

ENVT 165A - Geotechnical Sampling and Instrumentation

3 Credits, 2 Hours Lecture, 3 Hours Lab

The course is an introduction to the practical field and laboratory techniques used in the construction of buildings, industrial facilities, roads, bridges, containment structures, waste handling facilities, power lines, pipe lines and recreation sites common to the area. Topics such as construction site safety and material sampling and testing (soil, gravel, concrete and asphalt) are covered

Prerequisite: EAS 100

Instructor

Instructor name: Neil O'Donnell
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Office Hours (Winter 2018)

Tuesday 11:00 – 11:50, 2:00 – 2:50
Wednesday 1:00 – 2:50
Friday 11:00 – 11:50

Hours of Instruction (Winter 2018)

Monday 2:00 – 4:50 (Lab)
Thursday 2:00 – 3:50

Required Resources

Geotechnical Engineering: Principles and Practices. 2nd edition, ISBN-13: 978-0-13-236868-1

Course Outcomes

Upon successful completion of this course, the student shall be able to:

- establish and explain connections of course knowledge, as it applies to relevant current events, with emphasis on those of environmental concern.
- recognize the scope of geotechnical engineering and the role of the technologist.
- describe the regulatory environment (codes, standards, regulations, standard practices) in which geotechnical engineering is conducted.
- understand the composition, structure and classification of soil, aggregates, concrete, and asphalt.
- identify the various geotechnical issues involved in the construction of foundations, roads, bridges, pond liners, ditches, weirs and dams.
- distinguish the field and laboratory testing equipment frequently used by geotechnical engineers.
- explain the function of various types of heavy construction equipment.
- assess issues related to job site safety and etiquette.
- categorize surficial land formations of importance to geotechnical engineers.

- collect sand and gravel samples in the field, and perform common laboratory soil tests as per standard methods (soil sieve and proctor analysis, hydrometer, specific gravity, unit weight, shrinkage + expansion, compressibility).
- describe concrete tests as per standard methods (slump test, ball penetration test, density, air content, cement content, aggregate sampling, strength tests). (Guest lecture possible).

Evaluation

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|-------------------------------------|------|
| Labs & Assignments | 30% |
| Problems, Quizzes, & Videos | 20% |
| 1 st Half Exam (Week 6) | 10% |
| 2 nd Half Exam (Week 12) | 10% |
| Final Exam | 30% |
| Total | 100% |

A grade of C- is required for progression or transfer.

Lab Sessions

Laboratory work will be conducted weekly starting the 2nd week of classes. Lab protocol will be explained during the first lecture in Week 1, 2018. Labs will be graded. Completion of the labs and a passing grade on that component of the course are considered mandatory to pass ENVT 165. There is a final lab exam – all lab materials are testable.

The labs will run 3 hours per week. Attendance is mandatory. To get credit for a lab, you must attend the scheduled lab session. If you are absent, the mark recorded will be zero.

For laboratory work in this course, the observations you record must be made individually by you. All lab observations and notes must be completed in the lab. You must carry out all calculations yourself, and written answers must be in words composed uniquely by you. Refer to remarks below on Page 5.

Students present for the lab should hand in completed reports or assignments at the end of **that** lab session, or no later than two weeks following, with no penalty. After two weeks, a late penalty will be assessed, as outlined below.

- Due dates usually are set for two weeks following a lab, video assignment, report, field trip, or presentation.
- Otherwise, if submitted within one week (7 days) after the Due Date – 50% of regular mark.
- More than three weeks late – zero assigned.
- Unless specified differently by instructor, labs, reports, and assignments will be submitted electronically via Moodle.
- Any changes due to special circumstances will be communicated by instructor to students via Moodle.

Term Mark

- Mark will be determined from all the labs, reports, and assignments.
- Mark will be weighted average of all submissions.
- If all submissions have been handed in, the lowest mark will be excluded from the calculation.
- If one submission is missing, the calculation will be based on the weighted average of the others. In other words, you can miss one submission without penalty.
- If more than one submission is missing, the calculation will include the zeros for other missing items. If 20% or more of submissions (labs, reports, and assignments) are missing, student will not be allowed to write the final exam. This rule applies, even if the submission has a zero grade.

