City University of Hong Kong
Course Syllabus

offered by School of Energy and Environment
with effect from Semester A 2017/18

Part I Course Overview

Course Title:	Atmospheric and Climate Science
Course Code:	SEE5201
Course Duration:	One semester
Credit Units:	3
Level:	P5
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course is designed for students in the M.Sc. Energy and Environment programme. It will provide students with basic knowledge of physical processes in the atmosphere and climate system. It will also enable them to analyse issues related to the atmospheric environment and climate change.

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 thermal and dynamical structure of the atmosphere, the atmospheric general circulation, and the key components of the Earth's climate system	10%	✓		
2.	Relate basic thermodynamic and radiative processes in the atmosphere to the underlying physical laws	35%	✓		
3.	Relate basic dynamical processes in the atmosphere to the underlying physical laws	35%	✓		
4.	Describe climate change phenomena in terms of basic physical processes	20%	✓		
		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		✓	✓	✓	✓	✓	2
Tutorials		✓	✓	✓	✓	✓	1

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	✓	✓	✓	✓	✓		20%	
Midterm	✓	✓	✓				20%	
Term project	✓	✓	✓	✓	✓		20%	
Examination: 40% (duration: 2 hours, if applicable)								
							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 Assessment Rubrics.

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-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Homework	Ability to solve problems related to lecture material	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Midterm	Ability to explain key concepts and solve problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Term paper	Ability to apply lecture material to the analysis of a research topic	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. 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

- *Basic structure of the atmosphere*

  Composition of the atmosphere, greenhouse gases, three-dimensional temperature and wind distributions of the atmosphere, general circulation, large-scale circulation patterns.

CILO2

- *Atmospheric thermodynamics and radiative transfe*r

  Planck's law, radiative transfer, solar and terrestrial radiation, applications of the first and second laws of thermodynamics, potential temperature, adiabatic processes, thermodynamic diagrams.

- *Hydrostatics of the atmosphere*

  Hydrostatic equation, thermodynamic structure of the atmosphere, atmospheric stability.

CILO3

- *Basic atmospheric dynamic*s

  Dynamics of horizontal flow, geostrophic wind, thermal wind, pressure as vertical coordinate, primitive equations.

CILO4

- *Climate dynamics*

  Climate variability, natural and anthropogenic climate change, greenhouse warming.

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.	*Atmospheric Science-An introductory survey*, J.M. Wallace & P.V. Hobbs (Academic press/Elsevier, 2nd edition, 2006
2.	*The Atmosphere and Ocean: A Physical Introduction*, N. Wells (Wiley, 1997*).*
3.	*An Introduction to Dynamic Meteorology*, J.R. Holton (Academic Press).
4.	*Atmosphere, Ocean and Climate Dynamics: An Introductory Text*, J. Marshall and R. A. Plumb (Academic Press, 2007)
5.	*Fundamentals of Atmospheric Physics*, M.L. Salby (Academic Press)