

APPLIED SCIENCE AND MANAGEMENT DIVISION

GEOL 107

3 Credit Course

Spring, 2021



COURSE OUTLINE

GEOL 107

GEOLOGICAL FIELD METHODS AND MAPPING I

3 CREDITS

PREPARED BY: Joel Cubley, Instructor/Coordinator, Earth Sciences

DATE: March 2, 2020

APPROVED BY: Stephen Mooney, Acting Dean, Applied Science & Management

DATE: March 2, 2020

APPROVED BY ACADEMIC COUNCIL: March 11, 2020

RENEWED BY ACADEMIC COUNCIL: [Click or tap to enter a date](#)



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GEOLOGICAL FIELD METHODS AND MAPPING I

INSTRUCTOR:

OFFICE HOURS:

OFFICE LOCATION:

CLASSROOM:

E-MAIL:

TIME:

TELEPHONE:

DATES:

COURSE DESCRIPTION

This course provides students with a hands-on introduction to geological field methods and mapping. Course topics include field navigation and GPS use, topographic and geologic map use and analysis, effective field note-taking, and the systematic description of bedrock outcrops and soil profiles. Students employ common mapping strategies to construct basic geologic maps at multiple scales and use map data to make cross-section interpretations about subsurface geology. The course also introduces land access and use considerations in Yukon that impact how geoscientists conduct fieldwork, both for research and in industry.

PREREQUISITES

Successful completion of GEOL 105 (Physical Geology) and GEOL 106 (Historical Geology), or by permission of the instructor.

EQUIVALENCY OR TRANSFERABILITY

This course has been recently redeveloped and its transferability is still being evaluated. Receiving institutions always determine course transferability. Further information and assistance with transfers may be available from the School of Science.

LEARNING OUTCOMES

Upon successful completion of the course, students will be able to

- characterize exposures of rocks, sediments and soils with systematic approaches to lithologic descriptions and field notetaking.
- construct geologic maps including outcrop extents, contact relationships and basic structural data; infer rock types and contacts in areas without exposed bedrock.

- use compasses, GPS, topographic maps and air photos to perform the basic map-reading and orienteering tasks that are a fundamental requirement for effective geologic mapping.
- draw geologic cross sections to show interpreted subsurface lithologies from collected outcrop data.
- collect representative samples of lithological units in the field using standard collection and recording protocols.
- safely handle and sample diamond drill core and perform basic geotechnical logging.

COURSE FORMAT

This course is taught in a condensed format, with 7-8 full days of instruction. Instruction will be primarily delivered in field settings around the Whitehorse area, though College facilities will be utilized for some lecture topics and drill core instruction. Students will meet at the College at 8 am each morning and return by 5 pm. There are no overnight activities.

All fieldwork takes place on the traditional territories of the Ta'an Kwäch'än Council and Kwanlin Dün First Nation. Prior to geology and mapping exercises around Whitehorse, students will engage with College First Nation elders to learn more about the history of the area and encourage the framing of subsequent coursework in connection to the local place.

ASSESSMENTS:

Attendance & Participation

Students are required to attend the field course in its entirety. If extenuating circumstances arise, a course of action will be decided upon by the instructor and the Chair of the School of Science. The instructor **MUST** be informed prior to absence. Field course exercises must be completed during class hours, with the instructor present.

Students must be prepared for inclement weather. In the case of severe weather (e.g. lightning), appropriate safety precautions will be taken, and if the weather continues, students will return to the College.

Each student will be critically assessed on their participation during the field course. A grading rubric for assessment of participation will be provided to each student at the start of the field course. Students are required to come to class each day alert, engaged, and open to actively participating in activities. Following the conclusion of each field exercise, students and instructors will take time to collectively debrief and discuss personal perceptions of the success of the exercise, challenges, and opportunities for both personal and group growth.

Assignments

Students are required to hand in completed field school activities at the beginning of the subsequent day's program (i.e. 8 am). Generally, assignments are tailored such that data collection is completed within the field day; however, additional time will be required of the student in the evenings to complete reports, finish geologic maps, etc. Students are expected to spend an additional 2-3 hours each evening finishing coursework requirements. The total course commitment is estimated at 70 hours (56 hours instruction, 14 hours outside coursework).

