RENR 210 / SOIL 210

Introduction to Soil Science and Soil Resources

In Fall 2026, SOIL 210, *Introduction to Soil Science and Soil Resources,* is being offered at Yukon University concurrent with the University of Alberta's RENR 210, *Introduction to Soil Science and Soil Resources,* as part of the Northern Environmental and Conservation Sciences, B.Sc. Program. All students registered in SOIL 210 or RENR 210 must adhere to requirements outlined in this course syllabus. University of Alberta students must also be aware of, and adhere to, the University's Code of Student Behaviour, referenced in the outline; Yukon University students must be aware of, and adhere to, Yukon University's Academic Regulations, also referenced in the outline.

INSTRUCTOR: David Heilig, PhD

OFFICE HOURS: by appointment

OFFICE LOCATION: -

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CLASS DAYS & TIMES: Lectures: Tuesday and Thursday, 10:30 am – 11:50 am

Lab: Monday 2:30 – 5:30 pm

CLASS LOCATION: Lecture (A2603), Lab (T1090)

COURSE DESCRIPTION

Elementary aspects of soil formation, soil occurrence in natural landscapes, soil classification, soil resource inventory; basic morphological, biological, chemical, and physical characteristics employed in the identification of soils and predictions of their performance in both managed and natural landscapes.

Soils are natural bodies that form at the Earth's surface through the complex interaction of chemical, physical and biological processes. Soils are an integral part of terrestrial ecosystems and ecosystems are impacted by soil processes. Variability in soil characteristics will be examined both vertically within any one soil, as well as, horizontally across many soils at a landscape level. While soils of Yukon are taken as examples, the basic characteristics considered are those used to describe and predict the performance of all soils.

COURSE REQUIREMENTS

For students taking the course as SOIL 210:

Prerequisite(s): Students must have completed a university-level course in life or natural sciences. A university-level chemistry course is strongly recommended.

For students taking the course as RENR 210: Registration in Yukon University/University of Alberta B.Sc. in Environmental and Conservation Sciences degree program. Students must have completed a university-level course in life or natural sciences. A university-level chemistry course is strongly recommended.

EQUIVALENCY OR TRANSFERABILITY

Receiving institutions determine course transferability. Find further information at: https://www.yukonu.ca/admissions/transfer-credit.

Students in the B.Sc. ENCS program should contact an ENCS advisor if they have questions about equivalency or transferability of this course.

LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

- Have a clear understanding of the main concepts and rationales associated with the identification and description of basic soil and landscape features
- Be able to apply knowledge of soil characteristics to describe and classify soils under the Canadian Soil Classification System
- Have an understanding of the basic physical and chemical characteristics that govern soil behavior, and links between macro and micro levels of investigation
- Demonstrate an understanding of porosity, particle density, bulk density and the relationship between porosity and bulk density, saturated versus unsaturated flow, preferential versus uniform water flow and capillary rise

- Understand the role of soil colloids, isomorphous substitution and Cation Exchange Capacity in soils
- Have an understanding of the significance of basic biogeochemical soil characteristics to soil quality and nutrient cycling

COURSE FORMAT

Weekly breakdown of instructional hours

This course consists of two 90-minute lectures per week and ten three-hour laboratory sessions (unless otherwise indicated by the instructor). The lecture schedule in the course outline details the major topics covered and when those topics will be presented throughout the course. Please note that this schedule will likely be modified during the term to accommodate lecture topics that may not be finished within the predicted lecture time.

Delivery format

Lectures in the Fall 2026 offering of this course will be delivered in a face-to-face format in a classroom on Ayamdigut campus. Students are expected to attend each lecture. Copies of lecture materials are intended for review only and do not replace participation in the lecture period. Lab activities in this course take place both in a laboratory setting in the Earth Sciences Lab in T1090 and outdoors in settings that are both on campus and off campus. Students will meet in the Earth Sciences laboratory (T1090) before beginning a lab activity, unless noted in advance by the instructor.

