City University of Hong Kong
Course Syllabus

offered by
Department of Architecture and Civil Engineering
with effect from Semester A 2022 / 2023

Part I Course Overview

Course Title:	Finite Element Analysis
Course Code:	CA8027
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)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

The course intends to provide students with knowledge on basic principle of finite element method and its application to truss and frame structures, heat conduction, and linear elasticity; use of application software; overview of advanced topics such as structural dynamics, fluid flow, and nonlinear structural analysis.

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.	learn and discover fundamental principles of finite element to analyze and design structural members under axial load, shear load, bending moment and torsional moment	25%	✓		
2.	establish finite element model for structural analysis	25%		✓	
3.	discover appropriate finite element model in linear elasticity to solve practical boundary-value problems of structures	25%		✓	
4.	discover the advanced topics in elastic dynamics, variation principles, thick-walled cylinders, and nonlinear analysis of plates and shells	25%		✓	
* If weighting is assigned to CILOs, they should add up to 100%.		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)

TLA	Brief Description	CILO No.				Hours / week (if applicable)
		1	2	3	4	
Lecture	Address the basic principles and theories for Finite Element Method	✓	✓	✓	✓	2 hours/week
Tutorial	Explain how to use commercial software for structural analysis	✓	✓	✓	✓	1 hour/week

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

4. Assessment Tasks/Activities

Assessment Tasks / Activities	CILO No.				Weighting*	Remarks
	1	2	3	4		
Continuous Assessment: 50%						
Assignment	✓	✓	✓	✓	30%	
Mid-term test		✓			20%	
Examination: 50% (duration: 2 hour(s))						
Examination					50%	
* The weightings should add up to 100%.					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

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Marginal (D)/ Pass (P) on P/F basis	Failure (F)
Assignment	ABILITY to USE commercial software to solve an engineering problem.	High	Significant	Basic	Not even reaching marginal levels
Mid-term test	ABILITY to APPLY the basic principle and the scientific techniques in solving the plate and shell structures.	High	Significant	Basic	Not even reaching marginal levels
Examination	CAPACITY to UNDERSTAND the mathematical theories and USE them in solving an engineering problem.	High	Significant	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

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)
Assignment	ABILITY to USE commercial software to solve an engineering problem.	High	Significant	Moderate	Basic	Not even reaching marginal levels
Mid-term test	ABILITY to APPLY the basic principle and the scientific techniques in solving the plate and shell structures.	High	Significant	Moderate	Basic	Not even reaching marginal levels
Examination	CAPACITY to UNDERSTAND the mathematical theories and USE them in solving an engineering problem.	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

The finite element method and its application to engineering problems: truss and frame structures, heat conduction, and linear elasticity; use of application software; overview of advanced topics such as structural dynamics, fluid flow, and nonlinear structural analysis.

2. Reading List

2.1 Compulsory Readings

1.	Thomas, JR, Hughes & Hinton, E 1986, Finite element methods for plate and shell structures, Pineridge, Swansea.
2.	Zienkiewicz, OC, Taylor, RL & Zhu, JZ 2013, Finite element method: its basis and fundamentals, 7th edn, Butterworth-Heinemann, Oxford.

2.2 Additional Readings

1.	Moaveni S 2015, Finite element analysis : theory and application with Ansys, 4th edn, Pearson Education, Harlow.