Grading System

| Descriptor | Alpha Grade | 4.0 Scale | Percent | Rubric for Letter Grades |
|------------------------------------|-------------|-----------|-----------|--|
| Excellent | A+ | 4.0 | > 92.9 | Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format. |
| | A | 4.0 | 85 – 92.9 | |
| | A- | 3.7 | 80 – 84.9 | |
| Good | B+ | 3.3 | 77 – 79.9 | Work is generally of high quality, well developed, well written, has clarity, and uses proper format. |
| | B | 3.0 | 74 – 76.9 | |
| | B- | 2.7 | 70 – 73.9 | |
| Satisfactory Progression | C+ | 2.3 | 67 – 69.9 | Work has some developed ideas but needs more attention to clarity, style and formatting. |
| | C | 2.0 | 64 – 66.9 | |
| | C- | 1.7 | 60 – 63.9 | |
| Poor | D+ | 1.3 | 55 – 59.9 | Work is completed in a general way with minimal support, or is poorly written or did not use proper format. |
| Minimum Pass | D | 1.0 | 50 – 54.9 | |
| Failure | F | 0.0 | < 50 | Responses fail to demonstrate appropriate understanding or are fundamentally incomplete. |

Proposed Schedule of Topics (Lectures)

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|---------|---|
| Week 01 | Groundwater & Mass wasting Review from EAS 100. |
| Week 02 | Unit 1 : Geotechnology |
| Week 03 | Unit 2 : Soil Behaviour |
| Week 04 | Unit 2 : Soil Behaviour (continued) |
| Week 05 | Unit 3 : Materials (possible Guest Lecturer) |
| Week 06 | Unit 4 : Construction & Mid-Term Quiz No.1 |
| Week 07 | Reading Week (February 19 – 23, 2018) |
| Week 08 | Unit 5 : Site Investigation |
| Week 09 | Unit 6 : Groundwater Fundamentals |
| Week 10 | Unit 7 : Geoenvironmental Issues |
| Week 11 | Unit 7 : Geoenvironmental Issues (continued) |
| Week 12 | Unit 8 : Slope Stability |
| Week 13 | Mid-Term Quiz No.2 |
| Week 14 | Course Review and Summary |
| Week 15 | Final Exams |

Proposed Schedule of Laboratory classes Winter 2018

Ensure all students have Keyano-specific WHMIS certification.

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|----------------|--|
| Week 1. | Lab – 1 st Monday of course – Introduction and Planning |
| Week 2. | Lab Assignment – Rocks, Soil Formation |
| Week 3. | Lab Report Groundwater Observation Well |
| Week 4. | Lab - Sieve Analysis |
| Week 5. | Lab Assignment - Grain Curve Problems |
| Week 6. | Lab - 6 Hydrometer Analysis |
| Week 7. | NO LAB. NO CLASSES. Reading Week. |
| Week 8. | Lab - Excavation and Fill |
| Week 9. | Lab – Earthquakes and Volcanoes (geotechnical aspects) |
| Week 10. | Field trips to geotechnical Labs |
| Week 11. | Site Evaluation problems |
| Weeks 12 & 13. | Keyano STC Geotechnical Site Investigation Lab |
| Week 14. | NO NEW LAB. Review session for lab topics. |
| Week 15. | Final Exams |

Please Note:

Date and time allotted to each topic is subject to change.

Performance Requirements**Student Responsibilities**

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar.

More specific details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a students' learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

Specialized Supports

Counselling and Disability Services

Counselling Services provides a wide range of specialized counselling services to prospective and registered students, including personal, career and academic counselling.

SKILL Centre

The SKILL Centre is a learning space in the Clearwater Campus at Keyano College where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff.

The SKILL Centre, through a variety of delivery methods, provides assistance in skill development to Keyano students. Assistance is provided by instructors, staff and student tutors. Individuals wishing to improve their mathematics, writing, grammar, study, or other skills, can take advantage of this unique service.