

Course Outline

Course Title:	Geotechnical Drilling		
Course Number:	GEOL16	Approval Date:	2018/1/11
Course Hours:	45 hours	Academic Year:	2017
Academic School:	School of Environmental & Natural Resource Sciences		
Faculty:	Steve Wilkinson - steve.wilkinson@flemingcollege.ca Jim Smith - jim.smith@flemingcollege.ca		
Program Co-ordinator or Equivalent:	Steve Wilkinson - steve.wilkinson@flemingcollege.ca		
Dean (or Chair):	Rick Gray - Rick.Gray@flemingcollege.ca		

Course Description

This course introduces students to the soil testing and site investigation industry. Drill rig components, operation, servicing, maintenance and repair, drilling practices, and solving down-hole problems will be discussed. Standard procedures and safe work practices required to conduct the various sampling and testing techniques will be gained through hands-on experience in operating labs.

Prerequisites: None.

Corequisites: None.

Learning Outcomes

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

1. Recognize and react to unsafe working conditions, habits, and potential hazards in the work environment according to applicable codes, best practices, and regulations.
2. Know the basic components and their functions on a geotechnical drill rig.
3. Competently operate drilling and associated equipment according to industry standards of operation.
4. Use standard soil sampling and testing procedures to obtain and record accurate information for geotechnical investigation.
5. Determine the necessary equipment and supplies required for geotechnical drilling

Demonstate compliance with all related sections of the common core training modules

Learning Resources

Australian Drilling Industry Training Committee. 2015. Drilling the Manual of Methods, Applications, and Management. Boca Raton, Florida. CRC Press, 780 pp

Fleming College. 2007 Safety Manual for Well Technicians

Assessment Summary

Assessment Task	Percentage
Quizzes	10%
Tests	90%

Student Success: Policies and Procedures

Mutually, faculty and learners will support and adhere to college Academic Regulations, and Student Rights and Responsibilities. The following policies and guidelines have been developed to support the learning process.

Please click on the link for information about:

- [Student Rights and Responsibilities](http://flemingcollege.ca/PDF/Student-Rights-And-Responsibilities.pdf)
(flemingcollege.ca/PDF/Student-Rights-And-Responsibilities.pdf)
- [Grading and Academic Standing](https://department.flemingcollege.ca/hr/attachment/7752/download)
(https://department.flemingcollege.ca/hr/attachment/7752/download)
- [Academic Integrity](http://department.flemingcollege.ca/hr/attachment/7750/download)
(http://department.flemingcollege.ca/hr/attachment/7750/download)
- [Guidelines for Professional Practice: Students and Faculty](http://flemingcollege.ca/PDF/guidelines-for-professional-practice-students-faculty.pdf)
(flemingcollege.ca/PDF/guidelines-for-professional-practice-students-faculty.pdf)

Alternate accessible formats of learning resources and materials will be provided, on request.

Program Standards

The Ministry of Advanced Education and Skills Development oversees the development and the review of standards for programs of instruction. Each college is required to ensure that its programs and program delivery are consistent with these standards, and must assist students to achieve these essential outcomes.

This course contributes to Program Standards as defined by the [Ministry of Advanced Education and Skills Development](#) (MAESD). Program standards apply to all similar programs of instruction offered by

colleges across the province. Each program standard for a postsecondary program includes the following elements:

- **Vocational standards** (the vocationally specific learning outcomes which apply to the program of instruction in question);
- **Essential employability skills** (the essential employability skills learning outcomes which apply to all programs of instruction); and
- **General education requirement** (the requirement for general education in postsecondary programs of instruction that contribute to the development of citizens who are conscious of the diversity, complexity and richness of the human experience; and, the society in which they live and work).

Collectively, these elements outline the essential skills and knowledge that a student must reliably demonstrate in order to graduate from the program. For further information on the standards for your program, follow the MAESD link (www.tcu.gov.on.ca/pepg/audiences/colleges/progstan/)

Detail Plan

Term: 2018 Winter **Session Code:** DC

Faculty: Jim Smith - jim.smith@flemingcollege.ca

Program Co-ordinator or Equivalent: Steve Wilkinson - steve.wilkinson@flemingcollege.ca

