

CA3687: SOIL MECHANICS

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Soil Mechanics

Subject Code

CA - Civil and Architectural Engineering

Course Number

3687

Academic Unit

Architecture and Civil Engineering (CA)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

CA2560 Geology for Engineers (precursor w.e.f. 17/18) or CA3664 Geology for Engineers

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The course introduces basic concepts in soil mechanics, encompassing physical and mechanical properties of different types of soil. The course forms a foundation for students to take advanced geotechnical courses.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 app.)		
		DEC-A1	DEC-A2	DEC-A3
1	Experience the procedures in carrying out laboratory tests for basic soil properties which are commonly used in civil engineering;		x	
2	Interpret soil physical and mechanical properties from data obtained in laboratory experiments;		x	
3	Predict soil behavior under compression and shearing, and water flow in soil; and		x	
4	Characterize soil behavior using stress paths and soil models.		x	

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 real-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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Explain the key concept and fundamental theories in soil mechanics	2, 3, 4	2 hours/week
2	Laboratory	Experience the procedures in carrying out laboratory tests for basic soil properties which are commonly used in civil engineering	1, 2	2 hours/week

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Laboratory Report	1, 2	20	
2	Assignments	2, 3, 4	10	
3	Mid-term quiz	2, 3, 4	20	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Additional Information for ATs

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%.

Assessment Rubrics (AR)**Assessment Task**

Laboratory Report

Criterion

Ability to understand and apply soil mechanics concepts for different types of soil.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Assignments

Criterion

Ability to understand and apply soil mechanics concepts for different types of soil.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Mid-term quiz

Criterion

Ability to understand and apply soil mechanics concepts for different types of soil.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Ability to understand and apply soil mechanics concepts for different types of soil.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information**Keyword Syllabus**

Soil classification, physical and mechanical properties, phase relationships, soil compaction, effective stress concept, stress distributions in soil, water flow in soil, settlement calculations, consolidation, shear strength, critical state concept, stress paths, soil models

Reading List**Compulsory Readings**

Title	
1	Craig, R.F. 2004. Craig's Soil Mechanics. 7th Ed. Spon Press.

Additional Readings

Title	
1	Geotechnical Control Office (GCO) 1984. Geotechnical Manual for Slopes. The Government of Hong Kong Special Administration Region, 2nd Edition, Hong Kong.
2	Geotechnical Control Office (GCO) 1987. Geoguide 2: Guide to Site Investigation. The Government of Hong Kong Special Administration Region. Hong Kong.
3	Geotechnical Control Office (GCO) 1987. Geoguide 3: Guide to Soil and Rock Descriptions. The Government of Hong Kong Special Administration Region. Hong Kong.
4	Geotechnical Engineering Office (GEO) 1993. Geoguide 1: Guide to Retaining Wall Design. 2nd Edition, The Government of Hong Kong Special Administration Region, Hong Kong.
5	Powrie, W. 2004. Soil Mechanics: Concepts and Applications. 2nd Ed. Spon Press.