City University of Hong Kong
Course Syllabus

offered by Department of Architecture and Civil Engineering
with effect from Semester A 2024 / 2025

Part I Course Overview

Course Title:	Modelling and Computational Techniques
Course Code:	CA8018M
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:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	CA8022M Research Methodology and Ethics Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.
Equivalent Courses: *(Course Code and Title)*	BC8018M 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 engineering researches and the use of commercial software packages.

2. Course Intended Learning Outcomes (CILOs)

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 modelling 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 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.

3. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures and class Tests	understand and apply Finite element method, finite difference method, finite volume method, numerical optimization algorithm, system dynamics, Artificial Neural Network (ANN), fuzzy logic	✓	✓	✓	27
Presentation	Assignment Presentations	✓	✓		12

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

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.			Weighting	Remarks
	1	2	3		
Continuous Assessment: 100%					
Assignments	✓	✓	✓	50%	
Class Tests	✓	✓	✓	30%	
Presentation	✓	✓		20%	
Examination: 0%					
				100%	

5. Assessment Rubrics

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Assignments	Ability to appreciate CILO 1 to 3	High	Significant	Moderate	Basic	Not even reaching marginal levels
Class Tests	Ability to appreciate CILO 1 to 3	High	Significant	Moderate	Basic	Not even reaching marginal levels
Presentation	Ability to appreciate CILO 1 to 2	High	Significant	Moderate	Basic	Not even reaching marginal levels

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Assignments	Ability to appreciate CILO 1 to 3	High	Significant	Basic	Not even reaching marginal levels
Class Tests	Ability to appreciate CILO 1 to 3	High	Significant	Basic	Not even reaching marginal levels
Presentation	Ability to appreciate CILO 1 to 2	High	Significant	Basic	Not even reaching marginal levels

Part III Other Information

1. Keyword Syllabus

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

1.	Nil

2.2 Additional Readings

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.