The University of Manitoba
Faculty of Agricultural and Food Sciences
Department of Soil Science

COURSE TITLE Soil Productivity and Land Use

Department:	Soil Science	**Course Number:**	SOIL 0420
Academic Session:	Fall 2020	**Credit Hours:**	4

Class Time and Location: Lectures and labs will be offered online and synchronously, via Webex within UM Learn. In other words, students are expected to participate in online lectures on Tuesdays and Thursdays 10:00-11:15 and their scheduled lab on Tuesdays 11:30-12:45, Thursdays 11:30-12:45, or Thursdays 1:00-2:15. This format will facilitate a sustainable pace for learning, plus "live" discussion of students' questions and assisted group work during the lab periods.

Course Instructor: **Marla Riekman**
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Students with questions or suggestions are strongly encouraged to ask questions during or immediately after the regular lecture periods and lab periods. Due to other time commitments that are unpredictable, please call or email the instructor to set up mutually suitable appointment.

Notices and Course Materials posted on UMLearn: Students are also expected to regularly access the notices and class material posted on the UM Learn website for this course. Summary lecture notes and reference material for the laboratory assignments and term project will be posted on UM Learn. In addition, recordings for online lectures will be available via Webex on UM Learn for streaming for a minimum of one week and a maximum of two weeks after the lecture is given. For more information about accessing UM Learn, go to: https://centre.cc.umanitoba.ca/technology/umlearn/

Class Communication: Students are expected to establish and regularly access their official University email account, which is the email address that will be used for communication about this course. For full details of the Electronic Communication with Students please visit: http://umanitoba.ca/registrar/email_policy/.

Expectation for Student Participation in online lectures, labs, and exams: Students are expected to utilize reliable internet with sufficient capacity to handle online lectures, labs, and exams. Please note that in cases where internet access fails, students will have access to a toll-free dial-in number to support audio-only calls with Webex for teaching and learning. This option will appear automatically when students login to a Webex session.

To participate in lectures and labs via Webex, please follow the following instructions:

- Open Chrome browser (Google Chrome is the preferred browser for use with Webex)
- Log into UM Learn
- Locate this course in UM Learn and click into the UM Learn home page for the course
- Click on the "Communication" tab at the top; click on "Cisco Webex" to see the "Event Calendar"
- In Webex, click on the appropriate date and time to "Join" the lecture or lab session
- Mute yourself to avoid background noise and stop your video to reduce bandwidth requirements
- To ask questions, first type your request in the chat box to notify the instructor; then, when you are acknowledged by the instructor, unmute your microphone to ask your question
- If you run into problems on UM Learn, please send an email to the instructor as listed above

For more information about using Webex in UM Learn, go to: https://centre.cc.umanitoba.ca/wp-content/uploads/2020/03/Webex-Students-Instructions-and-FAQ.pdf

Recording of Lectures: Students are not permitted to record lectures without the permission of the instructor.

How this course fits into the curriculum: SOIL 0420 is a required course in the Agriculture Diploma program. The material is designed to provide a basic understanding of soil properties, why soil is a productive medium, why soils differ from place to place and the different capabilities of soil as a natural resource.

Calendar Description: Soil formation; soil physical, chemical and biological properties; soil classification systems, maps and reports; soil fertility, crop nutrients, soil sampling and testing; agricultural productivity. A full-day field trip is required.

Course Objectives: At the completion of this course, the student should be able to:

1. Describe basic physical, chemical and biological properties of soil;
2. Interpret soil survey and capability maps and reports; and
3. Describe soil nutrients and their cycles in the context of agricultural crop requirements.

Description of Assessments: Your final grade in this course will be determined based on your performance in the following:

Section Quizzes (7 total)	40%
Participation	5%
Lab Assignments	20%
In-Person Lab (Jan)	10%
Final Exam	25%

Each section quiz will be available for completion over a three day period at the end of each lecture section. You will have up to 45 minutes from the time the quiz is started to complete it. You will be given up to three attempts to write the section quiz; however, with each additional attempt, your final grade will be reduced by 10 percentage points (i.e. on your first attempt, the maximum grade you can obtain is 100%, on your second attempt the maximum grade you can obtain is 90% and on your third attempt the maximum grade you can obtain is 80%). For example, if you got 85% of the questions correct on your second attempt at a quiz, your final grade would be reduced to 75%, and if it was your third attempt, your final grade would be reduced to 65%. The mark from your last quiz attempt will be applied to your final AGRI 1600: Introduction to Agri-Food Systems Page 9 grade. Questions on the quiz will be randomly selected from a quiz bank; therefore, each quiz will be different from the other.