Dean (or Chair): Rick Gray - Rick.Gray@flemingcollege.ca

Learning Plan

Wks/Hrs Units	Topics, Resources, Learning, Activities	Learning Outcomes	Assessment
Week 1	LECTURE Introduction to Geotechnical Drilling LAB Safety Assignment Reading & Video review	1, 2	Weekly Drill Report Total of 10%
Week 2	LECTURE Drill Rig Characteristics of a soils rig LAB Components & Operation of Mobile B37	1,2,3	Weekly Lecture Quiz 10% Drill log
Week 3	LECTURE Augers - Types and uses LAB Circle Check, pre-trip service & inspection. Drill set up.	1, 2, 3	Drill log
Week 4	LECTURE Reports and Records LAB Safety during drill operations. Set up and use of Continuous Flight Augers for grab sampling	1, 2,3,4	Drill Log
Week 6	LECTURE Drilling Personnel LAB Safe use of Hoisting Equipment. Set up and safe use of the auto hammer.	1, 2, 3, 4, 5	Lab Test #1 10% Drill log

Wks/Hrs Units	Topics, Resources, Learning, Activities	Learning Outcomes	Assessment
Week 7	LECTURE Drill Rods, Casing and Subs LAB Safe Methods of Collaring the hole Set up and use of Hollow stem augers.	1, 3, 5	Drill log
Week 8	LECTURE Term Test LAB Drill Rods, Casing and Sub Identification	1, 3, 5	Term Test #1 20% Drill log
Week 9	LECTURE Tools & Safe Operation LAB Hoisting and Lowering tools Penetration tests	1, 3, 5	Drill log
Week 10	LECTURE Sampling and Testing tools Penetration Tests LAB Sampling Techniques Piezometer Installation	1, 3, 4	Dual Credit Research Assignment 15% handed out Drill Log
Week 11	LECTURE Piezometers, Observation Wells Packer Testing LAB Lab Test threads and hand tools	1 3, 4, 5	Drill Log
Week 12	LECTURE Shelby Tube Sampling and Vane Tests LAB Shelby Tube Sampling and Vane Tests	1, 3, 5	Drill Log
Week 13	LECTURE Hydrostatic Problems and Flowing Formations LAB Probe sampling with MC5	1, 3, 4	Lab test #2 Dual Credit research assignment due 15% Drill Log
Week 14	LECTURE Geothermal drilling LAB Drill Operation Test	1, 2, 3, 4, 5	Lab Test #3 15%
Week 15	LECTURE Final Exam LAB Drill Operation Test	1, 2, 3, 4, 5	Lab Test #3 15% Final 20%

Assessment Requirements

Assessment Task	Date/Weeks	Course Learning Outcome	Percentage
Weekly drill logs and soil logs	Weekly Drill Report	4	10%
Weekly Lecture quiz Previous Lecture and lab material	Weekly Lecture Quiz	1-5	10%
2 Part Short answer Safety test from Week 1 - 5 I.D. Drill components, control functions and augers components	Lab Test #1 Week 5	1,2	10%
Covers weeks 1-7 Lectures and Labs	Term Test #1 Week 7	1-5	20%
Dual Credit Research Assignment	Lab Test #2 Week 13 Dual Credit Assignment	2	15%

Assessment Task	Date/Weeks	Course Learning Outcome	Percentage
Operating of Mobile B37	Lab Test #3 Week 14-15	3	15%
Covers weeks 1-15 Lectures and Labs	Final Exam Week 15	1-5	20%

Exemption Contact

Steve Wilkinson

Prior Learning and Assessment and Recognition (PLAR)

PLAR uses tools to help learners reflect on, identify, articulate, and demonstrate past learning which has been acquired through study, work and other life experiences and which is not recognized through formal transfer of credit mechanisms. PLAR options include authentic assessment activities designed by faculty that may include challenge exams, portfolio presentations, interviews, and written assignments. Learners may also be encouraged and supported to design an individual documentation package that would meet the learning requirements of the course. Any student who wishes to have any prior learning acquired through life and work experience assessed, so as to translate it into a college credit, may initiate the process by applying through the Registrar's office. For more information please click on the following link: <http://flemingcollege.ca/admissions/prior-learning-assessment-and-recognition>

Course Specific Policies and Procedures

It is the responsibility of the student to retain this course outline for future reference. Course outlines may be required to support applications for advanced standing and credit transfer to other educational institutions, portfolio development, PLAR and accreditation with professional associations.

No recording (audio or visual) of classes is permitted without permission from the appropriate faculty member.

