

# GE1313: EARTHQUAKES

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Earthquakes

### Subject Code

GE - Gateway Education

### Course Number

1313

### 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

### GE Area (Primary)

Area 3 - Science and Technology

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Nil

### Equivalent Courses

Nil

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course introduces students to earthquakes in aspects related to science, engineering and the society. Science aspects include the origin of earthquakes and their geographical distribution, how they propagate through the earth crust and affect human beings. Engineering and social aspects cover the common methods used for quantifying and monitoring earthquakes, their damage on constructed facilities, preparedness and disaster mitigation strategies. Teaching and learning activities include formal lecture, discussion, and experimental demonstration. Students from all disciplines are welcome. Students shall pursue a topic of their own interest and background in a group project with presentation, which will allow them to consolidate the materials learnt in the course for learning development in their own discipline of focus.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the overall earthquake process and implications, including the origin, geographical distribution, seismic wave propagation and attenuation.	20	x		
2	Describe common scales used for quantifying earthquakes, the principles involved; and interpret earthquake events in news and earthquake monitoring websites.	20	x		
3	Describe the primary effects of an earthquake event to human beings; how constructed facilities are damaged and common solutions adopted for buildings and lifeline facilities.	20	x		
4	Describe the secondary effects of an earthquake event to human beings, e.g., landslides, tsunami and post-earthquake fire.	10	x		
5	Describe existing preparedness and disaster mitigation strategies against earthquake risks.	10	x		
6	Develop an approach to understand and discover earthquake related issues of personal interest; and explain to public audience in a comprehensible manner	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 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)**

	<b>TLAs</b>	<b>Brief Description</b>	<b>CILO No.</b>	<b>Hours/week (if applicable)</b>
1	Lecture	overall earthquake process, seismic wave phenomena	1, 2	
2	Lecture	Experimental demonstration of seismic wave phenomena	1	
3	Lecture	earthquake magnitudes and intensities; case studies and discussion using current and past news of earthquake events.	2	
4	Lecture	seismicity and seismic monitoring in Hong Kong, preparedness and mitigation	5	
5	Lecture	primary effects of earthquakes (e.g., buildings, lifelines).	3	
6	Lecture	secondary effects of earthquakes (e.g., landslide, tsunami, fire, economic loss).	4	
7	Group Project/Group Presentation	Students in group pursue a topic of their own interest and background, in consultation with instructor. They are to submit a group report explaining the issue focused and discussing their findings in the context of course./ Students shall present their group projects to the whole class, followed by Q & A.	1, 2, 3, 4, 5, 6	

**Assessment Tasks / Activities (ATs)**

	<b>ATs</b>	<b>CILO No.</b>	<b>Weighting (%)</b>	<b>Remarks (e.g. Parameter for GenAI use)</b>
1	Two Assignments	1, 2, 3, 4	10	
2	Group project report	1, 2, 3, 4, 5, 6	40	
3	Group project presentation	1, 2, 3, 4, 5, 6	20	

**Continuous Assessment (%)**

**Examination (%)**

30

**Examination Duration (Hours)**

1

**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**

Two Assignments

**Criterion**

Capacity to discuss earthquake process and implications

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

Excellent grasp of the earthquake process and implications

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

Some grasp of the earthquake process and implications

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

Fair grasp of the earthquake process and implications

**Marginal (D)**

Little grasp of the earthquake process and implications

**Failure (F)**

Not even reaching marginal level

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**Assessment Task**

Group project report

**Criterion**

Capacity to explain the issue focused and discuss their findings

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

Clear description of problem focused in relation to course context

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

Some description of problem focused in relation to course context

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

Insufficient description of problem focused in relation to course context

**Marginal (D)**

Little or no description of problem focused in relation to course context

**Failure (F)**

Not even reaching marginal level

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**Assessment Task**

Group project presentation

**Criterion**

Capacity to explain the issue focused and discuss their findings

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

Clear description of problem focused in relation to course context

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

Some description of problem focused in relation to course context

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

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Not even reaching marginal level

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**Assessment Task**

Examination

**Criterion**

Capacity to discuss earthquake process and implications

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

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**Part III Other Information**

**Keyword Syllabus**

Earthquake hazards, ring of fire, wave propagation, earthquake magnitude and intensity, tsunami, earthquake loss, seismic monitoring

**Reading List**

**Compulsory Readings**

Title	
1	Lecture notes

**Additional Readings**

Title	
1	United States Geological Survey (2001), This Dynamic Earth.
2	Bolt BA (2004). Earthquakes. W. H. Freeman, New York.
3	Kramer SL (1996). Geotechnical Earthquake Engineering. Prentice-Hall.
4	Reiter L. (1990). Earthquake Hazard Analysis. Columbia University Press.
5	This Dynamic Earth', online version, USGS <a href="http://pubs.usgs.gov/gip/dynamic/">http://pubs.usgs.gov/gip/dynamic/</a>
6	Earthquake Hazards Program, United States Geological Survey (USGS) <a href="http://earthquake.usgs.gov/">http://earthquake.usgs.gov/</a>
7	China Seismological Bureau (中國地震信息網) <a href="http://www.csi.ac.cn">http://www.csi.ac.cn</a>
8	HK Observatory [earthquakes in HK] <a href="http://www.weather.gov.hk/gts/quake/seismic_mon_e.htm?defaultpopup=0">http://www.weather.gov.hk/gts/quake/seismic_mon_e.htm?defaultpopup=0</a>
9	Consortium of Organizations for Strong-Motion Observation Systems (COSMOS) <a href="http://db.cosmos-eq.org/scripts/default.plx">http://db.cosmos-eq.org/scripts/default.plx</a>

**Annex (for GE courses only)**

**A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:**

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

**PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology**

1, 3, 4, 5

**PILO 3: Demonstrate critical thinking skills**

6

**PILO 4: Interpret information and numerical data**

1

**PILO 5: Produce structured, well-organised and fluent text**

6

**PILO 6: Demonstrate effective oral communication skills**

6

**PILO 7: Demonstrate an ability to work effectively in a team**

6

**PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation**

6

**B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.**

**Selected Assessment Task**

Student project