

# CA4182: ADVANCED COMPUTER-AIDED DESIGN

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## Effective Term

Semester A 2022/23

## Part I Course Overview

### Course Title

Advanced Computer-Aided Design

### Subject Code

CA - Civil and Architectural Engineering

### Course Number

4182

### 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

Nil

### Equivalent Courses

SE4656 Advanced Computer Aided Design

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course provides students with knowledge of advanced computer-aided design techniques to assist in the preparation; communication and sharing of building design information, and equips them with the necessary skills for using various software programs to carry out these tasks efficiently and effectively.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 app.)			DEC-A2	DEC-A3
1	Apply advanced CAD techniques in the preparation and communication of building design and production information;			x		
2	Organise a project design file effectively to facilitate data management, sharing and retrieval;		x			
3	Use various software programs for documentation and analysis of different types of building information through data sharing;		x	x		
4	Prepare customised commands and automated routines to facilitate design and drawing production.		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	Demonstration	Explain and exercise the principles, theories, software and techniques of advanced CAD.	1, 2, 3, 4
2	Hands-on	Require the students to apply advanced CAD techniques on a given scenario; and to create advanced CAD models and representations.	1, 2, 3, 4

**Assessment Tasks / Activities (ATs)**

ATs		CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4	45	2 separate assignments.
2	In-class, hands-on test	1, 2, 3, 4	20	
3	Term project	1, 2, 3, 4	35	To be completed individually.

**Continuous Assessment (%)**

100

**Examination (%)**

0

**Assessment Rubrics (AR)****Assessment Task**

Assignments

**Criterion**

- 1.1 CAPACITY to DISCUSS the key procedures in applying advanced CAD techniques.
- 1.2 ABILITY to USE the scientific techniques in solving advanced CAD challenges.
- 1.3 ABILITY to APPLY suitable advanced CAD techniques on a given scenario.

**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**

In-class, hands-on test

**Criterion**

- 2.1 CAPACITY to OPERATE advanced CAD programs effectively to generate innovative forms.

**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**

Term project

**Criterion**

3.1 ABILITY to ANALYZE and PARAMETERIZE an abstract design concept so as to IMPLEMENT and VISUALIZE the concept as architectural forms, adopting advanced form-finding and form-generating techniques.

3.2 CAPACITY to OPERATE advanced CAD programs to explore various alternatives of innovative architectural forms.

3.3 ABILITY to APPLY the advanced CAD techniques in solving future architectural design challenges.

**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**

Object-based computer-aided design. Parametric design. Visual Programming. Creating and programming automated routines. Advanced drawing organization and management. Data sharing and file interlink. CAD networking. Document sharing on the internet. Customized menus and commands for special tasks.

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

Title	
1	Nil

**Additional Readings**

Title	
1	Szalapaj, P., (2001), CAD Principles for Architectural Design: An Analytical Approach to the Computational Representation of Architectural Form, Oxford : Architectural Press.
2	Von Wodtke, M., (2000), Design with digital tools : using new media creatively, New York ; London : McGraw-Hill.