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:	AP6307
Course Duration:	One semester
Credit Units:	3
Level:	P6
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)	AP8307 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)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting	Discov	very-enr	riched
		(if	curricu	ılum rel	ated
		applicable)	learnin	ig outco	omes
			(please	e tick	where
			approp	riate)	
			A1	A2	A3
1.	Recognize the types, ingredients, and design of		\checkmark		
	structural building materials, especially concrete and				
	reinforcing bars.				
2.	Explain the factors affecting the durability of concrete		\checkmark		
	structures.				
3.	Select and apply various tests of concrete and other				
	building materials.		,		
4.	Recognize the types and function of cladding materials.		V		
5.	Select appropriate materials for internal walls, ceilings				
	and partitions.				
6.	Identify latest discoveries and state-of-the-art			\checkmark	
	developments in building materials and to form				
	opinions on relevant issues.				
		100%			

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)**

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if			
		1	2	3	4	5	6	applicable)
Lecture		\checkmark	✓	\checkmark	\checkmark	✓	✓	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.

Assessment Tasks/Activities (ATs) 4.

(ATs are designed to assess how well the students achieve the CILOs.)

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%	

100%

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent	Good	Fair	Marginal	Failure
		(A+, A, A-)	(B+, B, B-)	(C+, C, C-)	(D)	(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, shinkage, 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

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

Nil

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

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.