City University of Hong Kong
Course Syllabus

offered by Division of Building Science and Technology
with effect from Semester A 2018/19

Part I Course Overview

Course Title:	Science for Human Comfort
Course Code:	BST 12624
Course Duration:	1 semester
Credit Units:	3 credit units
Level:	A1
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ 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)*	BST11524 Building Environmental Science BST21621 Environmental Science BST11121 Environmental Studies 1
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to provide students with scientific knowledge of the physical and subjective factors which affect human comfort relating to heat, light, sound and air quality in the built environment.

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.	Analyse practical problems of heat in the built environment.		✓	✓	
2.	Analyse practical problems of light in the built environment.		✓	✓	
3.	Analyse practical problems of sound in the built environment.		✓	✓	
4	Analyse practical problems of air quality and natural ventilation in the built environment.		✓	✓	
	** If weighting is assigned to CILOs, they should add up to 100%.*	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	
Pre-Class Study*	Pre-Class Study is a combination of selected reference books and/or lecture notes reading and pre-lecture self-study questions before each lecture session.	✓	✓	✓	✓	-
Lecture (Average class size: not more than 100 students)	Lecture is an in-class activity in the form of groups of student. The activity involves oral presentation by lecturers and discussion with students on a selected topic through illustrating exercises, real-life examples and question generation by the students and answering by peers or by the lecturer.	✓	✓	✓	✓	3 hrs/wk
Home Assignment*	Home Assignments are case problems (one is a group assignment and the other two are individual assignments).	✓	✓	✓		-

* This will not contribute to any contact hour.

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: 40%						
Group Case Study	✓	✓			10%	
Individual Case Study	✓	✓	✓		10%	
Individual Case Study	✓	✓	✓		10%	
Test	✓	✓			10%	
Examination: 60% (duration: 2.5 hrs)						
Examination	✓	✓	✓	✓	60%	
** The weightings should add up to 100%.*					100%	

Note: A student must obtain a minimum mark of 35 in both coursework and examination components and an overall mark of 40 to pass the course.

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. Group Case Study	Ability to discover and analyze the living environment, building design and/or sustainable development for human comfort.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Individual Case Study	Ability to discover and analyze the surrounding living environment of the student's home for human comfort.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Test	Ability to analyse practical problems of heat and light in the built environment.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	Ability to analyse practical problems of heat, light, sound, air quality and natural ventilation in the built environment.	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.)

1. Heat: fundamentals of heat transfer; bodily metabolism; physical and personal variables for thermal comfort; thermal comfort indices and charts; Fanger's comfort environment; solar radiation; overall thermal transfer value; energy-efficient building envelope design; urban heat island effect, sustainability.
2. Light: photometry; basic illumination concept; visual comfort and performance; lighting criteria; daylighting, artificial and natural lighting design for buildings; energy conservation.
3. Sound: characteristics and strength of sound; noise criteria; sound transmission and sound insulation; sound measurement; room acoustics design and control on noise pollution for buildings.
4. Air quality and natural ventilation: outdoor air quality and indoor air quality (IAQ); purposes and principle of natural ventilation; building design for natural ventilation; factors influencing air quality; required ventilation for acceptable IAQ; the measurement and management of IAQ in offices and public places.

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.)

1.	McMullan, R. Environmental Science in Building. Macmillan Distribution Ltd.

2.2 Additional Readings

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

1.	Yutaka Tochihara, Tadakatsu Ohnaka. Environmental ergonomics: the ergonomics of human comfort, health and performance in the thermal environment. Amsterdam; Boston: Elsevier.
2.	Robert G. Harris and Daniel P. Moore. Indoor work and living environments: health, safety and performance. New York: Nova Science Publishers.
3.	M. Santamouris. Energy and climate in the urban built environment. London: James & James.
4.	Howard K. Pelton. Noise control management. New York: Van Nostrand Reinhold.
5.	Keith Slater. Human comfort. Springfield.
6.	Robert K. Kaufmann, Cutler J. Cleveland. Environmental science. McGraw-Hill Higher Education.
7.	Pritchard, D.C. Lighting. London: Longman.
8.	Bies, D.A. and Hansen, C.H. Engineering Noise Control Theory and Practice. E & FN SPON.
9.	Holman, J.P. Heat Transfer. (SI Version). McGraw Hill.
10.	Fry, A. Noise Control in Building Services. Pergamon Press.
11.	Fanger, P.O. Thermal Comfort Analysis and Applications in Environmental Engineering. McGraw Hill Book Co.
12.	ASHRAE Handbook: Fundamentals. Updated edition.
13.	Spengler, J.D., Samet, J.M. and McCarthy, J.F. Indoor Air Quality Handbook. McGraw Hill.
14.	Hazim B. Awbi, Ventilation of buildings. London : Spon Press.