

**City University of Hong Kong
Course Syllabus**

**offered by Division of Building Science and Technology
with effect from Semester A 2018/19**

Part I Course Overview

Course Title: Geotechnical and Foundation Engineering

Course Code: BST22347

Course Duration: 1 semester

Credit Units: 3 credits

Level: A2

Proposed Area:
(for GE courses only)

Arts and Humanities
 Study of Societies, Social and Business Organisations
 Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) Nil

Precursors:
(Course Code and Title) Nil

Equivalent Courses:
(Course Code and Title) Nil

Exclusive Courses:
(Course Code and Title) Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to provide students with the fundamental principles and concepts of soil mechanics and engineering techniques, and their applications in geotechnical engineering. Students are also expected to gain the basic knowledge of the physical and mechanical properties of soil and testing methods. To promote students' independent learning and critical thinking, they will engage in a project in which they will examine a specific case or situation in depth and carry out engineering design by applying the knowledge they learnt in the lectures.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs [#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Identify the physical and mechanical properties of soil through interpretation of laboratory soil testing results.		✓		
2.	Analyse slope stability, excavation and dewatering, compaction, settlement, ground movement and soil strength by applying basic soil mechanics and engineering techniques.			✓	
3.	Design geotechnical structures such as retaining walls and shallow foundations by applying basic principles of soil mechanics.			✓	

* If weighting is assigned to CILOs, they should add up to 100%.

100%

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)
(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures (Average class size: Around 100 students)	To systematically deliver the basic principles of soil mechanics, engineering techniques, retaining structure and foundation design concepts.	✓	✓	✓	3 hrs/week for 12 weeks
Laboratory work	To provide a hands-on opportunity for each student to familiarize with the physical and mechanical properties of soil. Students are required to study laboratory manual online before carrying out the laboratory work.	✓			3 hrs/week for 1 week
Coursework Assignments	To reinforce students' achievement of the CILOs and to facilitate their active learning particularly on the applications of soil mechanics, students are required to complete coursework assignments including independent in-class exercises and/or group design work.		✓	✓	

4. Assessment Tasks/Activities (ATs)
(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting*	Remarks
	1	2	3		
Continuous Assessment: <u>40%</u>					
Laboratory report	✓			10%	
Quiz	✓	✓		10%	
Coursework Assignments	✓	✓	✓	20%	
Examination: <u>60%</u> (duration: 2.5 hours, if applicable)					
				100%	

* The weightings should add up to 100%.

Note: A student must obtain a minimum mark of 35 in both coursework and examination (if applicable) and an overall mark of 40 to pass the course.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Laboratory Report	ABILITY to interpret experimental results, to present the findings in systematic manner and to demonstrate understanding of the properties of soil	High	Significant	Moderate	Basic	Not even reaching marginal levels
Coursework Assignments	CAPACITY in understanding the basic principles and concepts of soil mechanics. ABILITY to present ideas in a logical order via written texts, calculations and graphical means. ABILITY to analyse a specific case or real life situation and to apply the principles of soil mechanics for solving geotechnical engineering and/or foundation design problems. The assessment tasks/activities were completed accurately and on time	High	Significant	Moderate	Basic	Not even reaching marginal levels
Quiz	ABILITY to apply basic principles of soil mechanics, engineering techniques, retaining structure and foundation design concepts.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Soil mechanics

- soil classification, physical and mechanical properties, effective stress concept, flow of water in soil, soil compaction, consolidation, shear strength

Geotechnical analysis and design

- lateral earth pressure, design of earth retaining structures, slope stability analysis, design of shallow foundations

Laboratory testing

- soil classification, moisture content, liquid limit, plastic limit, plasticity index

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Craig, R.F. (2004) <i>Craig's Soil Mechanics</i> . 7th ed., New York: Spon Press.
2.	Tomlinson, M.J. (2001) <i>Foundation Design and Construction</i> . 7th ed., London: Prentice Hall.
3.	Smith, G.N. (1998) <i>Elements of Soil Mechanics</i> . Oxford ; Malden : Blackwell Science.
4.	Powrie, W. (2004) <i>Soil Mechanics: Concepts and Applications</i> , 2nd Ed., New York: Spon Press.
5.	Geotechnical Engineering Office (1990) <i>Review of design methods for excavations</i> . GCO Publication No.1/90, Hong Kong: Govt. Printer.
6.	Geotechnical Engineering Office (2006) <i>Foundation Design and Construction</i> . GEO Publication No.1/2006, Hong Kong: Govt. Printer.
7.	Buildings Department (2004) <i>Code of Practice for Foundation</i> , Hong Kong: Govt. Printer
8.	Geotechnical Engineering Office (1984) <i>Geotechnical Manual for Slopes</i> , 2nd Edition, Hong Kong: Govt. Printer.
9.	Geotechnical Engineering Office (1993) <i>Geoguide 1: Guide to Retaining Wall Design</i> . 2nd Edition, Hong Kong: Govt. Printer.
10.	Geotechnical Engineering Office (1987) <i>Geoguide 2: Guide to Site Investigation</i> . Hong Kong: Govt. Printer.
11.	Geotechnical Engineering Office (1988) <i>Geoguide 3: Guide to Soil and Rock Descriptions</i> . Hong Kong: Govt. Printer.