

EE4218: COMPUTER ARCHITECTURE

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Computer Architecture

Subject Code

EE - Electrical Engineering

Course Number

4218

Academic Unit

Electrical Engineering (EE)

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

EE2004 Microcomputer Systems

Precursors

Nil

Equivalent Courses

EE3201 Computer Architecture

Exclusive Courses

Nil

Part II Course Details

Abstract

The course aims to present the fundamentals of computer architecture, computer arithmetic, CPU design, memory system, I/O system, and interconnection structures.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	describe computer architecture, computer arithmetic, and CPU design	x	x	
2	explain the memory system of a computer	x	x	
3	describe I/O system and interconnection structures of computer	x	x	
4	identify high performance architecture design	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 Key concepts are described. Key concepts are learned from working on design problems. Explain how some problems are solved and the techniques used; explain some concepts	1, 2, 3, 4	3
2	Assignments	Practice problem solving	1, 2, 3, 4
3	Quiz/Test	Practice problem solving	1, 2, 3, 4

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tests (min: 2)	1, 2, 3, 4	30
2	#Assignments (min.: 3)	1, 2, 3, 4	20

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

Remark:

To pass the course, students are required to achieve at least 30% in coursework and 30% in the examination.

may include homework, tutorial exercise, project/mini-project, presentation

Assessment Rubrics (AR)

Assessment Task

Examination

Criterion

Achievements in CILOs

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

Coursework

Criterion

Achievements in CILOs

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**Fundamental concepts

- structure and function of computer
- computer evolution

Central Processing Unit

- computer arithmetic
- instruction format and addressing mode
- processor structure
- control unit

Memory system

- memory hierarchy
- cache memory
- external memory

I/O system and interconnection structures

- programmed I/O
- interrupt-driven I/O
- Direct Memory Access
- I/O channel

High performance architecture design

- superscalar and superpipeline
- cache coherency

Reading List**Compulsory Readings**

Title	
1	Nil

Additional Readings

Title	
1	W. Stallings, Computer Organization and Architecture: Designing for Performance, 9th Edition, Pearson.