

**ENVS\*4090 Soil Management**

Fall 2018

Section(s): C01

School of Environmental Sciences Credit Weight: 0.50

Version 1.00 - September 04, 2018

# Course Details

## Calendar Description

A lecture-tutorial course on the practical aspects of soil management for crop production as they relate to the physical, chemical and biological properties of soils; major emphasis is placed on soil fertility as related to field soil properties and fertilizer, lime and manure use, soil and plant testing for mineral nutrients. The beneficial aspects of drainage, irrigation, erosion control and related tillage practices on soil fertility are also presented. Due regard is given to both economic and environmental aspects of soil management practices.

### Pre-Requisite(s): Equate(s):

* 1. **Course Description**

1 of AGR\*2301/2, AGR\*2320, ENVS\*2060, SOIL\*2010 SOIL\*4090

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 using the NMAN software program. 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.

## Timetable

**Lectures:** MacKinnon room 115, Tuesday and Thursday 1:00 – 2:20

**Seminars:** (ENVS\*4090 and ENVS\*4160):

Macdonald Institute room 037, Monday 12:30 – 1:20

MacKinnon 308 Macdonald Institute room 017, Wednesday 1:30 – 2:20

## Final Exam

Tuesday December 4 at 8:30 - 10:20 Room TBA

# Instructional Support

## Instructor(s)

### John Lauzon Email: Telephone: Office:

lauzonj@uoguelph.ca

+1-519-824-4120 x52459

ALEX 219

## Teaching Assistant(s)

### Teaching Assistant: Email:

**Office Hours:**

**Teaching Assistant: Email:**

**Office Hours:**

Pedro Ferrari Machado pferrari@uoguelph.ca ALEX 109. By appointment

Lance Ouellette louellet@uoguelph.ca ALEX 222. By appointment

## Lab instructor for ENVS\*4160

Instructor Name: Dale McComb

Instructor Email: dale.mccomb@ontario.ca Office location and office hours: By appointment

# Learning Resources

## Recommended Resource(s)

### Soil fertility handbook (Textbook)

OMAFRA, 2006. Soil fertility handbook, Publication 611. Available online as a PDF <http://www.omafra.gov.on.ca/english/crops/pub611/p611order.htm>

### Soil Fertility and Fertilizers (Textbook)

Havlin, J.L., J.D. Beaton, S.L. Tisdale, and W.L. Nelson. Soil Fertility and Fertilizers. 8th edition, 2014, (note the 6th or 7th ed. are also OK). Prentice-Hall inc. New Jersey.

## Additional Reading

* + - 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 811Queen’s printer. Toronto, Ontario
		- Paul, E.A. and F.E. Clark. 1989. Soil Microbiology and Biochemistry. Academic Press, inc. Toronto.

## 3.2 Other Resources

The lecture slide sets and seminar assignments and resources will be available on courselink.

# Learning Outcomes

Upon completion of ENVS\*4090/4160 students should be able to:

## Course Learning Outcomes

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

* + 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 (ENVS\*4160 only)

# Teaching and Learning Activities

## Lecture

### Topic(s): Reference(s):

**Topic(s): Reference(s):**

**Topic(s): Reference(s):**

**Topic(s): Reference(s):**

**Topic(s): Reference(s):**

**Topic(s):**

Roots and Nutrient Movement in the Soil to the Root Barber pp. 90 - 106, Pub. 611 pp 41 – 51

Soil Organic Matter

Brady chapter 12, Paul chapter 7

Soil Nitrogen

Havlin chapter 4, Follett chapter 2, Pub 611 pp 51- 56, 118-124

Soil Phosphorus

Havlin chapter 5, Follett chapter 3, Pub 611 pp 56 – 60

Soil Pottasium

Havlin chapter 6, Follett chapter. 4, Pub 611 pp 60 – 63

Soil Calcium, Magnesium and Sulphur

Suggested Readings: Havlin chapter 7, Follett chapter 5, Pub 611 pp 64 – 70

### Topic(s): Reference(s):

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* 1. **Seminar**

**Topic(s):**

**Topic(s):**

Soil Micronutrients

Havlin chapter 8, Follett chapter 6, Pub 611 pp 70 – 79

Acidity and Liming

Havlin chapter 3, Follett chapter 8, Pub 611 pp 81 – 96

Soil/Plant Testing

Havlin chapter 9 Pub 611 pp 1- 40, and 125- 148

Manure

Follett chapter 10, Pub 611 pp 97 – 118

Fertilizer Placement

Havlin chapter 10, Pub 611 pp 169 – 178 Variable Fertility

Soil Degradation Brady chapter 17

Land Capability

O.M. dynamics

### Topic(s):

Nitrogen Management

### Topic(s):

**Topic(s):**

Irrigation Drainage

### Topic(s):

Liming and soil pH

### Topic(s):

* 1. **Lab**

**Topic(s):**

Manure Management

ENVS\*4160 Lab

The lab portion of ENVS\*4160 will focus on the Ontario nutrient management act. Specific information will be given as a separate handout.

## Seminar schedule

### Note that not all semenar sessions are required. Please see courselink for seminar assignments and seminare dates.

* 1. **Access to Readings:**

The readings can be found on reserve at the library. Complete bibliographic information is given in the section on course material.

# Assessments

## Marking Schemes & Distributions

|  |  |
| --- | --- |
| Name | Scheme A (%) |
| Midterm Exam | 25 |
| Seminar Assignments | 35 |
| Final Exam | 40 |
| Total | 100 |

* 1. **Assessment Details**

### Midterm Exam (25%)

**Date:** Thu, Oct 25, In Class

### Seminar assignments (35%)

Due Date: 1 week after assigning

### Final Exam (40%)

**Date:** Tue, Dec 4, 8:30 AM - 10:30 AM

Learning Outcomes Assessed: 1-9 Focus on 4-9

# Course Statements

## Grading Policies:

All seminar assignments are due one week after assigning 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.**

## Course Policy on Group Work:

The seminar assignments will be completed and submitted in groups. It is the responsibility of the group to ensure all members are contributing.

## Course Policy regarding use of electronic devices and recording of lectures:

*Default text: Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.*

# University Statements

## Email Communication

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

## 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. The regulations and procedures for [Academic Consideration](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml) are detailed in the Undergraduate Calendar.

## Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two- semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml) are available in the Undergraduate Calendar.

## 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.

## 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 book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

## Academic Misconduct

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://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml) is detailed in the Undergraduate Calendar.

## Recording of Materials

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

## Resources

The [Academic Calendars](https://www.uoguelph.ca/registrar/calendars/) are the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.