

COURSE INFORMATION

Course Name: Foundation Engineering

Course Code: CIV ENG 4S04

Session Offered: Term I, Fall 2021

Calendar Description: Principles of foundation design; stability analysis; bearing capacity, settlement and location, footings, deep foundations, piles, pile groups and drilled piers; retaining walls

Instructor: SeonHong Na

Phone: ext. 21720

Email: nas1@mcmaster.ca

Office Hours/Contact: TBA

Class Schedule Day(s):

Lecture: Monday, Tuesday, Friday

Time: 10:30am-11:20pm

Location: Virtual (MS Teams)

Tutorial: Thursday

Time: 09:30am-11:20am

Location: KTH B132

Teaching Assistants:

Mahyar Malekzade Kebria (e-mail: malekm9@mcmaster.ca)

Tao Xie (e-mail: xiet20@mcmaster.ca)

Prerequisite: CIVENG 3B03 Geotechnical Engineering II

Website: Avenue to Learn (<http://avenue.mcmaster.ca>). Students are required to check Avenue regularly

Textbook: Braja M. Das, Principles of Foundation Engineering (8th or 9th Edition), Cengage Learning

References/Additional Reading:

Canadian Foundation Engineering Manual (4th edition), 2006

Muni Budhu, Soil Mechanics and Foundations (3rd edition), John Wiley & Sons, 2006

G.E. Barnes, Soil Mechanics (4th edition), Red Globe Press, 2016

NAVFAC Manuals: DM 7.01 and DM 7.02

Joseph E. Bowels, Foundation Analysis and Design, McGraw-Hill, 1995

1. COURSE OBJECTIVES

This is a four-credit undergraduate course in civil engineering. The main purpose of the course is to apply the principles of geology and soil mechanics to the design and analyses of foundations of structures, such as buildings, bridges, and retaining structures. Theoretical and empirical design methods for stability and settlement are discussed using example problems and case histories. Practical application is emphasized through the assignments, which require interpreting results of a soil investigation, engineering analyses and design (applying the principles and concepts of Geotechnical Engineering to 'real' structures). Foundation designs are not unique; although some are better than others.

2. COURSE SPECIFIC POLICIES

The topics in this course will be presented using a traditional lecture format. Students are expected to attend lectures to ensure that they appreciate what material is considered to be most important. **Tutorials will be used to present examples, to review Assignments and Term Tests and to conduct Term tests.** Assignments are intended to help consolidate the understanding

of material presented in lectures as well as extend concepts covered in lectures. There are mandatory **4 Assignments** and **4 Term Tests** throughout this course.

- Students must achieve an average grade of **at least 50% for Term Tests** for the assignments to be counted as part of the final grade.
- Those obtaining **an average grade over 75% on Term Tests will not be required to write the final exam.**
- **Missed work forms will not be accepted for Term Tests.** If any Term Test is missed or MSAFed, one will be required to write the final exam.
- **Late assignments will not be accepted.**
- Each Term Test emphasizes the material covered during the previous two weeks unless otherwise informed.
- Final Exam will include all topics covered in this course.
- Assignments and Term Tests will be submitted and graded via Avenue to Learn.
- No solutions of Assignments and Term Tests will be posted. However, each Assignment and Term Test will be reviewed during the tutorials.

3. SCHEDULE

	Lecture	Tutorial	Assignment
WEEK 01 (09/06~09/10)	Introduction, Soil Mechanics Review	Soil Mechanics Review	Assignment #1
WEEK 02 (09/13~09/17)	Soil Mechanics Review, Site Investigation	Term Test #1 (Thu, 09/16)	-
WEEK 03 (09/20~09/24)	Shallow Foundation 1	Review – Term Test #1	Due – Assignment #1 (Friday, 09/24)
WEEK 04 (09/27~10/01)	Shallow Foundation 2	Review – Assignment #1	Assignment #2
WEEK 05 (10/04~10/08)	Shallow Foundation 3	Term Test #2 (Thu, 10/07)	-
WEEK 06 (10/11~10/15)	Mid-term recess		
WEEK 07 (10/18~10/22)	Deep Foundation 1	Review – Term Test #2	Due – Assignment #2 (Friday, 10/21)
WEEK 08 (10/25~10/29)	Deep Foundation 2	Review – Assignment #2	Assignment #3
WEEK 09 (11/01~11/05)	Deep Foundation 3	Term Test #3 (Thu, 11/04)	-
WEEK 10 (11/08~11/12)	Retaining Structure 1	Review – Term Test #3	Due – Assignment #3 (Friday, 11/12)
WEEK 11 (11/15~11/19)	Retaining Structure 2	Review – Assignment #3	Assignment #4
WEEK 12 (11/22~11/26)	Deep Excavation	-	-
WEEK 13 (11/29~12/03)	Special Topics	Term Test #4 (Friday, 12/02)	Due – Assignment #4 (Friday, 12/04)

Note that this schedule is tentative and can be changed by the instructor.

4. ASSESSMENT OF LEARNING	WEIGHT %
Assignments	30 %
Term Tests	50 %
Final Exam	15 %
Extra (Numerical Modeling, Midterm and Final Evaluations)	5 %

5. LEARNING OUTCOMES

By the end of this course, students should be able to:

- list various types of foundations and describe their applications.
- illustrate the design process of different foundations under the simple field conditions.
- explain fundamental theories and principles (models) in foundation engineering.
- select designing methods and perform analysis that accounts for foundations designs. identify assumptions and constraints in designing different foundations.
- investigate modern/state of the art tools in foundation engineering.

The emphasis in the course will be on relating theory to practice, which is not always clear. Skills and theoretical background obtained in CIVENG 3A03 and 3B03 should be sufficient to carry out analysis and design in this course. Sufficient review of material covered in the Level III courses is provided, focusing on the practical applications. You are expected to have mastered what was taken in Level III. ***Please remember that design in the application of theory to problems, which are not necessarily well defined to provide a solution for the task at hand.***

6. COMMUNICATIONS

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their "@mcmaster.ca" alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

8. POLICIES

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>.

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online.**

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [Academic Accommodation of Students with Disabilities](#) policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

[McMaster Student Absence Form \(MSAF\)](#): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

The McMaster Student Absence Form is a self-reporting tool for **Undergraduate Students** to report absences that last up to 5 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period. You may submit a maximum of 1 Academic Work Missed requests per term. It is **your** responsibility to follow up with your Instructor immediately regarding the nature of the accommodation. If you are absent more than 5 days or exceed 1 request per term you **must** visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation. This form should be filled out immediately when you are about to return to class after your absence.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

PROTECTION OF PRIVACY ACT (FIPPA)

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades, and all other personal information at all times. For example, the submission and return of assignments and the posting of grades must be done in a manner that ensures confidentiality – see <http://www.mcmaster.ca/univsec/fippa/fippa.cfm>.

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer, or the Human Rights Consultant, as soon as possible.

https://www.mcmaster.ca/policy/General/HR/Discrimination_and_Harassment.pdf

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

9. MCMASTER GRADING SCALE

Grade	Equivalent Grade Point	Equivalent Percentages
A+	12	90-100
A	11	85-89
A-	10	80-84
B+	9	77-79
B	8	73-76
B-	7	70-72
C+	6	67-69
C	5	63-66
C-	4	60-62
D+	3	57-59
D	2	53-56
D-	1	50-52
F	0	0-49