Several laboratory activities in the course will be based in the field. Some field activities will include hiking, digging using a shovel and walking on uneven/sloped ground. Please contact your instructor if you have any concerns about participating in these activities. In addition, students are expected to dress according to the weather to be comfortable. Suggested gear includes light hiking boots, gloves, hat, rain gear and warm clothing.

EVALUATION

The course grade will be determined as follows:

Students enrolled in the course as SOIL 210:

	Percent
Midterm test	15
Final Exam	25
Laboratory Exercises	30
Learning Assessments	10
Lecture Assignment	5
Term Assignment	15
Total	100%

Students enrolled in the course as RENR 210:

	Percent
Midterm test	15
Final Exam	25
Laboratory Exercises	30
Learning Assessments	10
Lecture Assignment	5
Term Assignment	15
Total	100%

Attendance and Participation

Students are expected to attend all scheduled lecture and laboratory sections. Students are responsible to make up for all missed lecture and laboratory content on their own time. It is not possible to complete most of the laboratory exercises outside of the scheduled laboratory period; missing these laboratory exercises may result in a student receiving a grade of zero on the laboratory assignment.

Assignments

Students will be assigned two learning assessment assignments, one lecture assignment and one final report (term project) to be completed outside of class time. Students will be required to submit a laboratory assignment for each laboratory exercise completed. Digital or hard copies of both lecture and laboratory assignments must be submitted for evaluation to receive a grade. If a student is absent when an assignment is distributed in class, it is the responsibility of the student to make sure that they understand the assignment instructions, and if not, that they seek assistance from the instructor.

Exams

There will be two exams in this course: one (1) midterm exam and one (1) final exam. Students must write the exam on the scheduled date. If an exam is missed, a grade value of zero will be assigned. If a student anticipates they will not be able to attend a scheduled exam, they must speak to the instructor at least a week in advance of the scheduled exam to determine the appropriate course of action.

Due Dates and Late Assignments

Lecture and learning assignments are due at the start of the lecture on the date assigned by the instructor. Laboratory assignments will be due at the start of the following laboratory period unless otherwise indicated by the laboratory instructor. Unless the instructor states that late assignment will not be accepted, late assignments will be graded based on the following scheme: a deduction of 10% per day up until a total deduction of 50% is reached, following that, assignments must be submitted by the start of the last lecture period or a grade of 0% will be automatically assigned. Under no circumstances will extensions be granted.

Assignment of grades

The total numerical score will be converted to a grade on Yukon University's letter grading system.

Grade	Percent Equivalent
A+	95 - 100
A	86 - 94
A-	80 - 85
B+	75 - 79
B	70 - 74
B-	65 - 69
C+	62 - 64
C	58 - 61
C-	55 - 57
D	50 - 54
F	Under 50%

COURSE WITHDRAWAL INFORMATION

Students registered in SOIL 210 should refer to the YukonU website for important dates.

Students registered in RENR 210 should refer to the UAlberta calendar for important dates (calendar.ualberta.ca).

TEXTBOOKS AND LEARNING MATERIALS

This course utilizes an open-source textbook entitled 'Digging Into Canadian Soils: An Introduction to Soil Science' offered through the University of Saskatchewan.

Link:
https://openpress.usask.ca/soilscience/

Citation:
Krzic, M., Walley, F.L., Diochon, A., Paré, M.C., & Farrell, R.E. (Eds.) 2021. Digging into Canadian soils: An introduction to soil science. Pinawa, MB: Canadian Society of Soil Science. https://openpress.usask.ca/soilscience/

COURSE WEBSITE

Students are expected to access, and stay up to date with course content, messages and announcements on the Moodle course website. Grades will be posted using the gradebook feature in Moodle. Lecture materials and additional resources will be posted on the Moodle course page.