At the end of the course, students will draft a detailed (1:1000) bedrock geology map of a small area on Grey Mountain outside of Whitehorse. This final-copy map will be constructed in groups from field data collected by the students and will include a formal report describing the lithologies observed.

Oral Exam

A 15 - 20-minute oral exam will be administered to each student by the instructor and teaching assistant. This exam tests students on their knowledge of concepts presented within the course- no outside material will be incorporated.

EVALUATION:

<i>Evaluation metric</i>	<i>Weight</i>	<i>Due date</i>
Daily assignments	40%	Due at the start of each subsequent field exercise.
Final Grey Mountain map and report	30%	Due one week following the completion of the field mapping component.
Participation	20%	Participation will be assessed daily using criteria detailed in the Participation Metrics document distributed to students.
Oral examination	10%	Oral examinations will be scheduled within the final day of the field school.
Total	100%	

REQUIRED TEXTBOOKS AND MATERIAL

There is no required textbook. An equipment list will be sent to students well in advance of the start of the course. The college is not responsible for basic field gear (e.g. hiking boots, raincoat, etc.) In addition, basic “personal” geology items (rock hammer, hand lens, etc.) will not be provided, and the equipment list will include suggestions for economical purchase of those items. More specialized geology equipment (compasses, levels, soil shovels, etc.) will be provided by the program, as will safety equipment.

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/ Admissions & Registration web page.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when a student submits work for credit that includes the words, ideas, or data of others, without citing the source from which the material is taken. Plagiarism can be the deliberate use of a whole piece of work, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Students may use sources which are public domain or licensed under Creative Commons; however, academic documentation standards must still be followed. Except with explicit permission of the

instructor, resubmitting work 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.

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

This course is inherently based upon experiential learning and students should be capable of hiking up to 3 km on rough trails carrying their personal daypack, and safely moving through forested, trail-less areas without putting themselves or others at risk.

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): lac@yukoncollege.yk.ca.

TOPIC OUTLINE

Day	Module	Topics
1	1	Field safety: emergency response plans; bear awareness; effective radio communications; traverse safety considerations [classroom]
	2	Land tenure and access Introduction to land types in Yukon (Crown, Category A/B, etc.) and land access considerations for geological investigations [classroom]. How to access land tenure information, and best practices for initiating access conversations.
	3	Introduction to topographic maps: contour lines; projections; grids and coordinate systems; magnetic declination; orienting and using maps for navigation; constructing topographic profiles [classroom]
2	4	Introduction to Geographic Positioning Systems (GPS): theory and technological developments, accuracy vs. precision and GPS, data collection and data download to database software, Google Earth etc. [classroom, field]
	5	Basic field navigation and measurement tools: Brunton and Suunto geologic compasses; measurement of azimuth (sighting) and inclination; methods for measuring distance; height calculations; triangulation; techniques for effective navigation without GPS. [field]
3	6	Field notebooks and notetaking guidelines: reporting responsibilities and intellectual property; daily introduction components; structure of observations and interpretations; sample naming protocols [classroom, field]
	7	Outcrop descriptions: general features of exposures; lithologic descriptions and their structure; structural features; outcrop sketches; interpretations and pitfalls [field]
4	8	Geologic maps: lithologic and structural features; contacts; legends and their structural; unit abbreviations and their meaning; common symbols [classroom]
	9	Geologic mapping styles and strategy: contact mapping; traverse mapping; closed traverses and closure error; exposure mapping [field]
5,6	10	Grey Mountain 1:1 000 mapping project: selection of appropriate mapping strategy for map area based on initial lithologic and structural observations; detailed mapping activity; final map drafting with legend construction; final lithologic descriptions. Construction of cross-sections for subsurface interpretations. [field]

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7	11	Surficial deposits and soils: soil formation processes and factors; soil profile descriptions; exploration grids and soil sampling techniques [classroom, field]
8	12	Diamond drill core: handling, sampling, and geotechnical logging (recovery, RQD, fracture density, etc.). [laboratory]