

CA3664: GEOLOGY FOR ENGINEERS

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Geology for Engineers

Subject Code

CA - Civil and Architectural Engineering

Course Number

3664

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

CA2560 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 its application in construction engineering. 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 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;	20		x	x
2	Recognize simple mineral and rock types;	20	x	x	x
3	Determine the strength and deformation of rock mass;	20		x	x
4	Identify potential hazards associated with construction activities from geological map and site investigation records;	20	x	x	
5	Understand the need to develop an enquiring attitude if geological hazards are to be identified.	20	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 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.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lectures	PowerPoint based lectures describing geological processes and hazards.	1, 3, 4	2
2	Field Trips	1 to 2 one day field trips to key geological exposures in Hong Kong	1, 2, 5	Maximum 16 hrs total
3	Laboratory	Laboratory and tutorial sessions to 1) learn use of key geological apparatus and techniques, 2) assess geological conditions from maps and sections	1, 2, 3, 4, 5	2

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks
1	Mid-Term Test	1, 2	20	
2	Field Trip Reports	1, 2, 5	10	
3	Laboratory Reports	2, 3	20	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

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**

Mid-Term Test

Criterion

ABILITY to UNDERSTAND and APPLY theories and knowledge to rock identification

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

Field Trip Reports

Criterion

CAPACITY to EXPLORE and INVESTIGATE field sites, with CAPACITY to ORGANISE data and record them concisely in notes, maps and sketches

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

Laboratory Reports

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)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

ABILITY to UNDERSTAND and APPLY theories and knowledge to identification of rocks, geological hazards and their relationship with geotechnical engineering

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

Origin, texture, mineralogy and alteration of igneous, sedimentary and metamorphic rocks, mineral and rock identification and classification, basic structural geology, geological mapping and site investigation, processes of weathering, rock structure and fault activity, rock deformability and strength, geological hazards, geological field trip and applications.

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Blyth, F.G.H. and de Freitas, M. H. (2006). A geology for engineers. Butterworth Heinemann (8th ed.). ISBN 0750651075.
2	Hoek, E. and Bray, J.W. (1981). Rock slope engineering. E & FN Spon. ISBN 0419160108.
3	Wyllie, D.C. (1999). Foundations on Rock. E & FN Spon. ISBN 0419232109.
4	Fletcher, C.J.N. (2004). Geology of Site Investigation Boreholes from Hong Kong. ISBN 988-97836-1-4