THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Department of Civil and Environmental Engineering

CIVL 4350 Design of Structural Systems
Spring 2016

Instructor: Professor Chun-Man Chan
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Office hours: 5 - 7 pm Tuesday or by appointment

Teaching Assistants: Miss Xuemeng Zhu (xzhuak@ust.hk)
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Class Schedule: Lecture: Tuesday, Thursday 9:00 – 10:20 a.m. (room 2304)
Tutorial: Friday 10:00 – 11:50 a.m. (room 2406)

Course Description:
The primary objective of the course is to provide the student with a solid understanding of the basic principles of high-rise building structures and to assist the student, facing for the first time with the design of a building, in developing an intuitive feeling for the structural behaviour of the building as a whole. Emphasis will be placed on the system level behaviour of lateral stability of building structures. Approximate analytical methods and computer aided analysis skills will be discussed. Special topics on structural optimisation of building structures will also be introduced.

Course Objectives:
This course will enable students to
1. Understand common structural systems utilized in high-rise buildings and their design philosophy.
2. Evaluate performance of a wide range of structural forms of buildings using analytical approximate methods for preliminary and conceptual design.
3. Develop analytical models for building structures and assess structural response using state-of-the-art structural analysis programs.
4. Effectively participate in structural design of buildings for specified performance objectives at component and system levels.
5. Develop critical thinking skills in an open-ended design process with practical applications to real-world building design.
Course Outline:

1) Introduction to Building Structures
   • Introduction to structural design of tall buildings
   • Tall building evolution
   • Classification of structural systems of tall buildings
   • Hong Kong tallest buildings illustrated

2) Load Action on Buildings
   • Dead and live loads
   • Wind loads
   • Earthquake loads
   • Combination of loads

3) Floor Framing Systems for Buildings
   • Steel floor systems
   • Concrete floor systems

4) Approximate Analysis of Simple Structures
   • Continuous trusses and beams
   • Simple frames under gravity loads
   • Portal and cantilever methods under lateral loads

5) Lateral Load Resisting Systems for Buildings
   • Braced frames
   • Moment resisting frames
   • Tubular frames
   • Coupled shear wall systems
   • Outrigger braced systems

6) Computer Modelling and Analysis of Building Structures
   • Modelling principles
   • Computer Analysis using ETABS and SAP2000

7) Special Topics
   • Composite construction – composite beams, columns and frames
   • Introduction to structural optimisation of tall buildings
   • Case studies of tall building design in Hong Kong

Reference Texts:

