CA29502: TECHNICAL STUDIES - BUILDING ENVELOPE SYSTEMS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Technical Studies - Building Envelope Systems

Subject Code
CA - Civil and Architectural Engineering
Course Number
29502

Academic Unit
Architecture and Civil Engineering (CA)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
A1, A2 - Associate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
BST21052 Technical Studies - Building Envelope Systems

Exclusive Courses
Nil

Additional Information
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.

Part II Course Details

Abstract

This course aims to further develop your technical understanding in the areas of building materials, construction and structure, including conservation technologies and the design and construction of building envelopes, and synthesising solutions for medium-scale buildings.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify the functional requirements for common structural components for medium-scale buildings.		x		
2	Outline the principles and techniques for building conservation.		x		
3	Specify the framing pattern and critical dimensions of the structural system of a medium-scale building.			x	
4	Produce a set of detailed wall sections illustrating the assembly of the building components and finishes.			x	
5	Incorporate a system of dimensional coordination for the various building components in the design of medium-scale building.				x
6	Design a set of general details for the envelope system including curtain wall system and cladding system for a medium-scale building.				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	Consists of oral presentations by instructors intended to present information on a particular subject. Other forms of teaching and learning activities will also be used to stimulate students' participation during a lecture.	1, 2, 3, 4, 5, 6	
2	Tutorial	Activity complementary to the lecture classes to provide more opportunities for student-instructor and student-student interaction. Students will be engaged in more detailed discussions on the lecture materials and/or assessment tasks in a tutorial.	1, 2, 3, 5, 6	
3	Seminar	Consists of oral presentations by instructors and/or external guests, which focuses on a selected topic relating to the integrated studio or the various subject area courses.	2, 6	
4	Design Project	Engages students in the production of an integrated proposal for a building in response to a set of constraints and requirements. Teaching and learning are conducted through regular studio classes in which students will develop their design proposals with a studio tutor.	2, 3, 4, 5, 6	

5	Problem Case	Engages students in the solving of a building-related problem. Teaching and learning are conducted through individual research and regular problem classes, in which students will discuss and share information found on a problem under the facilitation of a studio tutor.	2, 3, 4, 5, 6	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignment 1	1, 2, 3, 4, 5, 6	20	
2	Assignment 2	1, 2, 3, 4, 5, 6	20	
3	Quiz (in-class assignment)	1, 2, 3, 4, 5, 6	20	

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

1.5

Additional Information for ATs

Students must attain a minimum mark of 30 in all assessment components AND an overall mark of 40 to pass the course.

Assessment Rubrics (AR)

Assessment Task

Assignment 1

Criterion

- Consistent and thorough incorporation of the principles of buildability and modular design in the design of a medium-scale building.
- Insightful development of external envelope design of a medium-scale building, including curtain wall system and cladding system.
- Production of detailed wall section illustrating the assembly of the building components and finishes.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal level

Assessment Task
Assignment 2

Criterion
- Excellent discovery of framing pattern and critical dimensions of the structural system of a medium-scale building.
- Outstanding and innovative design of a medium-scale building incorporating dimensional coordination of various building components and a set of general details for the envelope system.
- Thorough and correct explanation of the principles and techniques for building conservation

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal level

Assessment Task
Quiz (in-class assignment)

Criterion
- Clear and comprehensive outline of functional requirements for common structural components for a medium-scale building.
- Insightful attempt to apply the understanding in the solving of project and problem solutions.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal level

Assessment Task
Examination

Criterion
Examine critically all relevant techniques and building envelop technologies learned in this course.

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal level

Part III Other Information

Keyword Syllabus

- Structural systems for medium-scale buildings: Steel structure; concrete structure; composite structure.
- Building conservation: Principles; planning process; protection and maintenance; International Charters.
- Dimensional coordination: Principles; dimensioning methods; structural and planning grids; module.
- Internal finishes: Natural and artificial flooring; resilient flooring; carpet; wood and laminate; ceramic tiles; wall finishes; paints; wallpaper; interior wall cladding; ceiling; partition.
- External cladding systems: Metal; timber; concrete; masonry; natural stone; plastics; tiles.
- Basic curtain wall system: Post and beam facade; panel facade; spandrel system; suspension system.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Brock, L. (2005). Designing the exterior wall - an architectural guide to the vertical envelope. Hoboken: John Wiley John Wiley & Sons, Inc.
2	Dean, Y. (1996). Mitchell's building series-finishes (4th ed). London: Addison Wesley Longman Limited.
3	Forsyth, M. (2007) Understanding historic building conservation. Oxford: Malden, Blackwell
4	Foster, J. S. and Harington, R. (1994). Mitchell's building series-structure and fabric part 2 (5th ed). London: Addison Wesley Longman Limited.
5	Herzog, T. , Krippner, R., Lang, W. (2004) Facade construction manual. Basel: Birkhaeuser

6	Knaack, U., Klein, T., Bilow, M., Auer, T. (2007) Facades. Principles of construction. Basel: Birkhaeuser
7	McEvoy, M. (1994). Mitchell's building series-external components. Harlow: Longman Scientific & Technical.
8	Schittich, C. (2001) Building skins: concepts, layers, materials. Basel: Birkhaeuser
9	Uffelen, C.V. (2010) Re-Use architecture. Salenstein: Braun
10	Watts, A. (2005) Modern construction facades. Wien: Springer