Subject Description Form

Subject Code	BRE453
Subject Title	Building Services II
Credit Value	3
Level	4
Pre-requisite /	BRE349
Objectives	1. Provide further knowledge of building services engineering systems, including the ventilation and air conditioning system, acoustics and vibration control systems, and information systems; 2. Understand the importance of the quality of installation and proper co-ordination on the overall performance and maintainability of buildings; 3. Provide students an understanding that sustainability can be achieved by environmental-friendly design of building services systems.
Intended Learning Outcomes	*Students will demonstrate their ability to:-* a. Understand the principles and various attributes of ventilation and air conditioning systems; b. Have an understanding of the importance of energy conservation in buildings for environmental protection, and the use of renewable resources in buildings for sustainability; c. Perform analyses on acoustic and vibration control of building services systems; d. Have an understanding of the concepts of green buildings, intelligent building, building automation, and information system of buildings; e. Properly co-ordinate the installation, commissioning and maintenance of various building services systems; and perform life-cycle cost analysis for selection of appropriate building services systems.
Subject Synopsis/ Indicative Syllabus	Integrated design: factors affecting selection of services/systems. Provision of space in the building to accommodate building services. Structural integrity of building services equipment. Sound and vibration attenuation features. Provisions for safe operation and maintenance. Building services engineering system for intelligent buildings: introduction to information transmission systems, communication and protection system, call systems, public address system and Building automation/management systems. The concepts and importance of sustainability in building services systems design, and operation; selection of environmentally friendly products and materials used in building services systems. Cooling load estimation for HVAC system. Indoor air quality monitoring

	Co-ordination and management of design and installation of various building services systems during the design and construction stages in particular the builder's works; and testing and commissioning of building services systems. Building services design for safety – Passive measures on fire safety & introduction to alternative approaches on fire safety design.
Teaching/Learning Methodology	The subject can be divided into three main parts; introduction to complex building services systems; management, co-ordination, installation and maintenance of the building services systems; and introduction to sustainable buildings and environmental-friendly design of building services systems. A "case oriented" approach is to be adopted for teaching the subject; A number of up-to-date case studies on building services systems of high-rise buildings are used to illustrate the current state-of-the-art on the design and operation of complex building service systems. Where applicable, practitioners from the industries will be invited to present lecture on the management of the building services installations and on operation and maintenance of building services systems. The subject will be delivered through lectures, laboratories (where applicable) and small groups tutorials. The lectures and laboratories aim at introducing theories, concepts and practices whereas tutorials are for in-depth small group discussions.
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	40	√	√	√	√	√	
2. Examination	60	√	√	√	√	√	
Total	100						

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

Examination and coursework contributes 60% and 40% of the overall grade for the subject respectively. Student must pass both the examination and coursework components in order to achieve an overall pass for the subject.

The coursework may comprises a combination of exercises at tutorials, group presentations, and in-class test. Both the coursework and examination assessment methods are intended to ensure the students achieve the learning objectives set, and to assist in students' learning through constructive feedback.

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 for the presentation coursework. 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:	
	▪ Lectures	26 Hrs.
	▪ Tutorials	13 Hrs.
	Other student study effort:	
	▪ Independent study including assignments and project works	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Reading List:** **Recommended:** Grondzik, Walter T; Alison G. Kwok, (2019) *Mechanical and Electrical Equipment for Buildings*, 13th Edition, Wiley Chadderton D.V. (2013) *Building Services Engineering*, 6th ed., Taylor & Francis. Greeno R. (2013) *Building Service, Technology and Design,* Routledge. CIBSE (1994) *Building Services Maintenance Management*, CIBSE CIBSE (2016). *Air Conditioning and Refrigeration*, CIBSE **Supplementary:** Various publications at Hong Kong Green Building Council Atkin B. (1993) *Intelligent Buildings: Application of IT and Building Automation to High Technology Construction Projects*, Unicom Seminars, England	