



UNIVERSITY OF
ALBERTA



SOIL 210 / RENR 210

INTRODUCTION TO SOIL SCIENCE AND SOIL RESOURCES

In Fall 2017, SOIL 210, Introduction to Soil Science and Soil Resources, is being offered at Yukon College 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 RENR 210 or SOIL 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 College students must be aware of, and adhere to, Yukon College's Academic Regulations, also referenced in the outline.

INSTRUCTOR: Mary Samolczyk, M.Sc.
Instructor, Geology

OFFICE HOURS: T/F 11:00 AM – 12:00 PM

OFFICE LOCATION: CNIM M105

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CLASS DAYS & TIMES: M/W 4:00 – 5:29 PM (Lec); F 1:00 – 4:00 PM (Lab)

CLASS LOCATION: A2603 (Lec); T1090 (Lab)

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.

STUDENT LEARNING OUTCOMES AND COMPETENCIES:

Upon successful completion of this course students will be able to do the following:

- 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 (Lecture and Lab):

This course consists of two 90-minute lectures and one three-hour laboratory sessions per week (unless otherwise indicated by the Instructor). Laboratory exercises may be performed in the field (outside) on the College campus. The laboratory Instructor will notify students in advance of a field laboratory exercise. Students are advised to dress appropriately for these labs including light hiking boots, rain gear and warm clothing.

COURSE PREREQUISITES AND/OR CO-REQUISITES:

For students taking the course as SOIL 210: 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 College/University of Alberta BSc 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.

REQUIRED TEXTBOOKS/MATERIALS:

Brady, N.C. and Weil, R.R. 2009. Elements of the Nature and Properties of Soils, 3rd Edition (mandatory).

COURSE WEBSITE

Students are expected to access, and stay up to date with, course content, messages and announcements on the Moodle course website.

UNIVERSITY OF ALBERTA ACADEMIC INTEGRITY AND CODE OF STUDENT BEHAVIOUR

Academic Integrity

“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 (www.ualberta.ca/secretariat/appeals.htm) 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.” (GFC 2003)

Code of Student Behaviour

“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.”

YUKON COLLEGE ACADEMIC STANDARDS AND REGULATIONS

Yukon College students are expected to be familiar with academic standards and regulations as outlined in Yukon College’s Academic Regulations, at

http://www.yukoncollege.yk.ca/downloads/Acad_Regs_FINAL_March_2017.pdf.

Plagiarism

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person’s writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

PROFESSIONALISM AND CLASSROOM RULES OF ENGAGEMENT

Students are expected to attend all lectures and laboratory exercises, be engaged and courteous in all course activities, and to be on time for class. Collaboration on laboratory activities and homework assignments is encouraged, but each student is responsible for individually completing and submitting all laboratory and homework assignments. Please do not use cellular phones during class. Laptops are permitted for note taking and in-class work; however, please do not use laptops in class for non-class-related activities. While in computer labs, students are expected to refrain from using the computers to engage in non-class-related activities.

COURSE REQUIREMENTS/EVALUATION:

Attendance and Participation

Students are expected to attend all lecture and laboratory sections. Students are responsible to make up for all missed lecture and laboratory content on their own time.

Assignments

Students will be assigned three (3) lecture assignments to be completed outside of class time. Students will be required to submit a laboratory assignment for each laboratory exercise completed. Hard copies of both lecture and laboratory assignments must be submitted.

Exams

There will be three exams in this course: two (2) midterm exams and one (1) final exam. There will be six (6) quizzes given at the start of laboratory periods based on required course materials.

Evaluation

The course grade will be determined as follows for both RENR 210 and SOIL 210:

Item	Percent
Module 1 exam	15
Module 2 exam	15
Final exam (inclu. Module 3)	24
Lab assignments (7 assignments @ 2% each)	14
Lab quizzes (6 quizzes @ 2% each)	12
Homework assignment 1	5
Homework assignment 2	5
Homework assignment 3	10

Due Dates

Lecture assignments are due at the start 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. 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 (December 7, 2017) or a grade of 0% will be automatically assigned.

Missed exams will be assigned a grade of 0% unless re-scheduling for a valid reason is approved and determined **in advance** of scheduled exam date. If there are known conflicts with exam scheduling, please see the instructor as soon as possible to discuss an alternative examination date.

Assignment of grades

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

YUKON FIRST NATIONS CORE COMPETENCY:

Yukon College recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon College program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukoncollege.yk.ca/yfnccr.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (800) 661-0504 (College Reception) or lassist@yukoncollege.yk.ca.

YUKON COLLEGE LORENE ROBERTSON WRITING CENTRE

All students are encouraged to make the Writing Centre a regular part of the writing process for coursework. The Writing Centre offers half-hour writing coaching sessions to students of all writing abilities. Coaching sessions are available in person and through distance technologies (e.g., email plus Skype or phone). For further information or to book an appointment, visit the Centre's website: www.yukoncollege.yk.ca/student_info/pages/writing_centre or email writingcentre@yukoncollege.yk.ca.

EQUIVALENCY/TRANSFERABILITY:

For current information on course transferability see <http://www.bctransferguide.ca>.

TENTATIVE SCHEDULE AND TOPIC OUTLINE:

Week	Lecture Dates	Lecture Topics	Lab
1	September 6	Course Introduction	No Lab
2	September 11, 13	Key concepts and definitions Soil parent materials Soil characteristics: color, texture, structure Soil forming factors and processes Canadian Soil Classification System	1
3	September 18, 20	Soil structure: attributes, genesis, influence on soil performance Scientific soil classification Sampling and preparing soil monoliths Soil forming factors and processes, cont.	2
4	September 25, 27	Using the Clorpt conceptual model Brunisols Chernozems Luvisols Podsoles	3
5	October 2, 4	October 2: Module 1 exam Soil structure at the micro scale – thin sections and SEM Porosity	4
	October 9	Thanksgiving Day Holiday (no class)	
6	October 11	Particle density and bulk density Relation between porosity and bulk density Influence of texture and structure on bulk density Gravimetric and volumetric water content	No lab
7	October 16, 18	Permafrost in northern soils	5
8	October 23, 25	Water content: from volume to area Saturated versus unsaturated flow Preferential versus uniform water flow Capillary rise	6
9	October 30, November 1	Primary versus secondary minerals Soil colloids The two basic structural units: tetrahedron and octahedron Isomorphous substitution Cation Exchange Capacity (CEC) Base saturation (%)	7

		Exchangeable Sodium Percentage (ESP) (%)	
10	November 6, 8	pH-dependent and pH-independent charges Relative contribution of clay and organic matter to TCEC Principles of cation exchange reactions Saline and sodic soils	8
	November 13	Remembrance Day Holiday (no class)	
11	November 15	November 15: Module 2 exam	No lab
12	November 20, 22	Soil pH and microorganisms and nutrient availability Anthropogenic sources of acidification Organic matter effects on soils Soil organic matter composition	9
13	November 27, 29	Soils and the global carbon cycle Soil organisms	10
14	December 4, 6, 7, 8	Soil nitrogen and phosphorus cycle Human impacts on the nitrogen cycle Nitrogen cycling in northern ecosystems Soil remediation and amendments Exam review	No lab