Subject Description Form

Subject Code	CSE513
Subject Title	Tall Building Structures
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Recommended background knowledge: It is expected that students will have a fundamental understanding of structural analysis and design consistent with undergraduate level study in civil engineering.
Objectives	To provide the students with an appreciation of the structural behaviour of tall building systems under various loading conditions. Emphasis will be placed on both rigorous analytical methods and practical methods of design.
Intended Learning Outcomes	Upon completion of the subject, students will be able: a. to understand the fundamental structural concepts for tall building design, and to have an overview of various common structural forms for different ranges of building heights; b. to appreciate the effects of wind loads in Hong Kong on tall buildings under prevailing codes of practice, and to apply the codes in practice; c. to analyse various common structural forms mentioned in Hong Kong; d. to work with others as a team to tackle a practical project in analysis and design of a particular form of tall building structures, and to take responsibility for an agreed area of a shared activity.
Subject Synopsis/ Indicative Syllabus	**Keyword Syllabus** i) Wind Forces on Tall Buildings Topographic effects on air flow; wind effects on buildings; design considerations and procedures for evaluation of wind loads on buildings. ii) Structural Planning of Tall Buildings General design considerations; choice of floor systems; choice of lateral load resisting systems; choice of structural materials. iii) Modelling Techniques General characteristics of behaviour; common assumptions; design stages and approaches of analysis; various modelling techniques. iv) Coupled Shear Walls Equivalent continuum method; wide column frame method; finite element method; behaviour of coupled walls. v) Wall-Frame Systems Equivalent shear cantilever; wall-frame interaction.

vi) Core Walls

Core walls as thin-walled sections; torsion of open sections.

vii) Tubular Structures

Framed-tube structures; tube-in-tube structures; equivalent plane frame method for framed tubes; shear lag.

viii) Outrigger-Braced Structures

Core-outrigger interaction; analysis of outrigger-braced structures; optimum locations of outriggers.

ix) Seismic Design of Tall Buildings

Seismic loading; seismic behaviour of tall buildings; seismic design of tall buildings.

Teaching/Learning Methodology

Lectures are delivered to cover various topics, including fundamental structural concepts, worked examples and case studies.

Coursework, tests, and an individual computer analysis project will be given to ensure that students have thoroughly digested the subject contents.

Group projects are assigned and each group is required to review technical papers or analyse a particular form of tall building structures. Students are required to present their work using Powerpoint, and marks are given according to the technical content and skills of presentation. All students are able to share and benefit from the outcomes of the group projects.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a.	b.	c.	d.		
1. Continuous Assessment	40%	√	√	√	√		
2. Written Examination	60%	√	√	√			
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessment is based on a test, a project report and seminar performance.

Written examination is evaluated by final examination.

Students must attain at least Grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.

Reading List and References	**<u>Books</u>** Hong Kong Buildings Department, *Code of Practice on Wind Effects in Hong Kong* (2004). MacDonald, A.J. and Coull A., *Wind Loading on Buildings*, Applied Science Publishers Ltd. (1975). Murray, N.W., *Introduction to the Theory of Thin-walled Structures*, Oxford Engineering Science Series (1984). Smith, B.S. and Coull A., *Tall Building Structures: Analysis and Design*, John Wiley (1991). Taranath, B.S., *Steel, Concrete, and Composite Design of Tall Buildings*, McGraw-Hill (1998). Taranath, B. S., *Structural Analysis and Design of Tall Buildings*, McGraw-Hill (1988). Taranath, B.S., *Wind and Earthquake Resistant Buildings – Structural Analysis and Design,* Marcel Dekker (2005). **<u>Journals</u>** ACI Structural Journal Engineering Structures ICE Proceedings-Structures and Buildings Journal of Structural Engineering, American Society of Civil Engineers The Structural Design of Tall and Special Buildings