City University of Hong Kong
Course Syllabus

offered Division of Building Science & Technology
with effect from Semester A 2017/18

Part I Course Overview

Course Title:	Building Services Laboratory
Course Code:	BST22571
Course Duration:	1 semester
Credit Units:	3 credits
Level:	A2
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)*	BST12511 Thermal Science BST12512 Fluid Science BST12513 Building Electrical Science BST22531 HVAC Services 1 BST12541/BST22541 Piped Service BST22551 Electrical services 1
Equivalent Courses: *(Course Code and Title)*	BST11571/BST21572 Building Services Laboratory 1/ Building Services Laboratory 2
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to:

1. Strengthen students' knowledge of thermodynamics, electrical science, fluid mechanics, environmental science, HVAC services, piped services, electrical services, commissioning, maintenance and management of building services systems; and
2. Allow students to obtain a hands-on experience on the measuring instrument and equipment to evaluate the performance of building services components and systems.

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 practical procedures to perform experiments	10	√	√	√
2.	Apply analytical techniques in the measurement and testing of building services components/systems	25	√	√	√
3.	Predict the performance of building services components/systems by related theories and principles	25	√	√	√
4.	Communicate the results and observations in the form of log sheets during the experiment	20	√	√	
5.	Contrast the experimental results with the theoretical interpretations	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	5		
Laboratory preparation	Students are required to prepare each experiment by studying its objective, theory, apparatus, procedures and any relevant information in the Laboratory Manual. Further information can be found from the references as provided. Students are expected to coordinate with their group members beforehand in order to ensure a smooth run of the experiment. In the first week, a briefing session will be conducted by the Laboratory Supervisors to let the students have an overall understanding of the laboratory requirements	√*	√*	√*	√*	√*		
Performing experiment	The students are required to perform the experiment according to the objective, theory, apparatus and procedures of the experiment as stipulated in the Laboratory Manual, and under the supervision of the Laboratory Supervisor. Each laboratory session will last for three hours. In normal situation, there will be no make-up session even the students cannot finish the experiment. Therefore good preparation and coordination is very crucial.	√	√	√	√	√		3 hrs/wk
Result recording	During the experiment, each group of students are required to record the results, observations and any useful data in a set of Log Sheets, which should be presented in a clear and systematic format. At the end of the experiment, the Log Sheets should be endorsed by the Laboratory Supervisor.	√*	√*	√*		√*		

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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: 100%								
Oral quiz	√	√	√		√		30%	
Laboratory report	√	√	√	√	√		70%	
Examination: 0 % (duration: --, if applicable)								
** The weightings should add up to 100%.*							100%	

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)
Oral quiz	The quiz is to assess students on how to perform experiments. The questions involved would be related to the instruments, experiment kits, objectives, procedures, precautions, basic principles, etc. The Laboratory Supervisor would conduct the quiz in the course of or at the end of the experiment. Each student would be verbally asked at least 2 questions, and he/she should reply them immediately. For the student who will be responsible to write up the Laboratory Report, he is exempted from this oral quiz.	High	Significant	Moderate	Basic	Not even reaching marginal levels
Laboratory report	Each student has to submit <u>two</u> Laboratory Reports. A Laboratory Report is a formal report, which is used to access the student's ability in applying the analytical techniques and discussing the results and applications of the related building services components/systems of the experiment. The areas of discussions are covered in the Laboratory Manual. The signed Log Sheets should be included into the Laboratory Report.	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. Thermodynamics: operating characteristics of reciprocating air compressor.
2. Electrical science: properties of D.C. circuit; properties of A.C. circuit; operating characteristics of D. C. electrical motor; operating principle of power factor correction; operating characteristics of single-phase transformer.
3. Fluid mechanics: application of air flow measurement techniques; verification of Bernoulli's equation.
4. Building environmental science: electrical analogy of heat transfer properties; operating characteristics of radiation and natural convection; prediction of daylight by modelling technique; study of community noise properties.
5. HVAC services: central air-conditioning system; fan performance; cooling tower; heat pump; VAV system.
6. Piped services: pumps in series and parallel.
7. Electrical services: electrical protective devices; electrical harmonics of electrical appliances; general lighting survey.
8. Commissioning, maintenance and management: ductwork leakage testing.

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.	BST12511, Thermal Science
2.	BST12512, Fluid Science
3.	BST12513, Building Electrical Science
4.	BST22531, HVAC Services 1
5.	
6.	BST12541, Piped Service
7.	BST22551, Electrical services 1
8.	

2.2 Additional Readings

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

N/A