Subject Description Form

Subject Code	BRE349
Subject Title	Building Services I
Credit Value	3
Level	3
Pre-requisite	BRE2031
Objectives	This subject is intended to: 1. Provide students with an overview of the various building services engineering systems in modern buildings, 2. Understand the basic design intent of various building services systems and their integration with the building fabric and architectural features.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Possess a knowledge of the system configuration and operation of various building services systems. 2. Relate how different building services systems can help to control and improve the indoor environment. 3. Identify the relationships between the design of building services systems and the overall building design. 4. Appreciate the cost and value relationship on the selection of appropriate building services systems. 5. Relate issues on environmental impact to the design of building services systems and overall building design.
Subject Synopsis/ Indicative Syllabus	Plumbing & Drainage Water supply and drainage system for high rise buildings. Simple design on pipe sizing for plumbing and drainage pipes. Sewage treatment process and fresh water recycling Electricity: Assessment of electricity demand. Lightning protection. Safety and Earthing provisions for electricity distribution within buildings. HVAC: Principles of air-conditioning process. Assessment on the efficiency of air-conditioning and air mixing processes. Large scale air conditioning system configurations and operations. Internal transportation: The configuration and operation of lifts and escalators. Assessment on the quality of services of lift operation. Fire Services: Active prevention, detection and suppression systems for Fire Services. Passive approaches to Fire Services. Integration of fire services system to other building services systems.

Teaching/Learning Methodology

The learning and teaching approaches for the subject comprises lectures, tutorials and laboratories.

Lectures aims at delivering the basic core of concepts and knowledge of respective topics whilst further design and operation arrangements will be elaborated and discussed in the tutorials. Presentation by students on selected topics will also be arranged at tutorials. Laboratories are included to allow students to relate theories and concepts to real situations.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	
1. Laboratory Report	6%	√	√			√	
2. Oral Presentation	14%	√	√	√	√	√	
3. Test	20%	√	√	√	√	√	
4. Examination	60%	√	√	√		√	
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment for the subject comprises end-of-semester written examination, laboratpry report, oral presentation, and in-class test.

The overall split between continuous assessment and examinations has been set at 40%60%. Students must pass both continuous assessment elements and the end-of-term examination in order to pass the subject.

Laboratories allow students to relate theories to actual practices and operations.
Written examination aims to assess students' ability to apply concepts learned for solving problems on building services design and operation.

Oral presentations on specific topics on building services serve to assess students' understanding on selected topics.

The test aims to determine the understandings of students on fundamental knowledge and key words on building services

For the presentation coursework, Students are encouraged to use Artificial Intelligence (AI) tools to assist in the development of the topic areas, identify related contents to be included and to conduct initial evaluation on different options and solutions.
Students will be required to document the adoption of AI tools in the coursework as an integral part of the submission for assessment.

Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Laboratory	6 Hrs.
	▪ Self-Learning	75 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Recommended:** Hall F. & Greeno R. (2017) *Building Services Handbook*, 9th ed., Routledge. Burberry P. (1997) *Environment & Services*, 8th ed., Longman Scientific & Technical. Chadderton D.V. (2013) *Building Services Engineering*, 6th ed., Taylor & Francis. Wang S. K. (2001) *Air Conditioning and Refrigeration*, 2nd ed., McGraw Hill. CIBSE (2020) *Guide D – Vertical Transportation*, CIBSE **Supplementary:** HKSAR (2015), *Code of Practice for the Electricity (Wiring) Regulations*. HKSAR (2016), *Code of Practice for Fire Safety in Buildings 2011 (2015 edition)*. HKSAR (2012), *Code of Practice for Minimum fire Services Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment*. HKSAR, *Building Ordinance and Regulations* CAP.123. NFPA (1997) *Fire Protection Handbook*, 18th Edition. BRE (various) *Digests and Current Papers*. Building Research Establishment, Garston, Watford, U.K. Various Standards and Codes published by British Standard Institution (BSI).	