

# CA2560: GEOLOGY FOR ENGINEERS

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## Effective Term

Semester B 2022/23

## 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 DEC-A1 app.)	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	Understand 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.

### Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lectures	Taught classes on geological processes, hazards and applications. Case studies.	1, 2, 3, 4	3 hours/week
2	Lab Classes	Lab classes on rock/soil identification and description, rock behaviour and geological interpretation.	2, 3, 4, 5	1 lab visit
3	Field Trip	Field Trip: Characterisation and structure of sedimentary and volcanic rocks.	1, 2, 3, 4	1 x 8-hour trip in total

**Assessment Tasks / Activities (ATs)**

	<b>ATs</b>	<b>CILO No.</b>	<b>Weighting (%)</b>	<b>Remarks (e.g. Parameter for GenAI use)</b>
1	Field Trip Report	1, 2, 3, 4, 5	15	
2	Assignments & Lab activity	1, 2, 3, 4, 5	15	
3	Mid-Term Test	1, 2, 3, 4	20	

**Continuous Assessment (%)**

50

**Examination (%)**

50

**Examination Duration (Hours)**

2

**Additional Information for ATs**

Students in order to submit “field trip report” , they need to attend the field trip. Students who do not attend the field trip will be requested to perform an alternative coursework.

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**

Field Trip Report

**Criterion**

ABILITY to APPLY the techniques and discoveries learnt in lectures, lab classes and tutorials to on-site assessment of geology and to RECORD the observations made.

**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 &amp; 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

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**Assessment Task**

Mid-Term Test

**Criterion**

ABILITY to APPLY the understanding of processes and techniques of interpretation in geology and rock mechanics that are learnt in lab classes, tutorials, field trip and lectures.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Below standard

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**Assessment Task**

Examination

**Criterion**

ABILITY to APPLY the understanding of processes and techniques of interpretation in geology and rock mechanics that are learnt in lab classes, tutorials, field trip and lectures.

**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 field trip and applications.

**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.