

# CA4623: MAINTENANCE TECHNOLOGY AND MANAGEMENT

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Maintenance Technology and Management

### Subject Code

CA - Civil and Architectural Engineering

### Course Number

4623

### 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

BC4623/BC4623F/BC4623P Maintenance Technology and Management

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

The Course aims to equip students with the knowledge and ability to appraise existing buildings and develop suitable schemes of maintenance, repair, refurbishment or rehabilitation as necessary; the knowledge of building defects' diagnosis and repair methodology; management of building maintenance projects; and statutory requirements for building repair and maintenance.

### Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Analyze the principles of building design to anticipate and prevent building component failure;	25		x	
2	Determine the condition of the structure, fabric and component materials and prepare maintenance plans for different building types and client needs including the management of building maintenance projects;	25		x	
3	Apply the building defects diagnosis techniques and recommend different repair approaches;	25			x
4	Understand the statutory requirements relating to building repair and maintenance.	25	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 the key principles, theories and tools for maintenance technology and management	1, 2, 3, 4	2 hours/week
2	Tutorial	Require the students to discuss the concepts and solve the problems in construction management individually or in a group basis in the tutorial class	1, 2, 3, 4	1 hour/week

3	Project	Require the students to take on the role of a project manager for planning a series of tasks under a given scenario; and to create feasible time and resource management plans by application of suitable tools with reasonable assumptions	1, 2, 3	
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**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	Project	1, 2, 3	30	

**Continuous Assessment (%)**

50

**Examination (%)**

50

**Examination Duration (Hours)**

3

**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**

1.1 CAPACITY to DISCUSS key principles, theories and tools for maintenance technology

1.2 ABILITY to USE the scientific techniques in solving the maintenance related 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**

Project

**Criterion**

2.1 ABILITY to APPLY suitable techniques to repair defect in existing structures

**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**

3.1 CAPACITY to RELATE and EXPLAIN the management theories and principles to maintenance technology, and DISCUSS the roles, functions and responsibilities of different parties in a building maintenance project

3.2 ABILITY to USE the scientific techniques in solving the maintenance and repair 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

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## Part III Other Information

**Keyword Syllabus**

- Maintenance technology; diagnosis of defects in materials, components, assemblies and elements; destructive & non-destructive testing; recognition of causes and selection of appropriate remedial methods.

- Maintenance inspection/ survey. Historical buildings repair/maintenance matters. Environmental issues in building maintenance.
- Maintenance management: Statutory requirements relating to building repair and maintenance; maintenance project management.

## Reading List

### Compulsory Readings

Title	
1	Nil

### Additional Readings

Title	
1	CIOB. (1990) 'Maintenance management : a guide to good practice', 3rd ed. CIOB. (TH3351 .C42)
2	Douglas J & Noy E.A. (2011) 'Building surveys and reports', 4th ed. Wiley-Blackwell. (TH439 .N68)
3	Douglas, J. & Ransom, B. (2007) 'Understanding Building Failures', 3rd ed. Taylor & Francis. (TH441 .D68)
4	Duncan, M. (2003) 'Understanding Housing Defects', 2nd ed. EG Books. (TH441 .M37)
5	Emmons, P.H. (1993) 'Concrete Repair and Maintenance Illustrated', R.S. Means Co., Inc. (TA681 .E45)
6	Harris, S.Y. (2001) 'Building Pathology: Deterioration, Diagnostics, and Intervention', John Wiley & Sons, Inc. (TH441 .H295)
7	Ho, D.C.W., Lo, S.M. and Yiu, C.Y. (2005) 'A Study on the Causes of External Finishes Defects in Hong Kong', Structural Survey, 23(5), 386-402.
8	Leung, A.Y.T. and Yiu, C.Y. (2004) 'Building Dilapidation and Rejuvenation in Hong Kong', Hong Kong: Joint Imprint of CityU Press and the Hong Kong Institute of Surveyors. (TH3351 .B835)
9	Riley, M. (2005) 'The technology of refurbishment and maintenance', Palgrave Macmillan. (TH4511 .R55)
10	Watt, D.S. (2007) 'Building Pathology: Principles and Practice', 2nd ed. Blackwell Science. (TH441 .W38)
11	Wordsworth, P. (2001) 'Lee's Building Maintenance Management', 4th ed. Blackwell Science. (TH3351 .L44)
12	Wood, B. (2009) 'Building Maintenance', Wiley-Blackwell. (TH3351 .W663)
13	Yiu, C.Y., Ho, C.W. and Lo, S.M. (2007) 'Weathering Effects on External Wall Tiling Systems', Construction and Building Materials, 21: 594-600.
14	<a href="http://www.hkcra.com.hk">http://www.hkcra.com.hk</a>
15	<a href="http://www.bd.gov.hk">http://www.bd.gov.hk</a>
16	<a href="http://www.hkcli.hk">http://www.hkcli.hk</a>