CA2560: GEOLOGY FOR ENGINEERS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Geology for Engineers

Subject Code
CA - Civil and Architectural Engineering
Course Number
2560

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
Nil

Equivalent Courses
CA3664 Geology for Engineers, BC3664/BC3664P Geology and Rock Mechanics

Exclusive Courses
Nil

Part II Course Details

Abstract
The course is intended to introduce geology, especially the structural, physical and mechanical properties of rocks and soils, and its application in civil and construction engineering. In examining the geological origins and subsequent geological

processes soils and rocks undergo the course provides a basis for the better understanding of the mechanical behaviour of these materials. It aims to foster a curiosity and an aptitude towards independent discovery in the geological environment by highlighting the variety of geological processes and hazards that occur and the need for engineers therefore to develop their own geological and ground model of the local environment.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the process of rock formation;			x	
2	Recognize simple mineral and rock types;		x		
3	Determine the strength and deformation of rock/ground mass;			x	
4	Identify potential hazards arising from geological and ground model;			x	
5	Discuss the need to develop an enquiring attitude if geological hazards are to be identified.		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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Students will engage in formal lectures to gain knowledge about the geological processes of soil/rock formation, rock strength and deformation, assessment of geological hazards.	1, 2, 3, 4	2 hours/week
2	Lab Classes	Students will participate in lab classes for first-hand experience on rock/soil identification and description, rock behaviour and geological interpretation.	2, 3, 4, 5	1 lab visit

3	Tutorials & Group Project on the Geology of Hong Kong	Students will participate in tutorial activities to extend their knowledge from the lectures in practical problems and will participate in groups to develop a technical report relevant to the geology and geotechnical engineering in Hong Kong	1, 2, 3, 4	1 hour/week

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Geology of Hong Kong Report	1, 2, 3, 4, 5	15		Yes
2	Assignments & Lab activity	1, 2, 3, 4, 5	15		Yes
3	Mid-Term Test	1, 2, 3, 4	20		No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

Students in order to submit the “Group project on the geology of Hong Kong”, they need to attend the lab session. Lab attendance is compulsory; students must attend the lab session they have been assigned by the course Leader. 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

Geology of Hong Kong Report

Criterion

ABILITY to DEVELOP a technical piece of work describing the specific geological and geotechnical characteristics relevant to Hong Kong environment

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Below standard

Assessment Task
Assignments & Lab activity

Criterion
CAPACITY to ANALYSE rock behaviour through laboratory tests and DISCUSS CRITICALLY the data.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Below standard

Assessment Task
Mid-Term Test

Criterion
ABILITY to DESCRIBE t theories, processes and techniques of interpretation in geology and rock mechanics that are learnt in lab classes, tutorials, and lectures.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)

Below standard

Assessment Task
Examination

Criterion
ABILITY to DESCRIBE the theories, processes and techniques of interpretation in geology and rock mechanics that are learnt in lab classes, tutorials, and lectures and ANALYZE rock mechanics problems.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Below standard

Part III Other Information

Keyword Syllabus
Origin, texture, mineralogy and alteration of igneous, sedimentary and metamorphic rocks, mineral and rock identification and classification, basic structural geology, geological exploration, processes of weathering, rock structure and fault activity, rock/ground deformability and strength, geological hazards, geological and geotechnical problems in Hong Kong.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	West T.R., (2010). Geology Applied to Engineering. Waveland Press Inc (Original Edition:1995, Reissued:2010)
2	de Vallejo L.I.G. and Ferrer M. (2011). CRC Press Taylor & Francis Group.
3	Price D.G. and de Freitas M.H. (2009). Engineering Geology, Principles and Practice, Springer.
4	Hencher S. (2012). Practical Engineering Geology, Spon Press.
5	Singh B. and Goel R.K. (2011). Engineering Rock Mass Classification, Elsevier.