# Course Outline Soil Management/ Soil Nutrient Management:

# Fall 2016

## General Information

**Course Title:**  Soil Management/ Soil Nutrient Management

**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 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.

**Credit Weight:** 0.50

**Academic Department (or campus):** School of Environmental Science

**Campus:** Guelph

**Semester Offering:** Fall

**Class Schedule and Location:**

Lectures (ENVS\*4090 and ENVS\*4160)

Crop Science room 117, Tuesday and Thursday 1:00 – 2:20

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

MacKinnon room 314, Wednesday 8:30 – 9:20

MacKinnon 311, Wednesday 1:30 – 2:20

Laboratories (ENVS\*4160 only)

Graham Hall room 2302, Friday 2:30 – 5:20

## Instructor Information

Instructor Name: John Lauzon

Instructor Email: lauzonj@uoguelph.ca

Office location and office hours: ALEX 219 By appointment

## Lab instructor for ENVS\*4160

Instructor Name: Dale McComb

Instructor Email: dale.mccomb@ontario.ca

Office location and office hours: By appointment

## GTA Information

GTA Name: Pedro Ferrari MacHado

GTA Email: pferrari@uoguelph.ca

GTA office location and office hours: ALEX 109, By appointment

## Course Content

### Specific Learning Outcomes:

Upon completion of ENVS\*4090/4160 students 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)

### Lecture Content:

Approximate Schedule of Lectures

|  |  |
| --- | --- |
| Topic | Suggested Readings\* |
| 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 Potassium | Havlin chapter 6, Follett chapter. 4, Pub 611 pp 60 – 63 |
| Soil Calcium, Magnesium and Sulphur | Havlin chapter 7, Follett chapter 5, Pub 611 pp 64 – 70 |
| Soil Micronutrients | Havlin chapter 8, Follett chapter 6, Pub 611 pp 70 – 79 |
| Midterm Exam |  |
| 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 |

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

### Labs:

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

### Seminars:

Tentative seminar schedule

|  |  |
| --- | --- |
| Tentative date | Topic |
| Sept 14 | Land Capability |
| Sept 28 | O.M. dynamics |
| Oct 12 | N Management |
| Oct 19 | Irrigation |
| Oct 26 | Drainage |
| Nov 9 | Liming/ pH |
| Nov 23 | Manure management  |

### Course Assignments and Tests:

| Assignment or Test | Due Date | Contribution to Final Mark (%)EVNS\*4090 | Contribution to Final Mark (%)EVNS\*4090 | Learning Outcomes Assessed |
| --- | --- | --- | --- | --- |
| Midterm exam | Oct 25 | 25 | 20 | 1- 3 |
| Seminar assignments  | 1 week after assigning | 35 | 25 | 1 – 9 |
| Labs 4160 only | TBA\* | --- | 25 | 10 |
| Final exam | Dec 16 | 40 | 30 | 1 – 9 focus on 4 - 9 |

\* **T**o **B**e **A**nnounced

### Final examination date and time: Tuesday December 16 at 2:30 – 4:30

### Final exam weighting: 40 % for ENVS\*4090 and 30 % for ENVS\*4160

## Course Resources

### Recommended Texts:

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

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.

### Other Resources:

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

## Course Policies

### 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 Policies

### Academic Consideration:

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml).

### 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.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml).

### Accessibility:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the [Student Accessibility Services website (http://www.uoguelph.ca/csd/)](http://www.uoguelph.ca/csd/).

### Course Evaluation Information:

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](https://courseeval.uoguelph.ca/) **for more information.**

### Drop period:

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III (Schedule of Dates) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII (Undergraduate Degree Regulations and Procedures) of the Undergraduate Calendar](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml).