2006. Agronomy guide for field crops. Publication 811 Queen's printer. Toronto, Ontario  
 Paul, E.A. and F.E. Clark. 1989. Soil Microbiology and Biochemistry. Academic Press, inc. Toronto.

### 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 Level Learning Outcomes

1. Understand and describe how plant nutrients reach the root surface
2. Understand and describe biological, chemical and physical processes involved in the cycling of soil organic matter.
3. Understand and describe the biological, chemical and physical processes involved in the cycling in soil systems, plant availability and loss of most required plant nutrients
4. Describe the fates and potential impacts of plant nutrients that leave the soil root zone
5. Understand the nature and management of animal manures
6. Understand the behavior and management of fertilizers in the soil/plant environment
7. Understand the impacts pH on the soil/plant environment
8. Understand the nature and management of water in agricultural systems
9. Apply the knowledge in outcomes 1 – 8 to develop soil management options which minimize unwanted environmental impacts and enhance the conditions for plant growth
10. Understand and implement regulations and protocols within the nutrient management act
11. Work effectively in groups
12. Improved written communication skills
13. Improved ability to apply mathematical skills to quantify soil processes and/or soil management.
14. Relate scientific principals covered in class to economics and management

## Lecture Schedule. (note exact dates are likely to change. Check course link for updates)

Day:	Date:	Topic	Activities	Due:
Fri	9/8	Introduction and review	Describing the course and the differences between ENVS*4090 and ENVS*4160	
Mon	9/11	Continued Soil review		
Wed	9/13	Roots and Nutrient Movement in the Soil to the Root	Suggested Reading: Barber pp. 90 - 106, Pub. 611 pp 41 - 51	
Fri	9/15	Roots and nutrient Movement Continued		
Mon	9/18	Soil Organic Matter	Suggested reading: Brady chapter 12, Paul chapter 7	
Wed	9/20	Soil Organic Matter		
Fri	9/22	Soil Organic Matter		
Mon	9/25	Soil Organic Matter		
Wed	9/27	Soil Nitrogen	Suggested reading: Havlin chapter 4, Follett chapter 2, Pub 611 pp 51- 56, 118-124	
Fri	9/29	Soil Nitrogen		
Mon	10/2	Soil Nitrogen		
Wed	10/4	Soil Nitrogen		
Fri	10/6	Soil Nitrogen		
Mon	10/9	Holiday (No class)		
Wed	10/11	Soil Phosphorus	Suggested reading: Havlin chapter 5, Follett chapter 3, Pub 611 pp 56 – 60	
Fri	10/13	Soil Phosphorus		
Mon	10/16	Soil Phosphorus		
Wed	10/18	Soil Potassium	Havlin chapter 6, Follett chapter. 4, Pub 611 pp 60 – 63	
Fri	10/20	Soil Calcium, Magnesium, and Sulphur	Suggested reading: Havlin chapter 7, Follett chapter 5, Pub 611 pp 64 – 70	
Mon	10/23	Soil Calcium, Magnesium, and Sulphur		
Wed	10/25	midterm Exam (in Class)		
Fri	10/27	Soil Calcium, Magnesium, and Sulphur		

Mon	10/30	Soil Micronutrients	Suggested reading: Havlin chapter 8, Follett chapter 6, Pub 611 pp 70 – 79
Wed	11/1	Soil Micronutrients	
Fri	11/3	Soil Micronutrients	
Mon	11/6	Soil pH and Liming (p. 4)	Suggested Reading: Havlin chapter 3, Follett chapter 8, Pub 611 pp 81 – 96
Wed	11/8	Soil pH and Liming (p. 4)	
Fri	11/10	Manure Management	Suggested Reading: Follett chapter 10, Pub 611 pp 97 – 118
Mon	11/13	Manure Management	
Wed	11/15	Manure Management	
Fri	11/17	Manure Management	
Mon	11/20	Nutrient Placement	Suggested reading: Havlin chapter 10, Pub 611 pp 169 – 178
Wed	11/22	Nutrient Placement	
Fri	11/24	Soil and Plant Testing	Suggested reading: Havlin chapter 9 Pub 611 pp 1- 40, and 125- 148
Mon	11/27	Soil and Plant Testing	
Wed	11/29	Variable Fertility	
Fri	12/1	Variable Fertility	

## Lab / Seminar Schedule

1. Land Capability
2. Soil Organic Matter Dynamics
3. Nitrogen Cycling and Management
4. Irrigation
5. Soil Drainage
6. Soil pH and Liming
7. Manure Management

The exact dates that we will meet for the seminar assignments will be indicated in Course Link

## Assessment Breakdown

{NOTE: instructor can add another row by hitting "TAB" button when they are at the end of the row}

Description	Weighting (%)	Due Date
Midterm Exam	20%	Oct 25, in class
Seminar assignments	25%	One week after assigning them
Lab	25%	due dates provided in labs
Final Exam	30%	Dec 11

## Final Exam

Date: Dec 11

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

Assignments are submitted to the appropriate course link drop box

### Late Assignment

All seminar assignments are due one week after the seminar that describes them. Assignments that are late without an acceptable explanation will receive a 10 % grade penalty per week. **All assignments must be handed in by the final class day or a mark of zero will be assigned.**

## 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/>)