It is important to submit assignments and projects at a specified time and location. The faculty member(s) for this course will provide the detail. It should be noted that the Academic Planning & Operations Office, Student Services, and Admissions and Records, will not accept any assignments or projects.

Final grades in this course are assigned based on the level of academic achievement which corresponds to the assessment components as cited in this course outline. It is important to note that faculty member(s) will not offer additional evaluation activities beyond those cited in this course outline. Whatever the reason, missed evaluations and due dates for assignments, including those missed due to illness, will be dealt with by your faculty member.

Lab activities in this course support skill and knowledge development. In order to be eligible for 100% of the marks associated with this course, attendance and participation is required. Students are eligible to participate in lab activities if they have not missed consecutive labs and are present for 11 out of 14 labs offered. This policy supports a safe learning environment for all individuals. Any exceptions will be dealt with on an individual bases with your instructor.

Cell phone use is NOT allowed in lecture/lab; cell phones must be turned off as they are a distraction to the class. Cell phones are not allowed during testing.

Each student has the responsibility to support academic integrity. Students are expected to work individually on assignments. If group work is permitted, each student in the group is expected to contribute an equitable amount of effort. Reports must be type-written and the sole work of each individual. A student may not write up a lab assignment unless he/she has documented authorization. Assignments that are submitted below a minimum level of competence as determined by the professor will be returned as incomplete. Assignments must be handed in to the professor no later than the beginning of the scheduled lab on the assigned due date. Any assignment handed in after the due date will receive a mark of ZERO.

Make-up arrangements for tests and assignments are normally not allowed. In the event of documented illness or circumstances that prohibit the student from completing work, make-up provisions may be provided. All requests must be received in writing.

Classes will begin on time! Those students arriving late may be refused admission.

If a student misses a lecture or lab, it is the student's responsibility to obtain the material and information from those lectures and labs.

LABS are subject to change due to Weather and Equipment availability.

MANDATORY REQUIREMENTS (As per course)

All listed below safety equipment is required any time students are in labs or in any drilling and blasting training area.

1) CSA Approved Hard Hat (Class E), Hearing protection, appropriate Safety Glasses, Prescription safety glasses must have side shields, CSA Approved 8 inch work boots, Overalls or Coveralls c/w reflective striping, Work Gloves, Jack Knife, Tape Measure, Book, Pencil, Calculator, Watch

STUDENTS MUST HAVE ALL MANDATORY EQUIPMENT FOR LABS!

2) A professional work environment will be stressed at all times, locations and activities. This includes attitude, communication skills, ability to work in teams or groups, safety and appearance.

3) Any student who has any restrictions on his or her ability to participate or perform any aspect of the Resources Drilling Program, must contact Program Co-ordinator at the beginning of the semester.

4) Operating Resources Drilling vehicles in an unsafe manner or, even worse, unlawful manner, will result in ejection from the lab, plus possible disciplinary action.

5) Any student considered by the instructor to be abusive to the equipment, fellow students or the

instructor, will be ejected from the course.

- 6) Students not actively participating in assignments must keep safely away from equipment in operation.
- 7) Before using any drills or vehicle, a complete circle check must be performed.
- 8) The shop must be left clean at all times before leaving lab. Failure to do so may result not being able to participate in future lab activities.
- 9) At the end of each lab period, tools and equipment must be cleaned and returned to their proper places. Failure to do so may result not being able to participate in future lab activities.
- 10) Stealing tools is unlawful; missing equipment affects all users of the R/D shop.
- 11) Any student arriving late without a valid reason will be considered absent.
- 12) When a vehicle is moving or backing up, another student should be present to supervise the operation.
- 13) There is no student parking at the RD&B shop. Walk or ride you bicycle.
- 14) Any person found in possession of, using or still under the influence of intoxicating beverages or stimulants, will be ejected from the lab and could face disciplinary action.
- 15) Student room will be cleaned and maintained by the students on a daily basis.
- 16) Dry baskets shall be used for overnight drying of work clothing only. Any clothing left, may be removed at any time by the faculty only.
- 17) All exposed jewellery to be removed prior to labs.
- 18) Long hair must be tied back to the base of the neck and tucked under coveralls.
- 19) No hoodies or loose fitting clothing
- 20) Only MOL approved safety equipment and apparel will be allowed during class
- 21) The best safety tool is your own common sense. USE IT !