



COURSE OUTLINE

ARC217

Prepared: Sal Ienco Approved: Corey Meunier

Course Code: Title	ARC217: SOIL MECHANICS
Program Number: Name	4080: CIVIL ENG TECHNICIAN
Department:	CIVIL/CONSTRUCTION
Semester/Term:	18W
Course Description:	This is an introductory soil mechanics course. Topics covered include: rock/soil origins, landform analysis, soil identification and classification system, site investigation, laboratory testing, movement of water through soils and compaction control.
Total Credits:	4
Hours/Week:	4
Total Hours:	60
Vocational Learning Outcomes (VLO's):	<p>4080 - CIVIL ENG TECHNICIAN</p> <p>#6. collect, process and interpret technical data to produce written and graphical project-related documents.</p> <p>#7. use industry-specific electronic and digital technologies to support civil engineering projects.</p> <p>#8. participate in the design and modeling phase of civil engineering projects by applying engineering concepts, basic technical mathematics and principles of science to the review and production of project plans.</p> <p>#10. perform quality control testing and the monitoring of equipment, materials and methods involved in the implementation and completion of civil engineering projects.</p> <p>#11. apply teamwork, leadership and interpersonal skills when working individually or within multidisciplinary teams to complete civil engineering projects.</p>
Essential Employability Skills (EES):	<p>#1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</p> <p>#2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>#3. Execute mathematical operations accurately.</p> <p>#4. Apply a systematic approach to solve problems.</p> <p>#7. Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>#8. Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>#9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>#10. Manage the use of time and other resources to complete projects.</p>

#11. Take responsibility for ones own actions, decisions, and consequences.

Course Evaluation:

Passing Grade: 50%, D

Other Course Evaluation & Assessment Requirements:

Grade
Definition Grade Point Equivalent
A+ 90 - 100% 4.00
A 80 - 89%
B 70 - 79% 3.00
C 60 - 69% 2.00
D 50 - 59% 1.00
F (Fail)49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.
S Satisfactory achievement in field /clinical placement or non-graded subject area.
U Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR Grade not reported to Registrar's office.
W Student has withdrawn from the course without academic penalty.

Attendance

Students are only allowed to miss three classes without a documented explanation. One mark will be deducted from your overall grade for each undocumented explanation. The maximum deduction in overall grade is not to exceed 15%. Valid documented explanation include:

- Medical reason
- Family emergency
- Child care issue
- Transportation problems

The documented explanation has to be sent to me by e-mail no later than three days from a missed class. A Doctor note, etc., is to be attached as a PDF file to your e-mail.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Final Test	30%
Mid-term Test	30%
Quizzes/Assignemtns/Laboratories	40%

Books and Required Resources:

Essential of Soil Mechanics by Pearson Custom Library
Publisher: Pearson
ISBN: 10: 1-323-34633-3

Course Outcomes and Learning Objectives:

Course Outcome 1.

Upon successful completion, the student will be able to:

1. Identify soil types, origins and properties.

Learning Objectives 1.

- 1.1 Outline the geological and weathering processes that resulted in rock formations and soil deposits.
- 1.2 Describe the characteristics of common soil deposits in Ontario.
- 1.3 Review soil and geological maps for probable site conditions.

Course Outcome 2.

Upon successful completion, the student will be able to:
2. Solve applied problems in soil mechanics.

Learning Objectives 2.

- 2.1 Identify the mass volume relationship that exist for soils.
- 2.2 Calculate mass/volume relationships for given units of soil

Course Outcome 3.

Upon successful completion, the student will be able to:
3. Use the Unified Soil Classification System (USCS) and assess the capabilities and limitations of soil groups in engineering applications.

Learning Objectives 3.

- 3.1 Identify the laboratory tests that are used the identifying soils using the USCS.
- 3.2 Identify coarse-grained soils and fine-grained soils using the USCS and ending up with both a group symbol and a group name.
- 3.3 Identify soils using the U.S. Department of Agriculture chart for textural classification of soils.

Course Outcome 4.

Upon successful completion, the student will be able to:
4. Describe the manner in which water moves through soils such as permeability and capillary action and the effect that water movement has on drainage and frost heave.

Learning Objectives 4.

- 4.1 Describe the process of water movement through soil particles.
- 4.2 Outline and illustrate the types of water found in soils
- 4.3 Explain the mechanics of capillarity.
- 4.4 Solve permeability problems using Darcy's law of flow.
- 4.5 Construct simple flow nets for various soil-water conditions.
- 4.6 Explain and illustrate dewatering systems for construction sites.
- 4.7 Explain the mechanics of frost heave

Course Outcome 5.

Upon successful completion, the student will be able to:
5. Conduct laboratory tests.

Learning Objectives 5.

- 5.1 Perform a mass-volume relationship test.

- 5.2 Perform a sieve analysis and hydrometer analysis.
- 5.3 Perform an Atterberg Limits test.
- 5.4 Perform a constant head permeability test.
- 5.5 Perform a standard compaction test.

Course Outcome 6.

Upon successful completion, the student will be able to:

- 6. Identify how a construction site can be improved moving earth, compacting and stabilizing it.

Learning Objectives 6.

- 6.1 list the field procedures and equipment used in improving a site
- 6.2 Relate the Unified Soils Classification of coarse-grained and fine-grained soils to their compaction characteristics and recommended compaction equipment
- 6.3 List the field control and field density test that are used in checking soil compaction.

Course Outcome 7.

Upon successful completion, the student will be able to:

- 7. Use industry-specific electronic technologies to support the calculations for typical Soil mechanics problems.

Learning Objectives 7.

- 7.1 Produce a soil profile from given log data using AutoCAD.
- 7.2 Present selected soil mechanics topics using Power Point.
- 7.3 Solve basic soil mechanics problems using Excel spreadsheets.

Course Outcome 8.

Upon successful completion, the student will be able to:

- 8. Apply teamwork, leadership and interpersonal skills when working individually or within a team to complete the survey field camp projects.

Learning Objectives 8.

- 8.1 Take initiative while working with your team to complete in class assignments and laboratories
- 8.2 Assume accountability for self in managing the use of time and resources to meet established deadline.
- 8.3 Work as an effective team player to complete in class assignments and laboratories while promoting a positive work environment.
- 8.4 Use effective time-management and organizational techniques to prioritize project tasks and to accomplish goals set by the team.

Date:

Friday, January 19, 2018

Please refer to the course outline addendum on the Learning Management System for further

 information.