

CA2627: BUILDING SCIENCE

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Building Science

Subject Code

CA - Civil and Architectural Engineering

Course Number

2627

Academic Unit

Architecture and Civil Engineering (CA)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BC2627/BC2627F/BC2627P Building Science

Exclusive Courses

Nil

Part II Course Details

Abstract

The course aims to develop understanding of fundamental knowledge of electrical sciences, photometry and acoustics as the foundation in the study of building services engineering and to apply them in the study of electrical building services, lighting design and acoustic design.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Explain the fundamental laws in electrical and electronic systems, indoor and outdoor lighting systems and acoustics systems;		x		
2	Apply basic theories in the study of electrical building services, lighting design and acoustic design;		x		
3	Analyse the nature of light and sound with particular reference to practical situations;			x	
4	Explain the power distribution systems in buildings and electrical design in Hong Kong.			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	Lecture	Students will engage in lecture activities about key concepts in building science and its applications in architectural engineering systems.	1, 2, 3, 4	
2	Laboratory	Students will apply the concepts in building science in experiments and analyse and reflect on deviations between theory and observed experimental results.	1, 2	

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Mid-term Test	1, 2, 3, 4	20	
2	Laboratory Report	1, 3	30	

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

Criterion

1. ABILITY to and ANALYSE and apply the understanding of light, sound and electrical and electronic systems in practical problems

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

Laboratory Report

Criterion

1. ABILITY to INTERPRET the fundamental laws in and DEVELOP the understanding on electrical building services, lighting and acoustic design

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

Criterion

1. ABILITY to and ANALYSE and apply the understanding of light, sound and electrical and electronic systems in practical problems

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

Part III Other Information

Keyword Syllabus

Circuit analysis, single phase and three phase systems, principles and characteristics of electrical d.c. and a.c. machines, electronic devices, logic circuits, power distribution in buildings, code of practices of electrical design in Hong Kong, photometry, eye and vision, interior lighting design, daylighting, properties of sound, ear and hearing, transmission of sound.

Reading List**Compulsory Readings**

Title	
1	Irwin, J. D. and Graf, E. R., Industrial Noise and Vibration Control, Englewood Cliffs, Prentice Hall, 1979.
2	Pritchard, D. C., Lighting, 6th Ed, Longman, 1999.
3	Hughes, Edward, Hughes Electrical and Electronic Technology, 9th Ed., Pearson, 2005.

Additional Readings

Title	
1	McMullan R., Environmental Science in Building, 5th Ed., Macmillian, 2002.
2	Dorf, R.C., Svoboda, J.A., Introduction to Electric Circuits, 4th Edition, John Wiley & Sons, 1999
3	Rizzoni, G., Principles and Applications of Electrical Engineering, 5th Edition, McGraw-Hill International, 2007
4	Smith B. J., Phillips G. M. and Sweeney M. E., Environmental Science, Longman, 1983.
5	EMSD, Code of Practice for the Electricity (Wiring) Regulations, 2003 Edition.
6	Online Resources: http://www.heh.com/hehweb/domesticservices/supplyrulesandguidetoconnectionofsupply/index_en.htm
7	On Resources: http://www.epd.gov.hk/epd/noise_education/web/ENG_EPD_HTML/m1/index.html