Participation marks will be given based on your activity in the group discussion board. The discussion board will be a forum for you to interact with your instructor, TAs, and fellow students, to engage in thoughtful conversation and broaden your knowledge about soil. Please remember to be polite and considerate when you post on the discussion board. Note that your participation will be graded not just on the number of posts you create, but on the quality of those posts (i.e. if you agree with a classmate, it is ok to post "I agree with so-and-so", but only after you post your own thoughts on the topic).

The final exam will be cumulative and "open book" style, written during the scheduled final exam period.

There will be an in-person lab session scheduled during the first two weeks of January to offer hands-on instruction on soil properties, soil development and soil classification. This lab session is important to provide a solid foundation of knowledge prior to taking SOIL 0620: Soil and Water Management.

Assignment Extension and Late Submission Policy: Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and to make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab;
- Contact an advisor in your faculty/college/school of registration for a missed final exam (scheduled in the final examination period);

- Inform your instructor/advisor as soon as possible do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam; and
- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed.

Late Assignments: Assignments must be submitted through UMLearn Assignment Drop Boxes on the date due. A 10% reduction in grade will be applied for every 24-hour period an assignment is late (unless an extension has been granted).

Missed Assignments: Unexcused missed assignments will be given a grade of zero. Where assignments are missed due to illness (see above), evidence of death in the family, or other circumstances that are beyond the control of the student, the student may be given the following options: 1) complete the assignment and receive the late assignment penalty as described above, 2) establish a new due date with the instructor and complete the assignment without penalty when handed in by the new due date, or 3) the final grade will be determined by increasing the value of the final exam by the amount that would have been allocated to the missed assignment. Option three will only be available under extreme circumstances.

Missed Quizzes: Unexcused missed quizzes will be given a grade of zero. Students cannot pass the course unless they complete all section quizzes and submit the final assignment. Where a quiz is missed due to illness, evidence of death in the family, or other circumstances that are beyond the control of the student, the student may be given the following options: 1) re-schedule a date for the quiz with the instructor and complete the quiz at that time (the instructor has the option to set a different quiz), or 2) the final grade will be determined by increasing the value of the final assignment by the amount that would have been allocated to the missed quiz. If the final assignment is missed and an appropriate excuse has been provided, procedures outlined in the University of Manitoba Undergraduate Calendar for deferral will be followed.

Laboratory Assignments
Laboratory assignments are designed to be completed during the laboratory session and submitted at the end. They will be graded and returned the following week. The concepts will be covered previously in the lectures and students should have their notes available to refer to the material when needed.

Laboratory Schedule: Assignments for each laboratory are due at the end of lab.

Sept 29, Oct 1	Lab 01	Soil Texture and Structure
October 6, 8	Lab 02	Soil Survey Reports and Ag Capability
October 20, 22	Lab 03	Determining Field Capacity
October 27, 29	Lab 04	Soil pH and Electrical Conductivity
November 3, 5	Lab 05	Soil Aggregate Stability
November 17, 19	Lab 06	Fertilizers
November 24, 26	Lab 07	Fertilizer Rates and Costs
December 1, 3	Lab 08	Manure Management

Laboratory attendance is required. Laboratories must be submitted at the end of the laboratory period in order to accommodate timely feedback of grades and comments. If students know beforehand that they will not be able to attend a laboratory session, they should contact the lab instructor to make alternate arrangements. Students who do not submit a weekly laboratory assignment at the end of the lab period will receive a grade of zero on that exercise.

Texts, Readings, Materials
No textbook is required. The Powerpoint slides for download from the course UM Learn page (color) constitute the study material for the class.

