

CA4738: FIRE ENGINEERING APPROACH

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Fire Engineering Approach

Subject Code

CA - Civil and Architectural Engineering

Course Number

4738

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

CA3732 Fire Engineering and Piped Services

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

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to provide students with in-depth knowledge in performance-based fire engineering approach and deterministic and probabilistic fire engineering approaches and statutory requirements on alternative design and relevant legislation control.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the key concept of the performance-based codes for fire engineering systems;	15	x	x	
2	Apply qualitative and quantitative techniques on building fire risk assessment;	25	x	x	
3	Propose current technologies of fire engineering techniques to solve fire engineering problems;	30			x
4	design fire engineering approach for simple fire problems.	30			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	Lectures	Students will engage in formal lectures to gain knowledge in performance-based fire safety engineering	1, 2
2	Tutorials	Students will engage in structured discussion on applying the concepts to solve fire problems	2, 3
3	Group Project	Students will participate in groups to design a fire engineering approach for solving holistic fire engineering problem	3, 4

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Mid-term Test	1, 2	20		No
2	Assignment	3, 4	10	Students are allowed to use GenAI to create script file for FDS simulation and to prepare report.	Yes
3	Project Report and Presentation	3, 4	20	Students are allowed to use GenAI to prepare project report.	Yes

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

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**

Mid-term Test

Criterion

ABILITY to DEVELOP understanding on the theories of fire safety 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

Assignment

Criterion

ABILITY to APPLY fire engineering tools to solve basic fire engineering problems

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

Project Report and Presentation

Criterion

ABILITY to DESIGN a performance-based fire engineering approach to solve a fire engineering problem

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

Criterion

ABILITY to DEVELOP understanding on the theories of fire safety engineering and APPLY the theories to solve the basic fire engineering problems

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

Part III Other Information

Keyword Syllabus

Reliability study. Performance based building fire codes. Deterministic approach. Probabilistic approach. Fire risk assessment. Building evacuation. Performance-based codes for the fire engineering systems.

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	A. E. Cote - Fire Protection Handbook, National Fire Protection Association, Quincy, Mass.
2	W.D. Moore - National Fire Alarm Code Handbook, NFPA, Quincy, Mass.
3	SFPE Handbook of fire protection engineering, Philip J. DiNenno et al., Society of Fire Protection.