

**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 2021	Credit Hours:	4

Class Time and Location: Lectures and labs will be offered synchronously online, 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
Email: marla.riekman@umanitoba.ca
Cell: 204-918-8440

Students with questions or suggestions are strongly encouraged to ask questions during or immediately after the regular lecture periods and lab periods. If additional time is required, please email the instructor to set up mutually suitable appointment.

When communicating via text or email, please make note of which course/lab section you are in. If communicating by text, make sure you include your name in your text message as well.

Announcements and Course Materials posted on UMLearn: Students are also expected to regularly access the announcements and course materials posted on the UM Learn website for this course. Summary slides and reference material for the laboratory assignments will be posted on UM Learn. Online lectures will be recorded in case students are unable to connect to the internet. Recorded 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 attend all lectures and lab sections that they are registered in; therefore, it will be necessary to have 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>

Students will also need to have a registered account with iClicker and be able to access the account via their phone or computer. For more information on iClicker, go to: <https://news.umanitoba.ca/iclicker-reef-a-new-and-free-mobile-app-for-students/>

Recording of Lectures: Students are not permitted to record lectures without the permission of the instructor. Lectures will be recorded onto the WebEx server and made available for viewing for a period of 1-2 weeks, as described above.

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.

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	25%
Final Exam	30%

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 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 awarded based on iClicker responses during the lectures. The iClicker questions will also act as example questions in preparation for the section quizzes.

The final exam will be "open book" style, written during the scheduled final exam period. The exam is cumulative, meaning you will be asked to draw on information you learned throughout the entire course to answer the exam questions. Each student will be assigned a field scenario during the exam period and will be assessed on how they apply their course knowledge to the assigned scenario.

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 by the instructor).

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/Exams: Unexcused missed quizzes will be given a grade of zero. Students cannot pass the course unless they complete all section quizzes and the final exam. 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 dates 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 exam 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 by 11:59pm the same day. 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 11:59pm the day of the lab.

September 21, 23	Lab 01	Soil Texture and Structure
October 5, 7	Lab 02	Soil Aggregate Stability
October 19, 21	Lab 03	Soil Survey Reports and Ag Capability
October 26, 28	Lab 04	Determining Field Capacity
November 2, 4	Lab 05	Soil pH and Electrical Conductivity
November 16, 18	Lab 06	Fertilizer Grades and Soil Test Analyses
November 23, 25	Lab 07	Fertilizer Rates and Costs
Nov 30, Dec 2	Lab 08	Fertilizer Recommendations
December 7, 9	Lab 09	Manure Management

Laboratory attendance is mandatory. 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. Please note the penalties for late/missing assignments outlined above.

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

<u>Topic</u>		<u>Number of Lectures</u>
1.	Introduction	3
1.1	What is soil?	
1.2	What is horizon, profile and soil pedon?	
1.3	Soil physical properties - texture, structure, bulk density, porosity	
2.	Classification of Soils	2
2.1	Soil forming factors, origin of prairie landscapes	
2.2	The purpose of soil classification	
	2.3 The Canadian Classification System	
3.	Soil Survey and Agriculture Capability	2
3.1	Legal survey system	
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	2
4.1	Forms of water in the soil system	
4.2	Soil water measurement (field capacity, permanent wilting point)	
	4.3 Water movement, management, use and losses	
5.	Soil Chemistry	2
5.1	pH, anion-cation exchange	
	5.2 Salinity and sodicity	
6.	Soil Organic Matter	3
6.1	Nature, composition and decomposition (C and N cycling)	
6.2	Importance in soils, beneficial and detrimental effects	
	6.3 Effect of management practices on organic matter	
7.	Soil Fertility and Fertilizers	5
7.1	Soil as a store of plant nutrients, nutrient availability	
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.