

Soils and Landscapes in Our Environment (SOIL 3600) Fall 2022

Department of Soil Science, Faculty of Agricultural and Food Sciences, University of Manitoba
Sections A01, B01, or B02, three credit hours

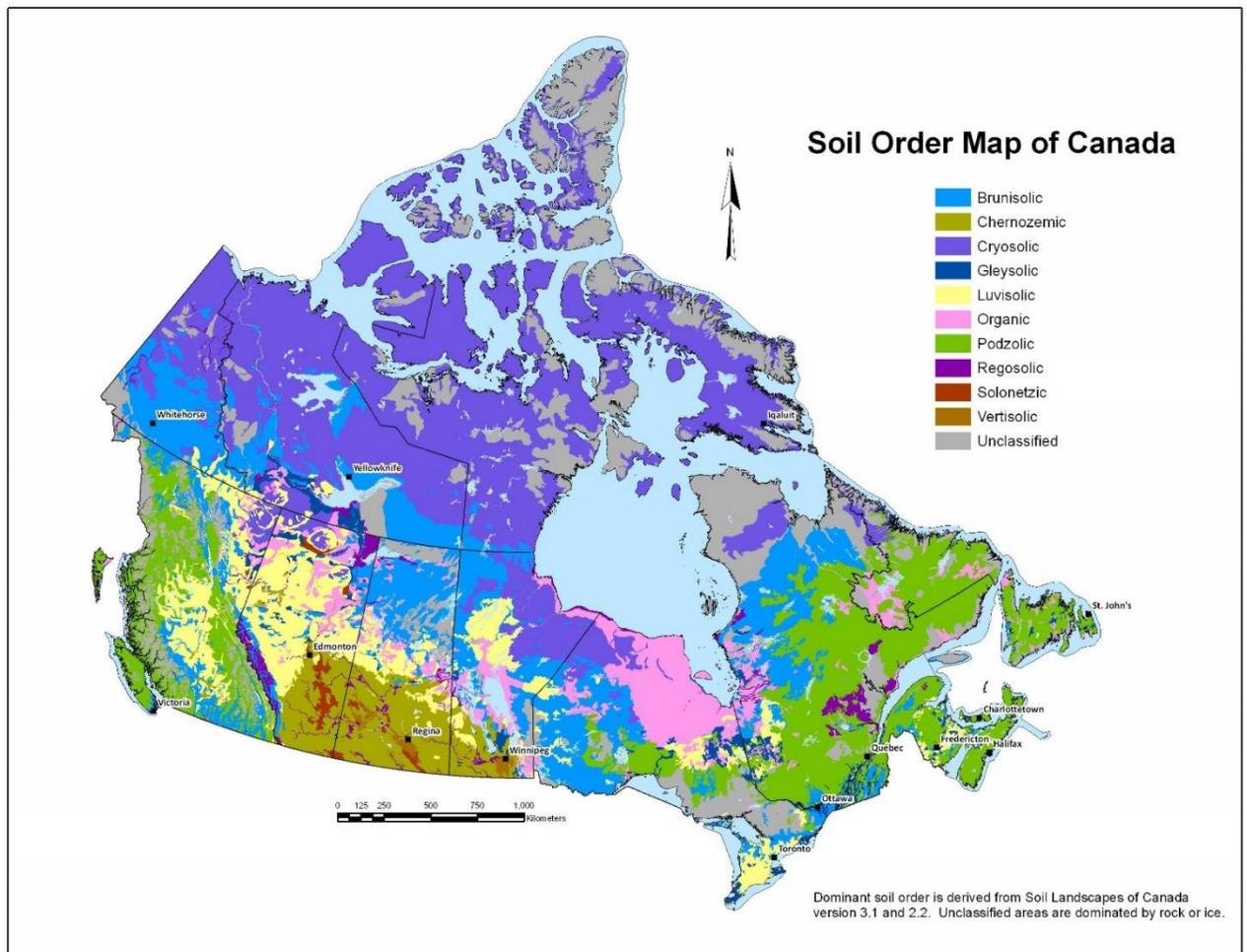
Lecture time: M, W, F 11:30 am–12:20 pm CT (lectures mandatory)

Lecture location: 219 Animal Science

Instructor's name: Inoka Amarakoon

Contact method: email inoka.amarakoon@umanitoba.ca

Office: 313 Ellis Building



Pre-requisites: None. This course is required for students in B.Sc. Agriculture specializing in Agronomy, B.Sc. Agroecology, and Minor in Soil Science. It is highly recommended for those in Physical Geography, Environmental Science, and Environmental Studies and a required course in the Land Option.

