CA5251: SUSTAINABLE BUILDING DEVELOPMENT

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Sustainable Building Development

Subject Code
CA - Civil and Architectural Engineering
Course Number
5251

Academic Unit
Architecture and Civil Engineering (CA)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course aims to provide students with knowledge of sustainable building development in the aspects of government policy & regulation, voluntary green building certification scheme, green building design, sustainable construction technology & material, building operation & retrofit, building demolition & material recycling over the life cycle of a building.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	appreciate the statutory regulation and voluntary certification scheme for sustainable building development		x		
2	explain and apply the concept of passive and active building design			x	
3	understand and describe the sustainable construction technology and building material		x		
4	appreciate the requirement for sustainable building operation and retrofit		x		
5	appreciate the requirement and technology for material recycling during building demolition		x		

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 real-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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures; seminars	Introduce the essential concepts of design, construction, operation and demolition of a building to fulfil the requirements of sustainable building development.	1, 2, 3, 4, 5	2
2	Tutorials	Explore and discuss the design approach and practice of sustainable building development through discussion, hand-on exercises or case studies.	1, 2, 3, 4, 5	1

Additional Information for LTAs

Semester Hours: 3 hours per week
Lecture/Tutorial/Laboratory Mix: Lecture (2); Tutorial (1); Laboratory (0)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Mid-term test	1, 2, 3	25	
2	Assignment	1, 2, 3, 4, 5	25	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

To pass a course, a student must obtain minimum marks of 30% in both coursework and examination components, and an overall mark of at least 40%

Assessment Rubrics (AR)

Assessment Task

Mid-term test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

1. ABILITY to RECOGNIZE and EXPLAIN the key concepts, mechanisms, and concerns of sustainable building development.

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Assignment (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

1. CAPACITY to INQUIRE and ANALYSE the issues and relevant information and references with respect to given scenarios and context.
2. ABILITY to
PRODUCE and ARTICULATE rational, substantiated and original discussion and/or suggestion.

Excellent
(A+, A, A-) High

Good
(B+, B, B-) Significant

Fair
(C+, C, C-) Moderate

Marginal
(D) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion
1. ABILITY to EXPLAIN and DISCUSS the key concepts, mechanisms, and concerns of sustainable building development.

Excellent
(A+, A, A-) High

Good
(B+, B, B-) Significant

Fair
(C+, C, C-) Moderate

Marginal
(D) Basic

Failure
(F) Not even reaching marginal levels

Assessment Task
Mid-term test (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion
1. ABILITY to RECOGNIZE and EXPLAIN the key concepts, mechanisms, and concerns of sustainable building development.

Excellent
(A+, A, A-) High

Good
(B+, B) Significant

Marginal
(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Assignment (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

1. CAPACITY to INQUIRE and ANALYSE the issues and relevant information and references with respect to given scenarios and context.
2. ABILITY to
PRODUCE and ARTICULATE rational, substantiated and original discussion and/or suggestion.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

1. ABILITY to EXPLAIN and DISCUSS the key concepts, mechanisms, and concerns of sustainable building development.

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Basic

Failure

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Part III Other Information

Keyword Syllabus

Climate change. Government policy. Environmental Impact Assessment. Passive and active building design. Building Information Modelling (BIM). Digital Twin. Green building certification schemes (BEAM Plus, LEED, etc.). Sustainable construction technology. Green building material. Life cycle assessment. Energy and carbon audit. Carbon neutrality. IAQ Certification Scheme. Building retrofit. Building demolition. Disposal and recycling of building material.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Kaufui Vincent Wong. Climate change. Momentum Press, 2016. (eBook, Run Run Shaw Library, City University of Hong Kong)
2	Stephen Tromans. Environmental impact assessment. (KD3372 .T76 2012)
3	Roberto, Gonzalo and Vallentin, Rainer. Passive House Design: Planning and Design of Energy-Efficient Buildings. Institut fur Internationale, 2014 (eBook, Run Run Shaw Library, City University of Hong Kong)
4	Ziyad Salameh. Renewable energy system design. (TJ808 .S238 2014)
5	Wu, Peng. Integrated Building Information Modelling. 1st ed. Sharjah : Bentham Science Publishers, 2017. (eBook, Run Run Shaw Library, City University of Hong Kong)
6	BEAM Plus New Buildings Version 2.0 (05.2021). BEAM Society Limited.
7	BEAM Plus Existing Buildings Version 2.0 Comprehensive Scheme (03.2016). BEAM Society Limited.
8	LEED v4.1 BUILDING DESIGN AND CONSTRUCTION. April 9, 2021. U.S. Green Building Council.
9	Tam, Vivian Y and Le, Khoa N. Sustainable Construction Technologies: Life-Cycle Assessment. San Diego: Elsevier Science & Technology 2019. (eBook, Run Run Shaw Library, City University of Hong Kong)
10	Karen Levine. Understanding green building materials. 1st ed. New York : W.W. Norton & Co., c2011. (TD196.B85 R53 2011)
11	Thad Godish. Indoor environmental quality. Boca Raton, FL : Lewis Publishers, c2001. (TD883.17 .G64 2001)
12	Code of Practice for Building Energy Audit. 2021. Electrical and Mechanical Services Department, HKSAR Government.
13	Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings in Hong Kong (2010 Edition). Environmental Protection Department and Electrical & Mechanical Services Department, HKSAR Government.
14	A Guide on Indoor Air Quality Certification Scheme for Offices and Public Places. 2019. IAQ Management Group, HKSAR Government.
15	Chow TT. Retrofitting Existing Building (Energy Efficiency) -A Quantitative Approach. Construction Industry Council 2018.
16	M.N.V. Prasad, Kaimin Shih. Environmental materials and waste: resource recovery and pollution prevention. Academic Press is an imprint of Elsevier, 2016. (TD793 .E56 2016)