City University of Hong Kong
Course Syllabus

offered by Department of Architecture and Civil Engineering
with effect from Semester A 2022/23

Part I Course Overview

Course Title:	Geomechanics
Course Code:	CA6694
Course Duration:	1 Semester (Some courses offered in Summer Term may start a few weeks earlier than the normal University schedule. Please check the teaching schedules with CLs before registering for the courses.)
Credit Units:	3
Level:	P6
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

The course introduces concepts and theories in geomechanics (soil and rock mechanics) and geotechnics. Analytical and empirical methods will also be introduced to solve geotechnical design problems. The course aims to foster a curiosity and an aptitude towards independent discovery about geotechnical structures and the behaviour of soils.

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.	Explain the importance of specialized theories and analytical/empirical methodologies in geomechanics;			✓	
2.	Experience specialized methods in experimental soil mechanics with emphasis on recent research progress internationally;		✓	✓	
3.	Predict ground and geo-systems behavior under variable loading conditions;		✓	✓	
4.	Characterize ground behavior using soil models;		✓	✓	
5.	Understand the need for an enquiring mind when new soils are encountered.		✓	✓	
		100%			

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	4	5	
Lectures	Taught classes on geomechanics	✓	✓	✓	✓	✓	
Tutorials	Example calculations applying models learnt in lectures			✓	✓		
Laboratory	Innovative tests exploring soil behavior	✓	✓	✓		✓	

Semester Hours:	4 hours per week
Lecture/Tutorial/Laboratory Mix:	Lecture (2); Tutorial (1); Laboratory (1)

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

Assessment Tasks / Activities	CILO No.					Weighting	Remarks
	1	2	3	4	5		
Continuous Assessment: 50%							
Mid-term test	✓	✓	✓	✓		20%	
Assignment 1	✓		✓	✓		10%	
Assignment 2	✓		✓	✓		20%	
Examination: 50% (duration: 3 hour(s))							
Examination	✓	✓	✓	✓	✓	50%	
						100%	

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%

5. Assessment Rubrics

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

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Mid-term test	ABILITY to APPLY the understanding of specialized geomechanics chapters learnt in lab classes, tutorials and lectures	High	Significant	Basic	Not even reaching marginal levels
Assignment 1	ABILITY to APPLY the understanding of soil behavior learnt in lab classes, tutorials and lectures	High	Significant	Basic	Not even reaching marginal levels
Assignment 2	ABILITY to APPLY the understanding of specialized geomechanics chapters learnt in lab classes, tutorials and lectures	High	Significant	Basic	Not even reaching marginal levels
Examination	ABILITY to APPLY the understanding of specialized ground behavior learnt in lab classes, tutorials and lectures	High	Significant	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Mid-term test	ABILITY to APPLY the understanding of specialized geomechanics chapters learnt in lab classes, tutorials and lectures	High	Significant	Moderate	Basic	Below standard
Assignment 1	ABILITY to APPLY the understanding of soil behavior learnt in lab classes, tutorials and lectures	High	Significant	Moderate	Basic	Below standard
Assignment 2	ABILITY to APPLY the understanding of specialized geomechanics chapters learnt in lab classes, tutorials and lectures	High	Significant	Moderate	Basic	Below standard
Examination	ABILITY to APPLY the understanding of specialized ground behavior learnt in lab classes, tutorials and lectures	High	Significant	Moderate	Basic	Below standard

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.)

Critical state soil mechanics and its limitations, Nonlinearity of stiffness, Behavior of ideal materials, Behavior of natural soils and rocks, behavior of geo-systems, constitutive models, discrete and continuous materials, failure criteria, anisotropy, settlement analysis, site investigation, origins and characteristics of soils and rocks.

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.)

1.	Nil

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

1.	Bolton, M.D and K. (1998). A Guide to Soil Mechanics. Chung Hwa Books.
2.	Coduto, D.P. (2001). Foundation Design: Principles and Practices. 2nd Ed. Prentice-Hall.
3.	Craig, R.F. (2004). Craig's Soil Mechanics. 7th Ed. Spon Press.
4.	Das B.M. (1999). Principles of Foundation Engineering. 4th Ed. PWS Publishing.
5.	Geotechnical Control Office (GCO) (1984). Geotechnical Manual for Slopes. The Government of Hong Kong Special Administration Region, 2nd Edition, Hong Kong.
6.	Geotechnical Control Office (GCO) (1987). Geoguide 2: Guide to Site Investigation. The Government of Hong Kong Special Administration Region. Hong Kong.
7.	Geotechnical Control Office (GCO) (1987). Geoguide 3: Guide to Soil and Rock Descriptions. The Government of Hong Kong Special Administration Region. Hong Kong.
8.	Geotechnical Engineering Office (GEO) (1993). Geoguide 1: Guide to Retaining Wall Design. 2nd Edition, The Government of Hong Kong Special Administration Region, Hong Kong.
9.	Muir Wood, D. (1990). Soil Behaviour and Critical State Soil Mechanics. Cambridge University Press.
10.	Powrie, W. (2004). Soil Mechanics: Concepts and Applications. 2nd Ed. Spon Press.
11.	Atkinson & Bransby (1978). The Mechanics of Soils. McGraw-Hill
12.	Atkinson (1993). An Introduction to the Mechanics of Soils and Foundations. Mc-Graw-Hill.
13.	Mitchell, J. K. and Soga, K. (2005). Fundamentals of Soil Behavior. Wiley.