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 Design Project
Course Code:	BST22583
Course Duration:	2 semesters
Credit Units:	6 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)*	Nil
Equivalent Courses: *(Course Code and Title)*	BST21583 Integrated Project
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course aims to:

- develop systems design for building services systems according to the building characteristics and design alternatives;
- develop layouts and schematics design based on client requirements, architectural and structural features, site environment, local design practice and regulations, and related design information; and
- communicate the design in the form of reports, drawings and oral presentation.

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.	synthesis the building services provision with innovative idea from client requirements, architectural and structural features, site environment, local design practice and regulations, and related design information.	37.5%	✓	✓	✓
2.	discuss the design consideration and solution through appropriate design calculation and equipment specification.	25%	✓	✓	✓
3.	interpret the design calculations, considerations and solutions through professional report, drawings and oral presentation	25%	✓	✓	✓
4.	Coordinate building services systems, architectural and structural features into an integrated scheme	12.5%	✓	✓	✓
	** 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.)

Teaching pattern: 4 hours per week
Seminar/Site visit mix: On demand

The Building Services Design Project is comprised of two parts.

Part 1

Each student is responsible for a layout design of the following three streams of building services:

- HVAC services;
- Electrical services;
- Piped and fire services.

Students are required to synthesis the building services design provision from client requirements, architectural and structural features, site environment, local design practice and regulations, and related design information.

Part 2

All students are sub-divided into design teams. Three students will work in a design team. Each team member will be fully responsible for one of the above streams. Students are required to do a scheme design by synthesizing information of client requirements, architectural and structural features, site environment, local design practice and regulations.

The final outcomes will be presented through professional report, drawings and oral presentation. The TLAs of this course are therefore participative and interactive, and categorized as follows:

a. Coordination meeting: There are frequent group meetings for students to explore, discuss and coordinate the project works regularly.
b. Project development: This is a small-class activity for students to discuss with their Project Supervisor on the development for the project design works.
c. Design calculation: Students will make use of the appropriate software and self-developed programme to carry out the necessary calculation.
d. Report preparation: Students will make use of a variety of resources to compile the design report.
e. Drawing production: Students will make use of the computer-aided drafting software and university facilities to produce the design drawings.

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
1.	Coordination Meeting (Part 2)	✓	✓	✓	✓	13
2.	Project Development (Part 1 and 2)	✓	✓	✓	✓	26
3.	Design Calculation (Part 1 and 2)		✓	✓		16
4.	Report Preparation (Part 1 and 2)	✓	✓	✓		20
5.	Drawing Production (Part 1 and 2)		✓	✓	✓	29

4. Assessment Tasks/Activities (ATs)

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

Coursework: 100%

The assessment stages and activities are outlined as follows:

a. **Layout design**: The submission is in the form of drawings, calculations and discussion of building services layout.
b. **Systems design**: A Design Report is developed to show the design concepts, consideration, analysis, solution, system applications, calculations, layout and schematic drawings plus combined services drawings.
c. **Oral Presentation**: This is an oral critique. Each Design Team will have an oral presentation followed by question and answer session for the completed project to their Supervisors.
d. **Technical Quiz:** A challenge by introducing questioning during the progression to the final design and application in viewing the application validity.

Assessment Tasks/Activities	CILO No.				Weighting*	Remarks
	1	2	3	4		
Continuous Assessment: 100%						
Layout Design (Part 1)	✓	✓	✓	✓	40	
Systems Design (Part 2)	✓	✓	✓	✓	45	
Oral Presentation(Part 2)	✓	✓	✓	✓	10	
Technical Quiz(Part 2)	✓				5	
Examination: 0% (duration:--)						
** 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)
1. Layout Design (Part 1)	Report content assessment and evaluation	Excellent A+ Good A, A-	Good B+ Medium B, B-	Average C+, C Below average C-	Below average D	Cannot demonstrate F
2. Systems Design (Part 2)	Report content assessment and evaluation	Excellent A+ Good A, A-	Good B+ Medium B, B-	Average C+, C Below average C-	Below average D	Partial answer F
3. Oral Presentation(Part 2)	Assessing student's presentation skill after completion of design report	Excellent A+ Good A, A-	Good B+ Medium B, B-	Average C+, C Below average C-	Below average D	Partial answer F
4. Technical Quiz(Part 2)	Assessing student's Technical knowledge before completion of design report	Excellent A+ Good A, A-	Good B+ Medium B, B-	Average C+, C Below average C-	Below average D	Partial answer F

