

**City University of Hong Kong  
Course Syllabus**

**offered by School of Energy and Environment  
with effect from Semester A 2016/17**

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**Part I Course Overview**

<b>Course Title:</b>	Climate Change: Science, Adaptation and Mitigation
<b>Course Code:</b>	SEE5202
<b>Course Duration:</b>	One semester
<b>Credit Units:</b>	3
<b>Level:</b>	P5
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	Nil
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	Nil

## Part II Course Details

### 1. Abstract

It is widely recognised that climate change is one of the most important problems of our time. This course will cover the physical science underlying climate as well as the impacts on humans and the environment. It will also cover proposals to counteract or mitigate climate change and strategies for coping or adapting to our new reality. After completing this course, students will be equipped with the knowledge required to analyse climate-related issues.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe the key physical mechanisms behind climate and climate change	30	✓		
2.	Explain the factors limiting our ability to model or predict the climate	15	✓		
3.	Describe impacts of climate change on natural resources and human settlements	20	✓	✓	
4.	Explain how adaptation is constrained by needs and options	10	✓	✓	
5.	Describe geoengineering strategies	25	✓	✓	
		100%			

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.*

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Lectures		✓	✓	✓	✓	✓	3

#### 4. Assessment Tasks/Activities (ATs)

*(ATs are designed to assess how well the students achieve the CILOs.)*

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4	5			
Continuous Assessment: 60%								
Homework	✓	✓					5	
Midterm	✓	✓	✓				20	
Class participation/discussion	✓	✓	✓	✓	✓		10	
Term paper			✓	✓	✓		25	
Examination: 40% (duration: 2 hours)								
							100%	

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 Grading of Student Achievement.

## 5. Assessment Rubrics

*(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)*

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Adequate (C+, C, C-)	Marginal (D)	Failure (F)
1. Midterm	Ability to explain key concepts and solve elementary problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Homework	Ability to solve elementary problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Term paper	Ability to apply lecture material to real-world issues and problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Discussion	Participation; contribution of opinions, perspectives and facts that stimulate debate	High	Significant	Moderate	Basic	Not even reaching marginal levels
5. Final exam	Ability to explain key concepts and solve elementary problems	High	Significant	Moderate	Basic	Not even reaching marginal levels

**Part III Other Information** (more details can be provided separately in the teaching plan)

**1. Keyword Syllabus**

*(An indication of the key topics of the course.)*

**CILO1**

- i) Basic concepts: Climate system, atmosphere, oceans, weather, climate
- ii) Climatology: climate zones, climate history, past climates, geological periods
- iii) Climate dynamics: factors influencing the weather, factors influencing the climate, radiative processes, energy balance, greenhouse effect, greenhouse gas, solar variability, Milankovitch cycles, albedo, aerosols, clouds, feedback, tipping points

**CILO2**

- i) Predicting the climate: Forecasting, numerical weather prediction, predictability, probability, ensembles, parameterization, growth scenarios

**CILO3**

- i) Natural resources and systems: freshwater resources, oceans, agriculture
- ii) Human settlements, industry and infrastructure: urban and rural areas

**CILO4**

- i) Adaptation: needs, options and planning

**CILO5**

- i) Geoengineering: cloud brightening, stratospheric sulfate aerosols, carbon capture, afforestation and reforestation, ocean fertilization

**2. Reading List**

**2.1 Compulsory Readings**

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

Nil

**2.2 Additional Readings**

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	T.F. Stocker et al. (eds.), 2013: <i>Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change</i> , Cambridge University Press. [Available from <a href="http://ipcc.ch/report/ar5/wg1/">http://ipcc.ch/report/ar5/wg1/</a> ]
2.	C.B. Field et al. (eds.), 2014: <i>Climate Change 2014: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change</i> , Cambridge University Press. [Available from <a href="http://ipcc.ch/report/ar5/wg2/">http://ipcc.ch/report/ar5/wg2/</a> ]
3.	O. Edenhofer et al. (eds.), 2014: <i>Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change</i> , Cambridge University Press. [Available from <a href="http://ipcc.ch/report/ar5/wg3/">http://ipcc.ch/report/ar5/wg3/</a> ]

4.	C.D. Ahrens, 2013: <i>Meteorology today: an introduction to weather, climate, and the environment</i> , Brooks/Cole.
5.	R. Henson, 2011: <i>The Rough Guide to Climate Change</i> , Rough Guides.