

# CA3732: FIRE ENGINEERING AND PIPED SERVICES

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Fire Engineering and Piped Services

### Subject Code

CA - Civil and Architectural Engineering

### Course Number

3732

### 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

For ARCE Major: CA2626 Thermal Engineering for Building Engineers and CA2627 Building Science and CA2123 Engineering Methods. For other students: CA2627 Building Science or SEE2101 Engineering Thermofluids I. 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

The course provides essential knowledge of waste handling systems and analytical ability to solve the hydraulic calculations in fire engineering and plumbing services such that the students can prepare themselves for taking the fire engineering electives.

### Course Intended Learning Outcomes (CILOs)

| CILOs | Weighting (if app.)   | DEC-A1 | DEC-A2 | DEC-A3 |
|-------|---|--------|--------|--------|
| 1     | analyze building hydraulic systems;   | x      | x      |        |
| 2     | select and apply appreciate engineering options in designs of building hydraulic engineering systems; |        | x      | x      |
| 3     | compare the design options and examine water based fire engineering systems;                          | x      | x      |        |
| 4     | apply hydraulic calculation technique to plumbing services and fire engineering systems.              |        | x      | 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           | Designs of different building hydraulic and fire engineering systems | 1, 2, 3, 4                 |
| 2    | Tutorial          | Case studies on different hydraulic and fire engineering systems     | 1, 2, 3, 4                 |

### Assessment Tasks / Activities (ATs)

| ATs | CILO No.          | Weighting (%) | Remarks (e.g. Parameter for GenAI use) |
|-----|-------------------|---------------|--|
| 1   | Mid-term Test     | 1, 2, 4       | 20                                     |
| 2   | Exercises         | 1, 2, 4       | 5                                      |
| 3   | Laboratory Report | 1, 2, 4       | 15                                     |
| 4   | Quiz              | 3, 4          | 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**

Mid-term Test

**Criterion**

ABILITY to UNDERSTAND and ANALYZE building hydraulic systems

**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

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**Assessment Task**

Exercises

**Criterion**

CAPACITY to APPLY and UNDERSTAND building hydraulic systems

**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

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**Assessment Task**

Laboratory Report

**Criterion**

CAPACITY to APPLY, UNDERSTAND and DISCUSS hydraulic calculation techniques to plumbing services and fire engineering systems

**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

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**Assessment Task**

Quiz

**Criterion**

ABILITY to UNDERSTAND, APPLY and ANALYZE different fire engineering systems

**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

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**Assessment Task**

Examination

**Criterion**

CAPACITY to UNDERSTAND, APPLY and ANALYZE the design and operation of building hydraulic and fire engineering systems

**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**

Transient flow analysis. Sewage and refuse disposal. Engineering options. Piped gases. Fully hydraulic calculations and analysis. Introduction to fire modeling.

**Reading List****Compulsory Readings**

| Title |     |
|-------|-----|
| 1     | Nil |

**Additional Readings**

| Title |  |
|-------|--|
| 1     | Wise, A. F. E. & Swaffield, J. A. (5th ed.) 2002, Water, Sanitary and Waste Services for Buildings, Butterworth-Heinemann, Oxford.   |
| 2     | Institute of Plumbing. 2002, Plumbing Engineering Services Design Guide, Institute of Plumbing, Hornchurch, Essex.   |
| 3     | Garrett, R. H.(3rd ed.) 2008, Hot and Cold Water Supply, WileyBlackwell, West Sussex.  |
| 4     | Water Supplies Department. 1995, A Guide to the Preparation of Plumbing Proposals, Water Supplies Department.  |
| 5     | National Fire Protection Association. 2002, SFPE Handbook of Fire Protection Engineering. .  |
| 6     | Fire Services Department. 2005, Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment, Fire Services Department, Hong Kong.  |
| 7     | Loss Protection Council and Fire Protection Association. 2001, LPC Rules for Automatic Sprinkler Installations: including BS 5306, part 2 and LPC technical bulletins 1 to 33, Fire Protection Association, England. |
| 8     | BSI. 2000, BS EN 12056-2 Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation, BSI.  |