

City University of Hong Kong
Course Syllabus

offered by Department of Physics
with effect from Semester B 2017 /18

Part I Course Overview

Course Title: **Building Materials**

Course Code: **AP8307**

Course Duration: **One semester**

Credit Units: **3**

Level: **R8**

Proposed Area:
(for GE courses only)

Arts and Humanities
 Study of Societies, Social and Business Organisations
 Science and Technology

Medium of Instruction: **English**

Medium of Assessment: **English**

Prerequisites:
(Course Code and Title) **Nil**

Precursors:
(Course Code and Title) **Nil**

Equivalent Courses:
(Course Code and Title) **Nil**

Exclusive Courses:
(Course Code and Title) **AP6307 Building Materials**

Part II Course Details

1. Abstract

The course aims at covering the basic structure and properties of building materials pertinent to the structural applications. Upon successful completion of the course, students are expected to be equipped with elementary understanding of the categories, structures and properties of common building materials. They will also be able to recognize the practical considerations of building materials in structural applications.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs [#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Recognize the types, ingredients, and design of structural building materials, especially concrete and reinforcing bars.		√		
2.	Explain the factors affecting the durability of concrete structures.		√		
3.	Select and apply various tests of concrete and other building materials.			√	
4.	Recognize the types and function of cladding materials.		√		
5.	Select appropriate materials for internal walls, ceilings and partitions.			√	
6.	Identify latest discoveries and state-of-the-art developments in building materials and to form opinions on relevant issues.			√	√
		100%			

* If weighting is assigned to CILOs, they should add up to 100%.

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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.

3. Teaching and Learning Activities (TLAs)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5	6	
Lecture		✓	✓	✓	✓	✓	✓	2
Tutorial	Students will be encouraged to discuss the characteristics and applications of various building materials in daily life examples	✓	✓	✓	✓	✓	✓	0.5
Group project	Students work in groups on self-directed projects relating to properties and applications of building materials			✓	✓	✓	✓	1

In tutorial sessions, students will be encouraged to discuss the principles and processes pertinent to the various families of building materials in relation to daily life examples. Quizzes or tests will also be held in tutorial sessions.

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5	6		
Continuous Assessment: 50 %								
Mid-term tests	✓	✓	✓	✓	✓		25	
Group project report and presentation			✓	✓	✓	✓	25	
Examination: 50% (duration: 2 hours)								
							100%	

* The weightings should add up to 100%.

5. Assessment Rubrics

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Examination	demonstrates understanding of the scientific principles and the working mechanisms; ability to solve relevant engineering problems	High	significant	moderate	basic	Not reaching marginal level
2. Mid-term tests	demonstrates understanding of the scientific principles and the working mechanisms; ability to solve relevant engineering problems	High	significant	moderate	basic	Not reaching marginal level
3. Group project	Ability to explain, in detail and with accuracy, the information collected and the methods of inquiry Demonstrate capacity for self-directed learning	High	significant	moderate	basic	Not reaching marginal level

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

- General introduction to building materials
Types and applications, ingredients of concrete.
- Steel frame construction
Structural steels, standard sections, methods of joining steel structural members, the construction process of steel structure, flooring and roof decking materials, fireproofing of steel framing.
- Cement
Basic chemical compositions, manufacturing processes, chemical reaction (hydration), properties, and types.
- Aggregates
Types, grading, properties.
- Design of concrete mix
Economic, workability, strength, applications.
- Testing of concrete
Testing of plastic properties, destructive, in-situ and non-destructive testing of hardened concrete.
- Durability
Chemical attack, impact, wear, shrinkage, creep, fatigue, thermal attack.
- Admixtures
Categories, properties and characteristics.
- Special concrete
Light weight concrete, high strength concrete, pre-cast concrete, reinforced and pre-stressed concrete.
- Glass
Structure of glass, classification of glass types, strength of glass and toughening methods, glazing.
- Cladding
Functions of cladding, cladding materials, the curtain wall.
- Materials for interior walls, partitions, ceiling and floorings
Fire walls, plaster, gypsum board, functions of ceiling, flooring materials, stone, brick, tiles, wood, synthetic flooring materials.

2. Reading List

2.1 Compulsory Readings

Nil

2.2 Additional Readings

1.	"Fundamentals of Building Construction – Materials and Methods", Edward Allen, 2 nd ed, John Wiley & Sons, 1990.
2.	"Basic Construction Materials" T W Marotta, C A Herubin, 5 th ed, Prentice Hall, 1997.