

CA6608: MODERN STRUCTURAL ENGINEERING

Effective Term

Semester B 2024/25

Part I Course Overview

Course Title

Modern Structural Engineering

Subject Code

CA - Civil and Architectural Engineering

Course Number

6608

Academic Unit

Architecture and Civil Engineering (CA)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

P5, P6 - Postgraduate Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

BC6608 Advanced Structural Engineering

Exclusive Courses

Nil

Part II Course Details

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.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Apply advanced techniques for structural analysis and design	35		x	
2	Apply computer applications for structural analysis and design	25		x	
3	Apply the state-of-the art design code for the design of steel structures	40		x	

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.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Theory, concepts and problem solving	1, 2, 3	
2	Hands-on	Computer-aided structural analysis and design	2	
3	Tutorial	Design of structures	3	

Additional Information for LTAs

Semester Hours: 3 hours per week

Lecture/Tutorial/Laboratory Mix: Lecture (2); Tutorial (0); Laboratory (1)

Tutorial/Laboratory 1 hour per week

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 3	10	
2	Mid-term test	1, 3	30	
3	Individual project	2	10	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

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%

Assessment Rubrics (AR)

Assessment Task

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

Criterion

- CAPACITY for SELF-DIRECTED LEARNING to understand the principles of modern structural engineering
- CAPACITY for structural analysis and design

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Mid-term test (Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- CAPACITY for SELF-DIRECTED LEARNING to understand the principles of plates and shells
- CAPACITY for structural analysis and design

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

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

Criterion

CAPACITY for structural analysis and design using computer application

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

- 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

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

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

Criterion

- CAPACITY for SELF-DIRECTED LEARNING to understand the principles of modern structural engineering

- CAPACITY for structural analysis and design

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Mid-term test (Applicable to students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

- CAPACITY for SELF-DIRECTED LEARNING to understand the principles of plates and shells
- CAPACITY for structural analysis and design

Excellent

(A+, A, A-) High

Good

(B+, B) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Individual project (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

CAPACITY for structural analysis and design using computer application

Excellent

(A+, A, A-) High

Good

(B+, B,) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

- 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

Excellent

(A+, A, A-) High

Good

(B+, B,) Significant

Marginal

(B-, C+, C) Basic

Failure

(F) Not even reaching marginal levels

Part III Other Information**Keyword Syllabus**

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.

Reading List**Compulsory Readings**

Title	
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.

Additional Readings

Title	
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.