

# CA2627: BUILDING SCIENCE

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## Effective Term

Semester A 2022/23

## 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	develop understanding of the fundamental laws in electrical and electronic systems, indoor and outdoor lighting systems and acoustics systems;		x		
2	interpret and apply these 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	develop understanding of 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.

### Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Explain key concepts in building science and its applications in architectural engineering systems.	1, 2, 3, 4
2	Laboratory	Practise the concepts in building science and discover the deviations between the theories and experiments.	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

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**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-)**

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**Good (B+, B, B-)**

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**Marginal (D)**

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**Failure (F)**

Not even reaching marginal levels

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## 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**

<b>Title</b>	
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: <a href="http://www.heh.com/hehweb/domesticservices/supplyrulesandguidetoconnectionofsupply/index_en.htm">http://www.heh.com/hehweb/domesticservices/supplyrulesandguidetoconnectionofsupply/index_en.htm</a>
7	On Resources: <a href="http://www.epd.gov.hk/epd/noise_education/web/ENG_EPD_HTML/m1/index.html">http://www.epd.gov.hk/epd/noise_education/web/ENG_EPD_HTML/m1/index.html</a>