CA3619: DESIGN OF STRUCTURAL ELEMENTS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Design of Structural Elements

Subject Code
CA - Civil and Architectural Engineering
Course Number
3619

Academic Unit
Architecture and Civil Engineering (CA)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
CA2673 Structural Mechanics and CA2674 Construction Materials

Students must have attempted (including class attendance, coursework submission, and examination) the precursor course(s) so identified.

Equivalent Courses
BC3619/BC3619P Design of Structural Elements

Exclusive Courses
Nil

Part II Course Details

Abstract

The course provides fundamental knowledge of limit state design with structural steel. It introduces the design concept and procedures of applying current code of practice to design steel members in building and civil engineering structures. This course provides the necessary backgrounds for studying the topics in structural analysis and design.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the importance of the general concept, principles and procedures of structural design;	15	x		
2	Explain the importance of the general concept of limit state design and select appropriate design philosophy for typical structures;	15	x		
3	Analyse and design simple steel members under tension, compression, flexural, shear, combined loads, bolted and welded connections;	70		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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	introducing basic theories, in-class experiment to demonstrate important structural behaviors	1, 2, 3	2
2	Tutorial	implementation of design concepts by working on design problems using design codes	3	1

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3	20	
2	Tests	1, 2, 3	30	

Continuous Assessment (%)
50

Examination (%)
50

Examination Duration (Hours)
3

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

Criterion
ABILITY to EXPLAIN various design concepts, and to DESIGN various structural elements.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Below standard

Assessment Task
Tests

Criterion
ABILITY to DESIGN different structural elements.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Below standard

Assessment Task
Examination

Criterion
ABILITY to EXPLAIN various design concepts, and to DESIGN various structural elements.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Below standard

Part III Other Information

Keyword Syllabus
Design philosophy and process, steel and concrete design codes; limit state design; design loads, tension members, compression members, flexural members, beam-columns, shear strength, bolted and welded connections, reinforced concrete, properties of reinforced concrete; design of reinforced concrete sections.

Reading List

Compulsory Readings

	Title
1	EN 1990 'Eurocode: Basis of structural design'.
2	EN 1991 'Eurocode 1: Actions on structures'.
3	EN 1993 'Eurocode 3: Design of steel structures'.
4	Buildings Department (2011), Code of Practice for the Structural Use of Steel 2011.
5	Buildings Department (2011), Code of Practice for Dead and Imposed Loads 2011.

Additional Readings

	Title
1	Luis Simoes da Silva, Rui Simoes and Helena Gervasio (2010), Design of Steel Structures: Eurocode 3, ECCS Eurocode Design Manuals, Ernst & Sohn: A Wiley Company.
2	Nethercot, D. A. 2001, Limit State Design of Structural Steelwork, 3rd Ed, Spon Press, London.
3	Trahair, N. S. & Bradford, M. A. 1988, The Behavior and Design of Steel Structures, 2nd Edition, Chapman and Hall, London.

4	TATA Steel Advance sections CE marked structural sections, Eurocode version.
5	Buildings Department (2004), Code of Practice on Wind Effects in Hong Kong 2004.
6	Department of Justice 1997, Chapter 123, Cap 123B - Building (Construction) Regulations
7	http://www.steel-sci.org/
8	http://www.eurocodes.co.uk/