# CIV E 554 - Geotechnical Engineering III
# Course Outline

University of Waterloo

Department of Civil Engineering


***Instructor:***

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***Course Website:***

http://www.civil.uwaterloo.ca/maknight/cive554.htm

***Course Textbook:***

Das Braja, ***Principles of Foundation Engineering*** 5th Edition

***Teaching Assistant:***


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**Objective:**

The objective of this course is to give students an opportunity to apply geotechnical engineering concepts by working on design projects that are structured to reflex the work in a geotechnical consulting company. Students will be given field and testing data from geotechnical case histories. This data will require critical review and will form the bases for each project. Students will be exposed to new topics and concepts through class lectures, tutorials and/or assigned readings.

**Concepts** to be covered in this course include:

- Site investigation and geotechnical testing
- Shear strength of soil
- Embankment design on soft ground
- Stability of slope (natural and excavated)
- Soil reinforced earth design
- Deep foundations design
- Braced excavations earth pressures and design procedures

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**Work Requirement:**

All undergraduate students working in groups of two will be required to submit group design projects. Graduates students will complete individual projects. Design projects will consist of using an assigned borehole record to complete each design project. For each design project a detail geotechnical report will be submitted that describes the design problems, site conditions, design, analysis, and engineering recommendations. Each report must follow the geotechnical report guide. Additional individual assignments may also be assigned throughout the term.

**Course Grading**

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| Design projects | 50% |
| Assignments | 10% |
| Final Exam | 40% |

**IMPORTANT NOTES:**

***To achieve course credit the follow conditions will apply:***

1. All assigned work must be completed and submitted for grading.
2. Grade of 50/100 on the final exam.

**If the final exam score is less than 50 percent the final exam score will be submitted as the final course grade.**

## *Course Reference Resources:*

**Books and Design Manuals:**

1. *Basic Soil Mechanics 4th Ed.*, Whitlow, Roy, *Pearson Education Limited*, 2001.
2. *Geotechnical Engineering - Principles and Practices*, Coduto, D. P, *Prentice Hall, New Jersey*, 1999.
3. *Foundation Design - Principles and Practices 2nd Edition*, Coduto, D. P, *Prentice Hall, New Jersey*, 2001.
4. *An Introduction to Geotechnical Engineering*, Holtz and Kovacs, Prentice-Hall, 1981.
5. *Canadian Foundation Engineering Manual* 3rd Edition, Canadian Geotechnical Society, Bitech Publishers Ltd, 173-1160 Hammersmith Way, Richmond B.C., V7A 5G1, 1992.

6. *Earth Structures Engineering*, R.J. Mitchell, Allen & Unwin, 1983.

7. *Foundation Engineering 2nd ed*, R. Peck, W. Hanson, and T. Thornburn, Wiley & Sons, 1974.

8. *Foundation Engineering Handbook*, edited by Winterkorn and Fang, Van Nostrand Reinhold1, 1st ed, 1976 and 2nd ed 1991.

9. *Foundations and Earth Structure Design Manual DM 7.02*, NAVFAC (Naval Facilities Engineering Command), 1986.

10. *Introductory Soil Mechanics and Foundations: Geotechnical Engineering*, G. F. Sowers, Macmillan, 1979.

11. *Soil Mechanics Design Manual DM 7.01* NAVFAC (Naval Facilities Engineering Command), 1986.

12. *Soil Mechanics in Engineering Practice*, K. Terzaghi and R. Peck, Wiley & Sons, 1967.

13. *Soil Mechanics 6th ed*, Craig, Prentice Hall, 1998.

14. *Soil Mechanics*, Lambe and Whitman, Wiley & Sons, 1969.

15. *The Measurement of Soil Properties in the Triaxial Test*, Bishop and Henkel, Arnold, 1962.

### *Journals:*

1. Canadian Geotechnical Journal
2. Geosynthetic International
3. Geotechniques
4. Computer and Geotechnics
5. American Society of Civil Engineering (ASCE) Soil Mechanics and Foundation Division

### *Conference Proceedings:*

Canadian Geotechnical Society (CGS) conference (Annual)
Specialty conferences sponsored by ASCE
International Geosynthetic Conferences (yearly)