CA4644: WIND AND EARTHQUAKE ENGINEERING

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Wind and Earthquake Engineering

Subject Code
CA - Civil and Architectural Engineering
Course Number
4644

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
CA3633 Structural Analysis

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

Equivalent Courses
BC4644/BC4644P Wind and Earthquake Engineering

Exclusive Courses
Nil

Part II Course Details

Abstract

The course provides students with an understanding on the behavior of structures under dynamic loading. The course discusses the nature and characteristics of wind load and earthquake load. It introduces the analysis and design of structures subjected to such loading.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	explain the nature and general characteristics of wind and earthquake loads;		x		
2	explain the general concept of wind and earthquake-resistant designs of structures;			x	
3	explain the basic principle of structural dynamics;			x	
4	analysis of structural response under wind and earthquake excitations;			x	
5	apply wind codes and earthquake codes for structural design.			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 and Experiment	Lecture and Wind tunnel testing for a tall building	1, 2, 3, 4	
2	Lecture and Design	Wind-resistant and seismic resistant design of structures	5	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Laboratory Experiment (Wind tunnel testing report)	1, 2, 3, 4	15		No

2	Design (Apply wind codes and siesmic codes for structural design)	5	15		No
3	Mid-term test	1, 2, 3	20		No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

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

Laboratory Experiment (Wind tunnel testing report)

Criterion

1.1 Ability to complete a pressure measurement wind tunnel testing and the report

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

Design (Apply wind codes and earthquake codes for structural design)

Criterion

2.1 Ability to apply wind codes and earthquake codes for structural 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
Mid-term test

Criterion
1.1 Capacity to understand the nature and general characteristics of wind and earthquake loads.
1.2 Ability to explain the general concept of wind and earthquake-resistant designs of 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

Assessment Task
Examination

Criterion
1.1 Capacity to understand the nature and general characteristics of wind and earthquake loads, the basic principle of structural dynamics.
1.2 Ability to explain the general concept of wind and earthquake-resistant designs of structures.
1.3 Ability to apply wind codes and earthquake codes for structural 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

Part III Other Information

Keyword Syllabus
Wind characteristics, turbulence, wind loading, extreme probability distribution, response of structures, Hong Kong wind code, earthquake response, seismic codes, seismic design of structures.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Gould & Abu-Sitta (1980). Dynamic Response of Structures to Wind and Earthquake Loading, Pentech Press.
2	Clough, R. W. and Penzien, J. (1993). Dynamics of Structures, 2nd Edition, McGraw-Hill, Inc. New York.
3	Holmes, J. D. (2001). Wind Loading of Structures, Spon Press, London.
4	Choi, E. C. C. (1983). Wind Loading in Hong Kong: Commentary on the Code of Practice on Wind Effects Hong Kong-1983, Hong Kong Institution of Engineers, Hong Kong.
5	Simiu, E. and Scanlan, R. H. (1996). Wind Effects on Structures: Fundamentals and Applications to Design. John Wiley & Sons, Inc.
6	Newmark, N.M. and Rosenbleuth, E. (1971). Fundamental of Earthquake Engineering, Prentice Hall.
7	Tedesco, J. W., Mcdougal, W. G. and Ross, C. A. (1999). Structural Dynamics Theory and Application. Addison Wesley Longman, Inc. California.
8	Chopra, A.K. (1995). Dynamics of Structures, Prentice Hal.
9	Wakabayashi, M. (1986). Design of Earthquake Resistant Buildings, McGraw Hill.