Subject Description Form

Subject Code	**BSE3701**
Subject Title	**System Design II**
Credit Value	3
Level	3
Pre-requisite Co-requisite Exclusion	BSE2701 System Design I Nil Nil
Objectives	1. To further develop the knowledge gained from the pre-requisite subject "System Design I". 2. To practice design and detailing skills of a specialised system. 3. To interpret detailed design drawings for tendering purpose and site co-ordination.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) identify and select appropriate codes, standards, regulations and design guides; and the use of information search from various sources to carry out a design; b) apply the knowledge and experience gained from "System Design I" to prepare a fully integrated and coordinated design / installation drawings for each of the Mechanical Ventilation and Air-Conditioning (MVAC), Fire, Electrical, Plumbing and Drainage Services; c) carry out complete basic design study, engineered calculations and checking of each of the building services systems with both manual and computerized methods; d) manage problem-solving and decision making in the course of a basic design process; e) integrate and coordinate all building services effectively to enable satisfactory installation, testing and commissioning, operation and maintenance; f) understand the need of good project management and the use of a systematic approach in the design process; g) work as a collaborative member in a multi-disciplinary team; and h) communicate design and reports effectively.
Subject Synopsis/ Indicative Syllabus	<u>Subject Synopsis</u> This subject enables students to further develop their design skills attained in pre-requisite subject "System Design I". It includes the inception design stage and detailed design stage. It provides the students the opportunity to follow statutory design requirements, perform detailed design calculations, design typical floor services layouts, integrate various building services systems and produce different types of drawings such as schematic diagrams and combined services drawings for all the systems. Operation and maintenance requirements will also be taken into consideration. Students have to pay attention to the plant room details. Plant room layouts and sectional drawings have to be produced. <u>Indicative Synopsis</u> Summary of design criteria. Detailed design and calculations with considerations on operation and maintenance requirements. Typical floor services layout. Plant room details. Sectional diagrams. Combined services drawings. Schematic diagrams.

<table>
<tr><td>Teaching/Learning Methodology</td><td>This subject is a continuation of the pre-requisite subject entitled “System Design I” with students working in a group of 3 or 4. Each group member is required to work individually for the inception and detailed design of his/her particular field of building services systems in this subject. The various systems are:
1. Electrical services which include lighting, lifts, building electrical power, lightning, emergency lighting and emergency power supply.
2. MVAC systems.
3. Plumbing and drainage systems.
4. Fire services systems.
Throughout the whole project, design tutors as supervisors and consultants will guide the students to complete their works by group discussions/tutorials. Roles of supervisors are to provide guidance on the project details and assess progresses of individual students while that of specialist consultants are to advise students on the technical problems faced in a particular service discipline.
Students have to submit schematic drawings of various systems and also layouts showing good coordination of the major plant room locations for all trades in the inception design stage and then a formal report in the detailed design stage. They need to give an oral presentation on their individual works in groups to a panel of assessors at the end of the semester to ensure they understand their works.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="8">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td></tr>
<tr><td>Inception design drawings, layouts and calculations</td><td>30</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Detailed design report</td><td>40</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Oral presentation</td><td>20</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Progress assessment</td><td>10</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100</td><td colspan="8"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
1. The inception design drawings, layouts and calculations and detailed design report will be used to assess students’ abilities to further apply the basic skills learnt in design and software application for various systems in the inception and detailed design stages. All the intended subject learning outcomes will be achieved and assessed.
2. The oral presentation will ensure the students being able to present clearly, deliver his/her thoughts and demonstrate the collaboration of works in a team to the assessors. All the intended learning outcomes will be achieved and assessed.
3. The progress assessment will ensure the students are making good progress throughout the whole semester. Most of the intended learning outcomes, in particular the first six, can be achieved and assessed.</td></tr>
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Student Study Effort Expected	Class contact:	
	▪ Project work	34 Hrs.
	▪ Assessment	5 Hrs.
	Other student study effort:	
	▪ Reports	72 Hrs.
	▪ Presentation	9 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	2021 ASHRAE Handbook – Fundamentals. ASHRAE, 2021. American National Standards Institute ANSI/ASHRAE Standard 62.1-2016, Ventilation for Acceptable Indoor Air Quality, ASHRAE, 2016. British Standards BS1192 - Collaborative production of architectural, engineering and construction information. Code of practice, 2008. BS1553 Part 1, Specification for graphical symbols for general engineering: Piping systems and plant, 1977. Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations, Chapter 123I, Laws of Hong Kong, 1997. Chartered Institution of Building Services Engineers CIBSE Guide A: Environmental Data, Guide D: Transportation Systems in Buildings and Guide E: Fire Safety Engineering, CIBSE, London, UK, 2015, 2015 and 2017 respectively. Code of Practice 101 for Distribution Substation Design, CLP Power Hong Kong Limited, the latest version. Code of Practice 215 Load Assessment Procedure, CLP Power Hong Kong Limited, the latest version. Code of Practice for Building Works for Lifts and Escalators 2011, Buildings Department (BD), Hong Kong Special Administrative Region (HKSAR), the latest version. Code of Practice for Energy Efficiency of Building Services Installation, Electrical and Mechanical Services Department (EMSD), HKSAR, 2015 and 2018. Code of Practice for the Electricity (Wiring) Regulations, EMSD, HKSAR, 2015. Code of Practice for Fire Safety in Buildings 2011, BD, HKSAR, the latest version. Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment, Fire Services Department (FSD), HKSAR, the latest version. Code of Practice for Overall Thermal Transmittance Value in Buildings, Buildings Department, Free download from http://www.bd.gov.hk/english/documents/code/e_ottv.htm, Building Authority, Hong Kong, April 1995. Design, commissioning, operation and maintenance guides and standards from ASHRAE/ CIBSE/ Institute of Plumbing (IOP)/ Building Services Research and Information Association (BSRIA), etc., the latest edition. Hong Kong Waterworks Standard Requirements for Plumbing Installation in Buildings, Water Supplies Department, January 2017. Faye C.M. and Jeffrey D.S. Cooling and Heating Load Calculation Manual. 2nd ed. New York: ASHRAE, c1992. The Institution of Electrical Engineers (IEE) Wiring Regulations, 17th Edition, Institution of Engineering & Technology, 2008. List of FSD Circular Letters, FSD, HKSAR.	

	Local regulations and codes of practices for various trades of building services, the latest edition. Loss Prevention Council LPC Rules for Automatic Sprinklers Installations Incorporating British Standard BS EN 12845 – Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance (with suitable modification pertinent to Hong Kong), LPC, UK, 2015. Plumbing Engineering Services Design Guide, IOP, UK, 2002. Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy-efficient Air Conditioning Systems, Electrical and Mechanical Services Department, 2008. The SLL Code for Lighting, The Society of Light and Lighting (SLL), CIBSE, 2012. Supply rules of power utilities, the latest edition.