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

1. Keyword Syllabus

- Design inception: client brief; site investigation; design team; design methodology; master design programme; preparation processes; architectural and structural features; sources of information; referral to local regulations; requirements and practice.
- Design application and solution: alternative systems; design consideration; concluding a feasible design solution.
- Design calculation and equipment specification: preliminary calculation and estimation for the basic system capacity; sizing the building services systems and final calculation; differences and actual practice; equipment schedule; material specification.
- Design documentation and presentation: conceptual alternative scheme report; scheme design report; final design report; schematic drawings; layout drawings; combined services drawings; oral presentation; coordination report.
- Design coordination: service co-ordination requirements; space and plant space planning; observation of the constraints of building structure and fabric.
- Design process: building services design stages; requirements and provisions in relation to planning and construction stages of a building project development; professional ethics.

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.)

HVAC services:

1. EMSD (latest edition). *Code of Practice for Energy Efficiency of Air Conditioning Installations*. Electrical and Mechanical Services Dept., HKSAR Government.
2. EMSD (latest edition). *Guidelines on Energy Efficiency of Air Conditioning Installations*. Electrical and Mechanical Services Dept., HKSAR Government.
3. EMSD (latest edition). *Pilot Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy-efficient Air Conditioning Systems*. Electrical and Mechanical Services Dept., HKSAR Government.
4. EMSD (latest edition). *Location Plans, Pilot Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy-efficient Air Conditioning Systems*. Electrical and Mechanical Services Dept., HKSAR Government.
5. Building Authority (latest edition). *Code of Practice for Overall Thermal Transfer Value in Buildings*. HKSAR Government.
6. ASHRAE Handbook Fundamentals (latest edition). The American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc.
7. Wang, S.K. (2001). *Handbook of Air Conditioning and Refrigeration.* 2nd Edition. McGraw-Hill, Inc.
8. McMullan, R. (2002). *Environmental Science in Buildings*. 5th Edition. Macmillan Distribution Ltd.
9. Bies, D. A. and Hansen, C.H. (2003). *Engineering Noise Control Theory and Practice*. 3rd Edition. E & FN Spon

Electrical services:

1. EMSD (latest edition). *Code of Practice for the Electricity (Wiring) Regulations*. Electrical and Mechanical Services Dept., HKSAR Government.
2. BS7671 (latest edition). *IEE Wiring Regulations. 16th Edition and subsequent amendments*. Institution of Electrical Engineering and Technology, UK.
3. Supply Rules, CLP Power Hong Kong Ltd., latest edition.
4. Supply Rules, The Hongkong Electric Co., Ltd., latest edition.
5. CLP (latest version). *Code of Practice for Distribution Substation Design.* CLP Power Hong Kong Ltd.
6. Dugan, Roger C. (2002). *Electrical Power Systems Quality.* 2nd Edition, New York: McGraw Hill.
7. CIBSE (latest edition). *Code for Lighting*. The Chartered Institution of Building Services Engineers, UK.
8. CIBSE (latest edition). *Guide D: Transportation Systems in Buildings*. The Chartered Institution of Building Services Engineers, UK.

Piped services:

1. WSD (latest edition). *Handbook on Plumbing Installation for Buildings*. Water Supplies Department, HKSAR Government.
2. The Institute of Plumbing, (latest edition). *The Plumbing Engineering Design Services Guide*.
3. CIBSE (latest edition). *Guide G: Public Health Engineering*. The Chartered Institution of Building Services Engineers, UK

Fire services:

1. FSD (latest edition) *Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment*, Fire Services Dept., HKSAR Government.
2. BSEN 12845 (2003). *Fixed fighting systems - Automatic sprinkler systems – Design, installation and maintenance*. The Fire Protection Association.
3. CIBSE (latest edition). *Guide E: Fire Engineering*. The Chartered Institution of Building Services Engineers, UK.
4. Robert M.Gagnon (Latest edition). *Design of Water-Based Fire Protection Systems*. Cengage Delmar Learning.
5. The latest FSD circular letters.

2.2 Additional Readings

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

1. AutoCAD (latest version). built-in online help and resources, Autodesk, Inc.
2. EMSD (latest edition). *Performance-based Building Energy Code*. Electrical and Mechanical Services Dept., HKSAR Government.
3. EMSD (latest edition). *Guidelines on Performance-based Building Energy Code*. Electrical and Mechanical Services Dept., HKSAR Government.
4. The latest Building Regulations