City University of Hong Kong
Course Syllabus

offered by Department of Architecture and Civil Engineering
with effect from Semester A 2017/18

Part I Course Overview

Course Title:	Structural Dynamics and Applications
Course Code:	CA5010
Course Duration:	1 Semester (Some courses offered in Summer Term may start a few weeks earlier than the normal University schedule. Please check the teaching schedules with CLs before registering for the courses.)
Credit Units:	3
Level:	P5
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)*	BC5010 Structural Dynamics and Applications
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course aims at equipping students with knowledge in structural dynamics, stability and vibration control with a balanced scope on fundamentals, research and applications. Basic topics include single-degree-of-freedom (SDOF) systems, multi-degree-of-freedom (MDOF) systems and continuous systems. It also includes advanced topics such as structural stability, random vibrations, damping in structures, vibration control, theory and dynamics of plates, wind and earthquake engineering.

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 (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	establish governing equations for linear-elastic structural dynamics problems with common structural elements;		✓		
2.	apply effectively analytical and numerical techniques for analyzing dynamic response of SDOF and MDOF linear-elastic structures under different characteristic types of loading;		✓		
3.	identify vibration problems and apply structural dynmaics concepts to its mitigation;		✓	✓	
4.	apply probability theory to analysis of linear-elastic vibration of structures subjected to stochastic loads;			✓	✓
5.	perform vibration testing of structures using common techniques;			✓	✓
6.	apply structural dynamics to basic assessment of structural response due to wind and earthquake loads.			✓	✓
		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 applicable)
		1	2	3	4	5	6	
Lectures	Theory of structural dynamics	✓	✓	✓	✓			
Tutorials	Application in structural dynamics				✓	✓	✓	

Semester Hours:	3 hours per week
Lecture/Tutorial/Laboratory Mix:	Lecture (2); Tutorial (1); Laboratory (0)

4. Assessment Tasks/Activities
(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%								
Assignments	✓	✓	✓	✓			30%	
Mid-term Test				✓	✓	✓	20%	
Examination: 50% (duration: 2 hours)								
							100%	

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%

5. Assessment Rubrics

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)/ Pass (P) on P/F basis	Failure (F)
Assignments	Understanding the theories	High	Significant	Moderate	Basic	Not even reaching marginal levels
Mid-term Test	Applying the theories	High	Significant	Moderate	Basic	Not even reaching marginal levels
Examination	Understanding and applying the theories	High	Significant	Moderate	Basic	Not even reaching marginal levels

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

1. Keyword Syllabus
(An indication of the key topics of the course.)

Single-degree-of-freedom (SDOF) systems: free vibration, harmonic loading, periodic loading, general loading. Multi-degree-of-freedom systems (MDOF): natural frequencies and modeshapes, modal analysis, time-stepping schemes. Distributed-parameter systems: governing PDE, eigenvalue problem. Stationary stochastic processes, random vibration of structures; wind engineering; earthquake engineering; structural vibration testing.

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.)

1.	Nil

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

1.	Clough RW and Penzien J (1993), Dynamics of Structures (Second Edition), ISBN 0-07-11394-7, McGraw-Hill.
2.	Simiu E and Scanlan R (1986). Wind Effects on Structures (2nd Edition), ISBN 0-471-86613-X, Wiley-Interscience.