GE1301: CLIMATE CHANGE AND EXTREME WEATHER

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Climate Change and Extreme Weather

Subject Code
GE - Gateway Education
Course Number
1301

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

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 covers issues such as weather and climate in our lives, our changing climate history, sea level rise and our future, ozone hole vs global warming, El Niño events and disastrous climate, tropical cyclones, and response to climate change.

This course intends to enable students to contribute to the debate on global environmental change and societal adaption strategies, to understand the latest innovative development in the discipline, to connect scientific world with daily life and to help students become better informed citizens and decision makers.

This course aims to provide students with an understanding of contemporary climate issues, to broaden students' knowledge about the myth and facts of global warming, and to raise his/her awareness of extreme weather in a changing world.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand the earth system and greenhouse effect	15	x		
2	Explain the difference between weather and climate	10	x		
3	Understand ENSO and severe weather events	20	x		
4	Describe sea level rise, tsunami and earthquake hazards	15	x		
5	Understand mechanisms responsible for climate change: past, present, and future, and the latest innovative development in the discipline	20	x		
6	Apply the acquired knowledge to explain the possible causes of global warming, its effects and solutions	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)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Introduction of basic concepts, ideas, and arguments.	1, 2, 3, 4, 5, 6	1.5
2	Tutorials	Group discussion/ presentation.	1, 2, 3, 4	1.5

3	Projects	Team work/ Problem solving, critical and creative thinking, report writing.	5, 6	2
4	Seminars	Knowledge and experience sharing by experts from HKO.	3	
5	Fieldwork	Visit to HKO, EPD or airport.	5, 6	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Participation: Students' involvement throughout the course.	1, 2, 3, 4, 5, 6	10	
2	In-class assignments: Short written questions to assess students' knowledge and understanding in climate change and severe weather.	1, 2, 3	20	
3	Individual homework: Students are required to write a report on extremes events of their choice.	4	30	
4	Group discussions/ presentation.	2, 3, 4, 5	40	

Continuous Assessment (%)

100

Examination (%)

0

Examination Duration (Hours)

N/A

Additional Information for ATs

Scheduled activities: 1.5 hrs lecture + 1.5 hrs tutorial including team projects (hands-on experiments), group presentations and group assessment exercises. Group discussion is a good TLA as students need to do prior research before the activity. Furthermore, if students are formed into teams, they can gain experience with teamwork. The maximum class size is 60.

Examination duration: N/A
Percentage of coursework, examination, etc.: 100% by coursework

To pass a course, a student must do ALL of the following:
1) obtain at least 30% of the total marks allocated towards coursework (combination of assignments, pop quizzes, term paper, lab reports and/ or quiz, if applicable);
2) obtain at least 30% of the total marks allocated towards final examination (if applicable); and
3) meet the criteria listed in the section on Assessment Rubrics.

Assessment Rubrics (AR)

Assessment Task
1. In-class assignments

Criterion
Ability to analyse questions related to the earth system and greenhouse effect

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
2. Individual homework

Criterion
Ability to analyse questions related to atmospheric circulation and extreme weather events

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
3. Group discussions/presentation

Criterion
Ability to analyse questions related to climate change and climate adaptation

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

1. Weather and severe weather in our lives
The weather around us, Cyclones and frontal systems, Severe weather: thunderstorms, tornadoes, and hurricanes

2. Our changing climate history
Climate through the ages, Six historic periods, Global climate regions, Extreme climate environments, Records of climate change, Natural causes of climate change

3. Sea level rise, tsunami and earthquake hazards
Glaciers, Sea level rise, Plate tectonics, Seismic waves and earthquake detection, Earthquake hazards, Earthquake safety

4. El Niño events and disastrous climate
Ocean currents and circulation, El Niño-Southern Oscillation (ENSO), Impacts of ENSO. Severe hazards: droughts, floods, snow storms, heat waves.

5. Global Change and Response to climate change
Alternative climates, Greenhouse gases and global change, Carbon footprint for a sustainable living: carbon cycle, carbon footprint, human effects, personal responsibility for global warming.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	The Good Earth. Introduction to Earth Science. McConnell Steer Knight Owens. The McGraw-Hill Companies
2	The Greenhouse Effect, Diana Falloon (NSW, 1993)
3	Meteorology Today: An Introduction of Weather, Climate, and the Environment, C. Donald Ahrens (Brooks/Cole, 6th edition, 2000)
4	http://www.co2science.org/subject/e/ensoew.php
5	Understanding Weather and Climate, E Aguado and J E Burt (Prentice Hall, 2001)
6	Weather: Eyewitness Companion (Dorling Kindersley, 2008)
7	Extreme weather and climate, C. Donald Ahrens and Perry Samson (Brooks/Cole, 2011)
8	Meteorology: understanding the atmosphere, Steven A. Ackerman and John A. Knox (Jones & Bartlett Learning, 2014)
9	http://weather.cityu.edu.hk/

10	http://www.cityu.edu.hk/gcacic/index.htm
11	http://www.hko.gov.hk/education/edu01met_e.htm
12	http://www.metoffice.gov.uk/learning/learn-about-the-weather
13	http://www.metoffice.gov.uk/climate-guide

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 1: Demonstrate the capacity for self-directed learning

1, 2, 3, 4, 5

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

1, 2, 3, 4

PILO 3: Demonstrate critical thinking skills

5

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

1, 2, 3, 4, 5

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

1, 2, 3, 4, 5

PILO 9: Value ethical and socially responsible actions

5

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

1, 2, 3, 4, 5

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

Hands on experiments: analysis of each student’ s carbon footprint. An opportunity for students to clarify significant notions through their own efforts, an exercise for students to be aware that there is an alternative to reduce the carbon footprint at home and school. Students are required to work out well argued and defensible positions of their own through a process of collaboration.

Related CILO(s): CILO 5, CILO 6
Related GE PILO(s): PILO 3, PILO7, PILO 9, PILO 10