Other resources for supplemental learning:

N.C. Brady and R.R. Weil, 1998. The Nature and Property of Soils (Twelfth Edition).

Havlin, J.L., J.D. Beaton, S.L. Tisdale, and W.L. Nelson, 1999. Soil fertility and Fertilizers: An Introduction to Nutrient Management (Sixth Edition).

Henry, L, 2003. Henry's Handbook of Soil and Water.

Manitoba Agriculture, Food and Rural Initiatives, 2007. Soil Fertility Guide. Online: https://www.gov.mb.ca/agriculture/crops/soil-fertility/soil-fertility-guide/pubs/soil_fertility_guide.pdf

Manitoba Agriculture, Food and Rural Initiatives, 2008. Soil Management Guide. Online: https://www.gov.mb.ca/agriculture/environment/soil-management/soil-management-guide/pubs/soil-management-guide.pdf

Course Content

Topic	Number of Lectures
1. Introduction	
1.1 What is soil?	3
1.2 What is horizon, profile and soil pedon?	
1.3 Soil physical properties - texture, structure, bulk density, porosity	
2. Classification of Soils	
2.1 Soil forming factors, origin of prairie landscapes	2
2.2 The purpose of soil classification	
2.3 The Canadian Classification System	
3. Soil Survey and Agriculture Capability	
3.1 Legal survey system	2
3.2 Soil survey and reports	
3.3 Agriculture capability mapping and reports	
3.4 MASC soil productivity index, ag productivity, target yields	
4. Soil Water	
4.1 Forms of water in the soil system	2
4.2 Soil water measurement (field capacity, permanent wilting point)	
4.3 Water movement, management, use and losses	
5. Soil Chemistry	
5.1 pH, anion-cation exchange	2
5.2 Salinity and sodicity	
6. Soil Organic Matter	
6.1 Nature, composition and decomposition (C and N cycling)	2
6.2 Importance in soils, beneficial and detrimental effects	
6.3 Effect of management practices on organic matter	
7. Soil Fertility and Fertilizers	
7.1 Soil as a store of plant nutrients, nutrient availability	5
7.2 Macronutrients and micronutrients	
7.3 Nutrient deficiencies and toxicities, nutrient cycling/balance	
7.4 Nutrient sources - commercial fertilizers and manure	
7.5 Soil sampling and soil testing	

Academic Integrity: Academic integrity helps all of us, improving the quality and long term value of learning, as well as maintaining a good reputation and public confidence in individual students and graduates, as well as students, staff, our Faculty, our university, and our profession. The University of Manitoba regards acts of academic misconduct in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence. Penalties range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. Examples of misconduct include, but are not limited to:

a) Plagiarism – the presentation or use of information, ideas, sentences, findings, etc. as one's own without appropriate attribution in an assignment, test or final examination.

b) Cheating on quizzes, tests or final examinations – the circumventing of fair testing procedures or contravention of exam regulations. Such acts may be premeditated/planned or may be unintentional or opportunistic.

c) Inappropriate collaboration – when a student and any other person work together on assignments, projects, tests, labs or other work unless authorized by the course instructor.

d) Duplicate submission – cheating where a student submits a paper/assignment/test in full or in part, for more than one course without the permission of the course instructor.

e) Personation – writing an assignment, lab, test, or examination for another student, or the unauthorized use of another person's signature or identification in order to impersonate someone else. Personation includes both the personator and the person initiating the personation.

f) Academic fraud – falsification of data or official documents as well as the falsification of medical or compassionate circumstances/documentation to gain accommodations to complete assignments, tests or examinations

If you have any questions about how to make sure that you're complying with the University's expectations for academic integrity in this course, please contact the instructor for this course.

For more information about the U of M's commitment to academic integrity, go to: http://umanitoba.ca/student-supports/academic-supports/academic-integrity

For more information about the U of M's Student Discipline By-Law, go to: https://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html

Other Student Resources: For student resources, including student accessibility services, writing and learning support, library information, academic advisory services, student advocacy, and policies regarding student discipline, intellectual property and reporting sexual assaults, please see **Schedule A - Policies and Resources for Students** posted on this course's UM Learn website.