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:	Modelling and Computational Techniques for Built Environment
Course Code:	CA5018
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)*	BC5018 Modelling and Computational Techniques for Built Environment
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

The course provides the knowledge about the theories and computer implementations of the modeling and computational techniques. It allows students to appreciate the application of computational techniques to model problems in built environment and the use of commercial software packages.

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.	Understand and apply the modeling techniques and computer software packages to solve problems related to engineering researches,				
2.	Discover and explain the properties of different modeling techniques,			✓	
3.	Explore the significance and limitations of empirical approach, and the use of simulation models for engineering research problems.				
		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	
Lectures and class tests	Understand and apply the modeling techniques and computer software packages to solve problems related to engineering researches, the properties of different modeling techniques, Explore the significance and limitations of empirical approach, and the use of simulation models for engineering research problems.	✓	✓	✓	
Tutorials	Tutorials to assistant teaching sessions for above	✓	✓	✓	

Semester Hours:	- hours per week
Lecture/Tutorial/Laboratory Mix:	Lecture (Mixed); Tutorial (Mixed); Laboratory (Mixed)
	39 contact hours

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		
Continuous Assessment: 50%					
Assignments	✓	✓	✓	30%	
Class tests	✓			20%	
Examination: 50% (duration: 3 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	Ability to appreciate and apply CILO 1 to 3	High	Significant	Moderate	Basic	Not even reaching marginal level
Class tests	Ability to appreciate CILO 1	High	Significant	Moderate	Basic	Not even reaching marginal level
Examination	Ability to appreciate and apply CILO 1 to 3	High	Significant	Moderate	Basic	Not even reaching marginal level

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.)

Finite element method, finite difference method, finite volume method, numerical optimization algorithm, system dynamics, Artificial Neural Network (ANN), fuzzy logic.

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.	Reddy, J.N. (2005) An Introduction to the Finite Element Method, third edition
2.	Stasa, F.L. (1995) Applied finite element analysis for engineers
3.	Epton, J. (1994) Expert System and Optimisation, Aldershot, Hants, England, Avebury Technical.
4.	Harvey, R.L., (1994) Neural Network Principles, Englewood Cliffs, Prentice Hall.
5.	Stauffer, D. (1993) Computer Simulation and Computer Algebra: Lectures for Beginners, 3rd Edition, Berlin, Springer-Verlag.
6.	Coyle R.G. (1996) System Dynamics Modeling: A Practical Approach, Chapman & Hall, London.