

Soil 0620 Soil Conservation and Management

Course Syllabus

Winter 2023

Calendar Description

Land capability for agriculture; storage, use of water and water use efficiency; saline and alkaline soils; soil acidity; soil erosion and conservation; tillage, cropping systems and rotations; fate of biosolids, pesticides.

Course Objectives

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

1. explain relationships among soil, water and air as they relate to environmental quality and agriculture in western Canada,
2. interpret soil, climate and landscape data for the purpose of identifying potential environmental impacts of agricultural practices, as well as the most relevant beneficial management practices to minimize those impacts, and
3. pass the Soil & Water Management section of the Prairie Province Certified Crop Advisor exam if they decide to write it.

How this course fits into the curriculum

SOIL 0620 is a prescribed course in the Crop Management option of the Agriculture Diploma program. This course is designed to provide applied learning exercises in the areas of agricultural production practices, agricultural sustainability, limitations to agricultural production and environmental impacts on the environment. These topics are especially current with recent increased public awareness and scrutiny of food production practices and agricultural impacts on the environment.

Prerequisites and how they apply to this course

The prerequisite course for the class is SOIL 0420 (Soil Resources and Productivity). The prerequisite course provides fundamental knowledge about soil and landscape properties and how they are described and reported. This knowledge will be utilized for applied learning by considering practical issues involved in soil and water management.

Instructor

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Teaching Assistants (Laboratories)

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Time and Location

Lectures will be delivered Tuesdays and Thursdays from 10:00-11:15 in room 172 of the Agriculture Building. Laboratories will take place in two separate sections (B01 and B02, pre-assigned) on Tuesdays following the lecture from 11:30-12:45 in room 115 of the Ellis Building, and 1:00-2:15 in room EITC E2 304 of the Engineering Building. Students are expected to attend all lectures and laboratories (attendance will be monitored). Regularly scheduled lectures and laboratories will provide for steady progress towards course objectives and learning outcomes.

Class Communication

Outside of these lectures and laboratories, students can contact the instructor and TAs by email, and the instructor and TAs will attempt to respond within 48 hours. Students' questions and concerns about course content will be addressed at the start of the next class meeting. Individual telephone meetings with the instructors can be arranged by appointment.

Course materials and emails will be delivered by the instructor and TAs to the class via UMLearn. The Subject line of emails from students to the instructor and TAs must start with "SOIL 0620, Last Name, topic..."

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

Recording of Lectures

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

Course Materials

The lecture slides are available for students to download from the UM Learn course page. Each student is expected to download these slides and have them for reference during class. The PowerPoint slides constitute the primary study material for the class. The slides are made available to facilitate learning the course material and to provide an opportunity for interactive class sessions. Review questions are provided at the end of each section of lecture slides and are intended to assist students by testing their knowledge of course material prior to the exams. Students are expected to study the review questions on their own and seek clarification on any material that they do not fully understand prior to writing exams. Class attendance is needed if students are to gain a full understanding of the course material. Students who attempt to pass this course without attending class, do so at their own risk.

Electronic copies of the Manitoba Soil Management Guide and laboratory handouts will be provided to students. No other textbook is required. Some reading materials will be provided to supplement the lectures for some course topics.

Students' rights and responsibilities

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 posted on this course's UM Learn website.

Description of Examinations

Two (2) 25-minute exams will be held during class period at the completion of Sections 2 and 4 in the course. The course section exams are tentatively scheduled for February 9 and March 23. Each exam will cover the content of the section(s) just completed. A final exam will be scheduled during the exam period at the end of the term and will cover all course (focusing on the fifth and final section) and the lab content.

Missed Exams

If students know beforehand that they will not be able to attend an exam, they must contact the instructor to make alternate arrangements. Students who miss an exam without notice will receive a grade of zero on the exam.

Laboratory Assignments

There will be 9 laboratories and 7 laboratory assignments. Lab information and assignments will be distributed on the Tuesday mornings before the laboratory, and they must be submitted by the end of the laboratory. Laboratory assignments are designed to be completed during the laboratory session and handed in at the end. They will be graded and returned the following week. Lab exercises involve interpretation of environmental information and its application to a case farm. For the most part, the concepts will be covered previously in the

lectures and students should have their lecture notes on-hand during the lab to refer to the material when needed. During some of the lab periods, students will perform calculations and should have a calculator. The lab assignments will utilize a real farm as a case study; this is meant to provide context for the exercises and improve proficiency in the application of environmental information for addressing issues in soil conservation and management.

Late or Missed Lab Assignments

Laboratories must be submitted at the end of the day on the day 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 instructor to make alternate arrangements. Students who do not submit a laboratory assignment at the end of the day of their lab period will receive a grade of zero on that exercise. Missed laboratory exercises can be made up with an excused absence provided it is completed prior to the distribution of marks to the class for that lab.

Course Evaluation:

Student performance will be based on laboratory assignments, two mid-term exams and a final exam.

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| Mid-term Exams (2) | 40% | tentative dates: Feb 9, Mar 23 (10:00-10:25 a.m.) |
| Laboratory Assignments (7) | 25% | Tuesdays |
| Final Exam | 35% | |

Lecture and Laboratory Content and Schedule

| Date | Class Topic | Lab Topic |
|---|---|---|
| <i>Agricultural Land Resource</i> | | |
| Jan 10 | Soil orders and their productivity limitations | Laboratory and Case Farm Intros |
| Jan 12 | Landscape impacts on productivity | |
| Jan 17 | Applying ag capability to soil management decisions | 1. Soil Resources |
| <i>Agricultural Climate Resource</i> | | |
| Jan 19 | Classes cancelled – Experiential Learning | |
| Jan 24 | Classes cancelled – Experiential Learning | No Lab |
| Jan 26 | Weather-climate, FFDs, heat units, probability | |
| Jan 31 | Precipitation, soil moisture and risk | 2. Ag Capability |
| <i>Water Management</i> | | |
| Feb 2 | Crop water demand/use/balance, moisture management | |
| Feb 7 | Surface water issues, riparian zones | 3. Temperature Risk |
| Feb 9 | Groundwater issues | |
| | 1st mid-term exam (Sections 1&2) | |
| Feb 14 | Groundwater issues | 4. Water Resources and Moisture Risk |
| Feb 16 | Soil salinity/sodicity and management | |
| Feb 21 | Winter term break | No Lab |
| Feb 23 | Winter term break | |
| Feb 28 | Drainage, irrigation | Review 1 st mid-term, prep for 2 nd |
| Mar 2 | Irrigation suitability / Nutrient management – fertilizer use | |
| <i>Nutrient Management</i> | | |
| Mar 7 | Nutrient cycling, balance, fertilizer use | 5. Drainage and Irrigation |
| Mar 9 | Productivity, target yield, manure | |
| Mar 14 | Manure management | 6. Manure Management |
| <i>Soil Management Issues</i> | | |
| Mar 16 | Soil Degradation/ Soil Erosion | |
| Mar 21 | Water erosion risk and management | 7. Erosion Risk |
| Mar 23 | Wind erosion risk and management | |
| | 2nd mid-term exam (Sections 3&4) | |
| Mar 28 | Tillage erosion risk and management | Review laboratories, prep for final |
| Mar 30 | Soil organic matter and its management | |
| Apr 4 | Soil structure issues and management | Review 2 nd mid-term, prep for final |
| Apr 6 | Soil health | |

Final Exam -- To be scheduled April 14 - 28