Course Syllabus

offered by School of Energy and Environment and Department of Public Policy

with effect from Semester A 2018/19

Part I Course Overview

Course Title:	**Urban Green City: Pollution and Solution**
Course Code:	**GE1337**
Course Duration:	**One semester**
Credit Units:	**3**
Level:	**B1**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities 2 Study of Societies, Social and Business Organisations 1 Science and Technology
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

(A 150-word description about the course)

Pollution is the by-product of industrialization and urbanization. Growing cities throughout the world have suffered from issues of air, water and waste pollution, regardless of their size, population and urban complexity. Clean and healthy city environments have been demanded by urban dwellers and are considered essential elements of quality living. To be able to develop a sustainable society, it is necessarily to apply new technologies to tackle pollution problems. Recent research and development on pollution controls and sustainable designs have shed light on future quality living. Government policies and the economic factors related to pollution have driven the rapid development of these innovative technologies.

This course is designed to enable students to develop a broader perspective and critical understanding of the current pollution issues. The comprehensive course contents consist of air pollution and health effects, integrated solid waste management, wastewater management, environmental policies and economics, and future sustainable development/environmental ethics. The major learning activities include lectures, tutorials, hands-on experiments, projects and field trips.

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 source of pollutions inside a megacity	10%			
2.	Discover pollution issues and apply existing innovative technologies for remedying these problems	40%		√	
3.	Understand the role of environmental policies and economics in pollution related decision-making	30%		√	
4.	Apply the acquired knowledge to design a future sustainable city	20%			√
		100%			

** If weighting is assigned to CILOs, they should add up to 100%.*

 # Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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	
1	Lectures: Introduction to science, engineering principles, environmental policies, pollution economics and sustainable development/environmental ethics	√	√	√	√	1.5
2	Group discussion/presentation/tutorial: Practice on problem solving; questions and answers; group discussion.	√	√	√	√	0.75
3	Hands-on experiments: Play "pollution game" to achieve understanding of pollution-policy-economics concepts (See below for more information)		√	√	√	0.75
4	Field trip: Visit to power plant, waste separation facility, wastewater treatment plant or other pollution related facility	√	√	√	√	NA
5	Reading; Self-study; Project: Data and information collection; problem solving, critical thinking, report writing	√	√	√	√	3

<u>Hands-on experiments (Innovative teaching):</u>

An innovative/creative instructional tool will be implemented in the tutorial class. This tool contributes to a particular item in the CILO described above. It is intended to facilitate the teaching and learning. At the end of some tutorials, in-class discussion on controversial issues and ethics will be conducted.

In the CILO 3, it emphasizes environmental policy and pollution economics. A new board game, named "urban pollution world" will be used to facilitate student learning. The game is designed to incorporate pollution problems, environmental policies and pollution economics within the gaming environment. By playing the game, students will grasp the knowledge of such complex factors as the role of government in environmental policy-making and how those policies influence business and engineering decision-making. The idea of the game is similar to Monopoly, the board game, where a single economical system is embedded into the game. In our case, a single pollution world is presented inside the game.

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		
Continuous Assessment: 60%						
Participation: Students' involvement throughout the course	✓	✓	✓	✓	10%	
Assignments: Individual homework assignments on problem solving and analysis in environmental system/policy/economics	✓	✓	✓	✓	20%	
Project: Group exercise where students work together to comprehensively predict and design future sustainable development.	✓	✓	✓	✓	30%	
Examination: 40% (duration: 2 hours)						
** The weightings should add up to 100%.*					100%	

Examination duration: 2 hrs
Percentage of coursework, examination, etc.: 60% by coursework; 40% by exam

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. Participation, assignment and final exam		Strong evidence of knowledge and skills in the interpretation, analysis and problem solving in pollution issues.	Some evidence of knowledge and skills in the interpretation, analysis and problem solving in pollution issues.	Student has some understanding of the pollution subject, and shows some analytical capability; evidence of interest in the material.	Sufficient familiarity with matters in the pollution field to enable the student to progress without repeating the course.	Little evidence of familiarity with the field of pollution issues.
2. Project		High degree of originality and evidence of reflection on performance-based on theory and creative views.	Some degree of originality. Good coverage with relevant and accurate support on issues.	Student covers a fair number of issues. However, little evidence of understanding the overall view of the project.	Information is relevant, but limited. Minimal understanding with poor coverage of the project.	Irrelevant information with no understanding to the project

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.)

Week	Content	Description	Ref.
1	Urban pollution problems	Overview of pollution problems in urban city, factors affecting urban pollution, types of pollution and existing challenges of handling pollution.	1,2, 14
2-4	Air pollution and health effects	Source of air pollution, type of air pollutants, effective air pollution control and health effects of air pollution.	2-6, 13-15
5-6	Integrated solid waste management	Types of waste produced in urban environment; 4R approach: Reduce, Reuse, Recycle and Replace; waste handling methods and energy recovery processes. What are the current challenges in Hong Kong?	7-8, 12, 14
7-8	Wastewater management	Water usage, wastewater production, wastewater treatment, sewage water, drinking water and storm water separation, and regulation of water quality.	9-10, 14
9-11	Environmental policy and pollution economics	Government regulations of air, water, solid waste pollution; air pollution cap and trade program, emissions testing and maintenance program, international agreement, carbon trading, waste/energy recovery economy and economical impacts/gains associated with urban pollution.	3, 15, 16
12-13	Future sustainable development/ environmental ethics	Develop sustainable approach to tackle pollution problems, make pollution reduction a profitable business, promote green economy and change a new paradigm to net energy balance development.	11,16

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) Gallagher, K. S., 2006, China Shifts Gears: Automakers, Oil, Pollution, and Development (Urban and Industrial Environments)
(2) Vesilind, A, 2010, Introduction to Environmental Engineering
(3) Warner, C. F, 1997, Air Pollution: Its Origin and Control (3rd Edition)
(4) Cooper, C. D., 2010, Air Pollution Control: A Design Approach
(5) Jacobson, M. Z., 2002, Atmospheric Pollution: History, Science, and Regulation
(6) Schwartz, J., 2007, Air Quality in America: A Dose of Reality on Air Pollution Levels, Trends, and Health Risks
(7) Vesilind, A, 2011, Solid Waste Engineering
(8) Young, G. C., 2010, Municipal Solid Waste to Energy Conversion Processes: Economic, Technical, and Renewable Comparisons
(9) Tchobanoglous, G., 2002, Wastewater Engineering: Treatment and Reuse
(10) Davis, M. L., 2010, Water and Wastewater Engineering
(11) Daly, H. E., 1997, Beyond Growth: The Economics of Sustainable Development
(12) http://www.epa.gov/osw/
(13) http://www.epa.gov/airquality/index.html
(14) http://www.epd.gov.hk/epd/eindex.html
(15) http://ec.europa.eu/environment/air/index_en.htm
(16) http://australia.gov.au/topics/environment-and-natural-resources/environmental-sustainability