References:

- Brady, N.C., and Raymond Weil, 2017. *The Nature and Properties of Soils*. 15th Edition Prentice Hall. One copy is on reserve in Ag. Library. You are not required to buy.
- *Digging Into Canadian Soils: An Introduction to Soil Science*, 2021. Open access book by the Canadian Society of Soil Science. <https://openpress.usask.ca/soilscience/>
- Soil Classification Working Group. 1998. *The Canadian System of Soil Classification*. 3rd Ed. Natural Resources Canada. Ottawa. 187 p. <http://sis.agr.gc.ca/cansis/taxa/cssc3/index.html>

Course Description:

The course will provide the necessary scientific background for a comprehensive understanding of soils and landscapes—their place in agriculture and forestry, and their role in our environment. The course emphasizes soils as part of the land ecosystem and as structured bodies of biotic and abiotic components whose properties interact to provide form and function within landscapes. The course is an in-depth examination of the terrestrial environment, including soil, water, air, and biota as a resource, its behavior, limitations, fate, and use.

Rationale:

Soil and landscapes are often the interfaces between human activities and those parts of the environment we wish to use, preserve and protect. They play an essential role in plant and animal production and environmental health as they can be a source, sink, or interacting medium for many biotic and abiotic constituents. Therefore, understanding soil properties and reactions is critical to evaluating how plants, animals, and even humans survive in the environment. Soil is at the center of it all. Welcome as we journey through the wonder of soil.

Intended Learning Outcomes:

At the end of the course, students should be able to:

- know the difference between soil and dirt
- describe a soil to the Great Group level
- understand how soil-forming processes result in the evolution of soils
- understand the physical, chemical, and biological properties of soils
- know the role of soil in carbon and nutrient cycling in the environment
- understand how the management of soils affects conditions for plant growth
- understand soil contamination and their impacts

Lecture Schedule:

- Value of Soils - Functions of Soils and Landscapes
- Formation of Soils and origin of Landscapes
- Physical Properties of Soils: Soil color, texture, and structure
- Physical Properties of Soils: Density and Porosity
- Soil Classification and Soils of Canada
- Soil Chemistry: Soil Colloids, Cation and Anion Exchange, Acidity, Alkalinity, Salinity, and Sodicity
- Water in Soils and Landscapes: water movement into and through the soil, soil moisture storage and losses, water movement over and through the landscape
- Soil Biology: Organisms and Ecology
- Soil Nitrogen Dynamics: Cycles (stocks and flows); Greenhouse Gases, Leaching and Runoff
- Soil Phosphorus and Potassium Dynamics: Cycles
- Quality and Degradation of Soil (and water and air)
- Soil Contamination: organic and inorganic contaminants and their impacts on soil, water, and air quality

Laboratories: Monday and Wednesday 2:30 - 5:30 pm.

- Completed assignments are uploaded to the UMLearn folder created under the tab assignments before the set deadline. It will be penalized 5% per day if they are late and not accepted after seven days of the deadline.

Evaluation:

1 st Mid-term Examination	30%
Final Examination	40%
Lab Assignments	25%
Quizzes	5%

Grading Scheme: Final grades are subjected to the approval of the Head of Soil Science and Associate Dean Academic of the Faculty

- A+Exceptional (90–100%)
- A Excellent (80–89%)
- B+Very good (75–79%)
- B Good (70-74%)
- C+ Satisfactory (65–69%)
- C Adequate (60–64%)
- D Marginal (50–59%)
- F Failure (<50%)

Other important notes:

I will email the class for updates. Please make sure your UofM email account is activated and monitored. Thanks! Feel free to contact me if you have questions.