

**City University of Hong Kong
Course Syllabus**

**offered by Department of Architecture and Civil Engineering
with effect from Semester A 2022/23**

Part I Course Overview

| | |
|---|---|
| Course Title: | Modern Structural Engineering |
| Course Code: | CA6608 |
| 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: | P6 |
| 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) | BC6608 Advanced Structural Engineering |
| Exclusive Courses: (Course Code and Title) | Nil |

Part II Course Details

1. Abstract

The course aims at introducing modern technologies for structural engineering and their applications. The course focuses on the state-of-the-art theory, analysis and design of structural members and systems with the help of the computer applications.

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. | Apply advanced techniques for structural analysis and design | 35% | | ✓ | |
| 2. | Apply computer applications for structural analysis and design | 25% | | ✓ | |
| 3. | Apply the state-of-the art design code for the design of steel structures | 40% | | ✓ | |
| | | 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 | |
| Lecture | Theory, concepts and problem solving | ✓ | ✓ | ✓ | |
| Hands-on | Computer-aided structural analysis and design | | ✓ | | |
| Tutorial | Design of structures | | | ✓ | |

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

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 | ✓ | | ✓ | 10% | |
| Mid-term test | ✓ | | ✓ | 30% | |
| Individual project | | ✓ | | 10% | |
| Examination: 50% (duration: 2 hour(s)) | | | | | |
| Examination | | | | 50% | |
| | | | | 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.)

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

| Assessment Task | Criterion | Excellent (A+, A, A-) | Good (B+, B) | Marginal (B-, C+, C) | Failure (F) |
|--------------------|---|-----------------------------|-----------------|----------------------------|-----------------------------------|
| Assignments | CAPACITY for SELF-DIRECTED LEARNING to understand the principles of modern structural engineering CAPACITY for structural analysis and design | High | Significant | Basic | Not even reaching marginal levels |
| Mid-term test | CAPACITY for SELF-DIRECTED LEARNING to understand the principles of plates and shells CAPACITY for structural analysis and design | High | Significant | Basic | Not even reaching marginal levels |
| Individual project | CAPACITY for structural analysis and design using computer application | High | Significant | Basic | Not even reaching marginal levels |
| Examination | ABILITY to UNDERSTAND the taught methodology and procedures in using the modelling and calculation techniques ABILITY to APPLY the scientific techniques in solving theoretical and application problems in structural engineering | 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) | Failure (F) |
|--------------------|---|-----------------------------|------------------------|------------------------|-----------------|-----------------------------------|
| Assignments | CAPACITY for SELF-DIRECTED LEARNING to understand the principles of modern structural engineering CAPACITY for structural analysis and design | High | Significant | Moderate | Basic | Not even reaching marginal levels |
| Mid-term test | CAPACITY for SELF-DIRECTED LEARNING to understand the principles of plates and shells CAPACITY for structural analysis and design | High | Significant | Moderate | Basic | Not even reaching marginal levels |
| Individual project | CAPACITY for structural analysis and design using computer application | High | Significant | Moderate | Basic | Not even reaching marginal levels |
| Examination | ABILITY to UNDERSTAND the taught methodology and procedures in using the modelling and calculation techniques ABILITY to APPLY the scientific techniques in solving theoretical and application problems in structural engineering | 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

(An indication of the key topics of the course.)

Advanced structural analysis; Computer-aided structural analysis and design; Column buckling; Lateral torsional buckling; Shear buckling of web; Web bearing and buckling due to transverse force; Design of steel structures.

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. | BSi, BS EN 1993-1-1: 2005, Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings. |
| 2. | BSi, BS EN 1993-1-5: 2006, Eurocode 3: Design of steel structures - Part 1-5: Plated structural elements. |

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

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| 1. | J.N. Reddy, An Introduction to the Finite Element Method, 3rd edition, McGraw-Hill, 2006. |
| 2. | Devdas Menon, 2009, Advanced Structural Analysis, Morgan & Claypool. |
| 3. | Buildings Department, 2011, Code of Practice for the Structural Use of Steel, download at: http://www.bd.gov.hk/english/documents/code/SUOS2011.pdf |
| 4. | Buildings Department, 2011, Code of Practice for Dead and Imposed Loads 2011. |