ACADEMIC INTEGRITY

Yukon University Academic Standards and Regulations

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to YukonU Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

University of Alberta Academic Integrity and Code of Student Behaviour

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are

particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.governance.ualberta.ca) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students at the University of Alberta are subject to the Code of Student Behaviour, as outlined at: http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.aspx Please familiarize yourself with it and ensure that you do not participate in any inappropriate behavior as defined by the Code. Key components of the code include the following statements.

30.3.2(1) No Student shall submit the words, ideas, images or data of another person as the Student's own in any academic writing, essay, thesis, project, assignment, presentation or poster in a course or program of study.

30.3.2(2) c. No Student shall represent another's substantial editorial or compositional assistance on an assignment as the Student's own work.

PROFESSIONALISM AND CLASSROOM RULES OF ENGAGEMENT

Students are expected to attend all lectures and labs, be engaged and courteous in all course activities, and to be on time for class. Please do not use cellular phones during class and laboratory. Laptops are permitted for note taking and in-class work; however, please do not use laptops in class for non-class-related activities.

ELECTRONIC DEVICES

Use of electronic devices during lecture/lab is only permitted if being used for note-taking, in-class activities, or accessing course materials. Please set devices to silent when in class. The use of electronic devices during examinations is restricted, except for:

- approved non-programmable calculators.

RECORDING OF LECTURES, LABS, ETC.

Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed *only* with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used

solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Please note that classes may be recorded using web conferencing software, and links to recordings may be posted on the class website.

ACCESSIBILITY AND ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact Accessibility Services for resources or to arrange academic accommodations: access@yukonu.ca.

TENTATIVE TOPIC OUTLINE

Please note that this topic list or the order in which materials are delivered may change throughout the semester. Updates to the schedule will be announced in lecture.

Week	Date	Lecture Topics	Lab Number
1	Tu Sept. 1	Course introduction Introduction to soils and definitions	NO LAB
	Th Sept. 3	Soil constituents	
2	Tu Sept. 8	Soil constituents Weathering types	1– Soil characterization Basics
	Th Sept. 10	Factors influencing soil formation	
3	Tu Sept. 15	Soil profile description	2 – Parent materials (FIELD LAB)
	Th Sept. 17	Soil architecture Soil physical properties	
4	Tu Sept. 22	Soil organic matter	3 – Field soil profile examination (FIELD LAB)
	Th Sept. 24	Canadian System of Soil Classification Notation	
5	Tu Sept. 29	Soil orders of Canada	4 – Independent soil profile examination and sample collection (FIELD LAB)
	Th Oct. 01	Soil orders of Canada Learning Assessment #1	
6	Tu Oct. 06	Soil orders of Canada	4 – Independent soil profile examination and sample collection (FIELD LAB)
	Th Oct. 08	Cryosols and permafrost	

Week	Date	Lecture Topics	Lab Number
7	Tu Oct. 13	FALL READING BREAK	NO LAB
	Th Oct. 15	FALL READING BREAK	
8	Tu Oct. 20	MIDTERM EXAM	5 – Soil moisture content and bulk density (PART FIELD LAB)
	Th Oct. 22	Yukon and Whitehorse Soils	
9	Tu Oct. 27	Soil water basics	6 – Estimating soil organic matter
	Th Oct. 29	Soil water and potential energy	
10	Tu Nov. 03	Soil water and potential energy	7 – Soil grain size analysis Part 1
	Th Nov. 05	Soil colloids	
11	Tu Nov. 10	Soil colloids Learning Assessment #2	8 - Soil grain size analysis Part 2
	Th Nov. 12	Cation exchange capacity and base saturation	
12	Tu Nov. 17	Cation exchange capacity and base saturation	9 – UCS testing
	Th. Nov. 19	Alkalinity, acidity and salinity	
13	Tu Nov. 24	Alkalinity, acidity and salinity	10 – Soil chemistry and nutrients
	Th. Nov 26	Biogeochemical cycles	
14	Tu Dec. 01	Biogeochemical cycles	Flex week in lab
	Th Dec. 03	Flex Day – if needed Term Project due	