جامعة الملك سعود
King Saud University

# CSC 220: Computer Organization


## Unit 0
## Introduction

**Prepared by:**

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# Course Introduction

## Main Component

https://www.youtube.com/watch?v=yRmPTbGBqVI

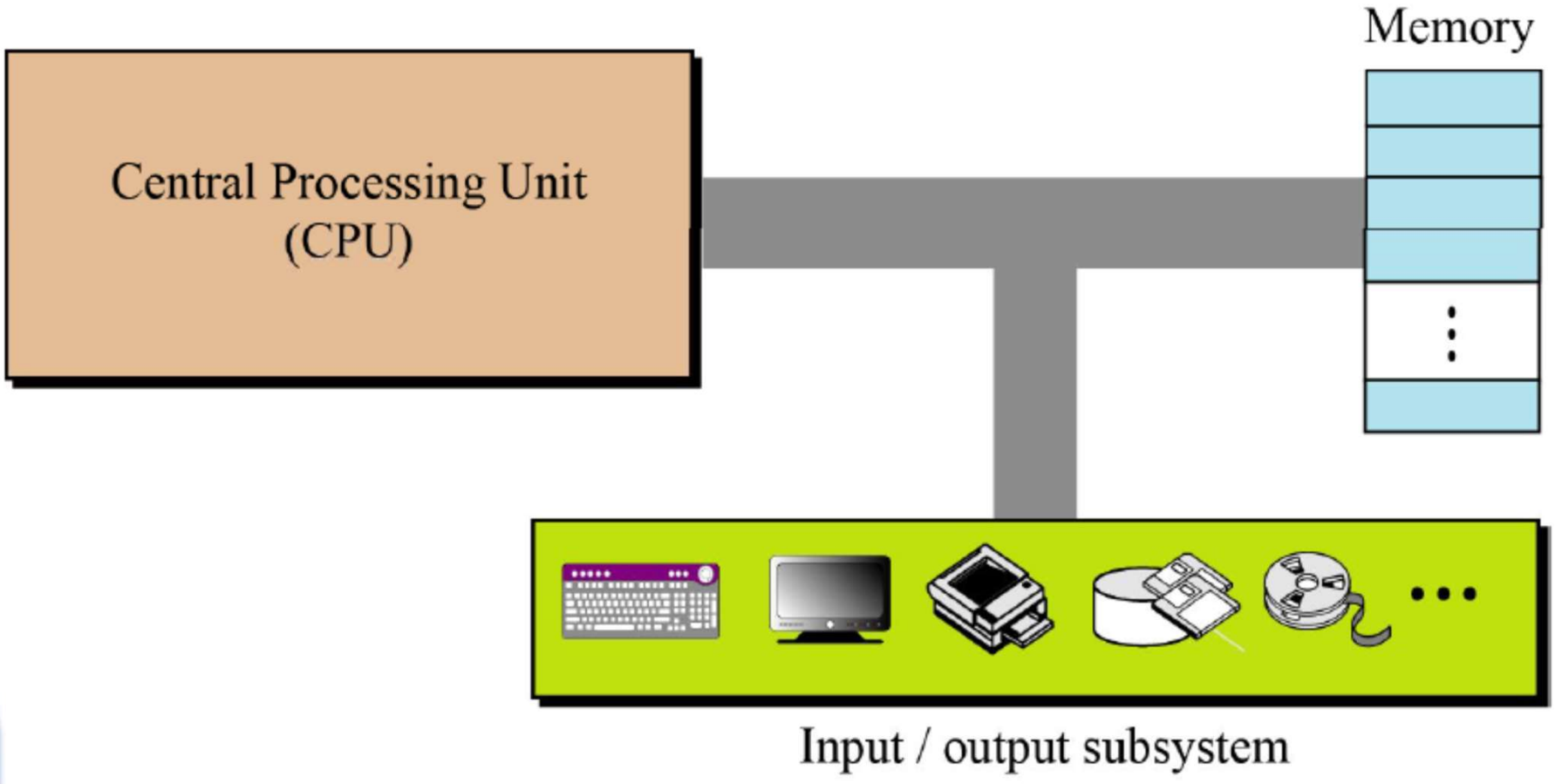
### Integrated Circuit (IC) Fabrication

**https://www.youtube.com/watch?v=aWVywhzuHnQ**

**https://www.youtube.com/watch?v=qm67wbB5GmI** (new)

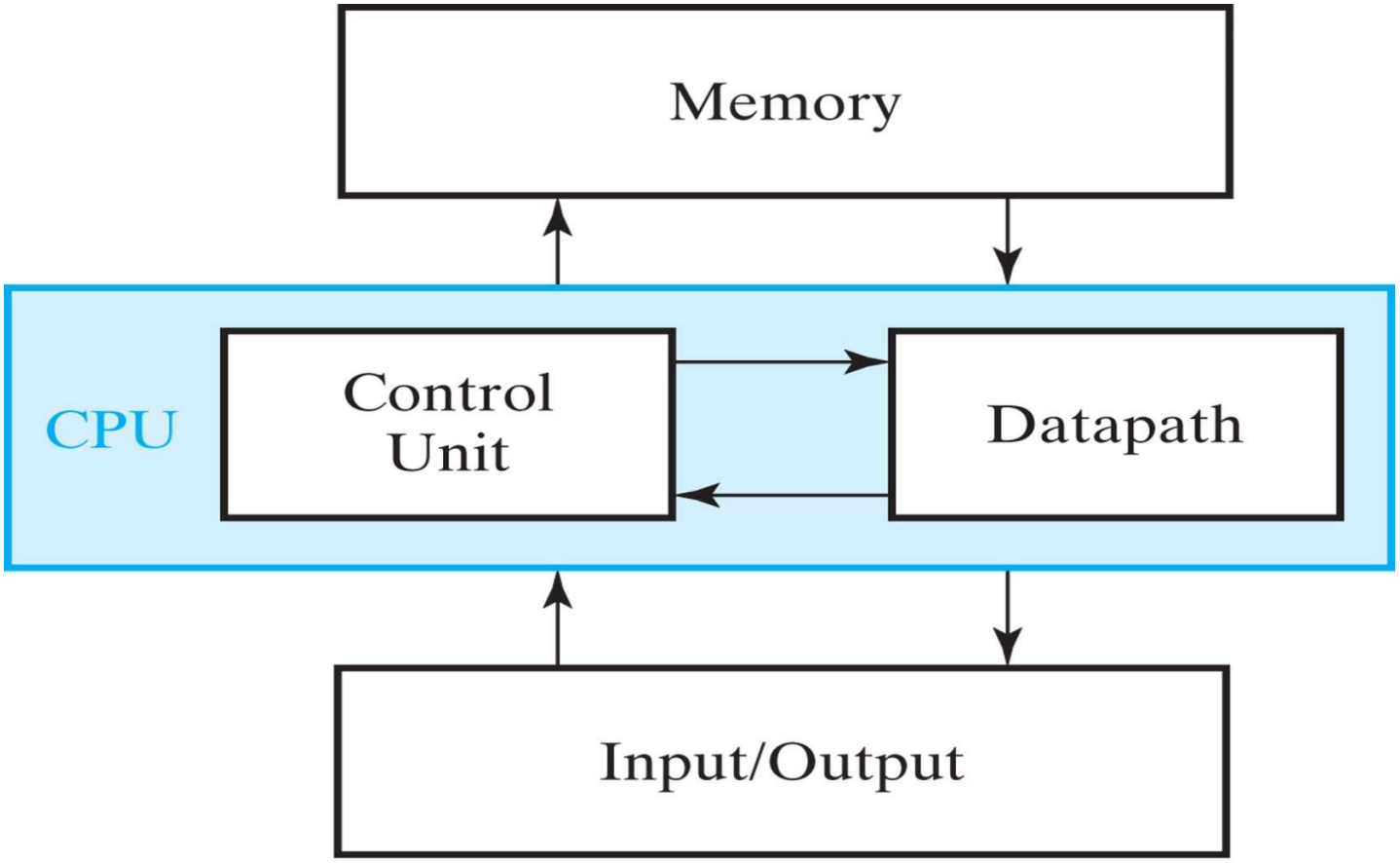
# Course Introduction

## Computer Hardware (Subsystems)



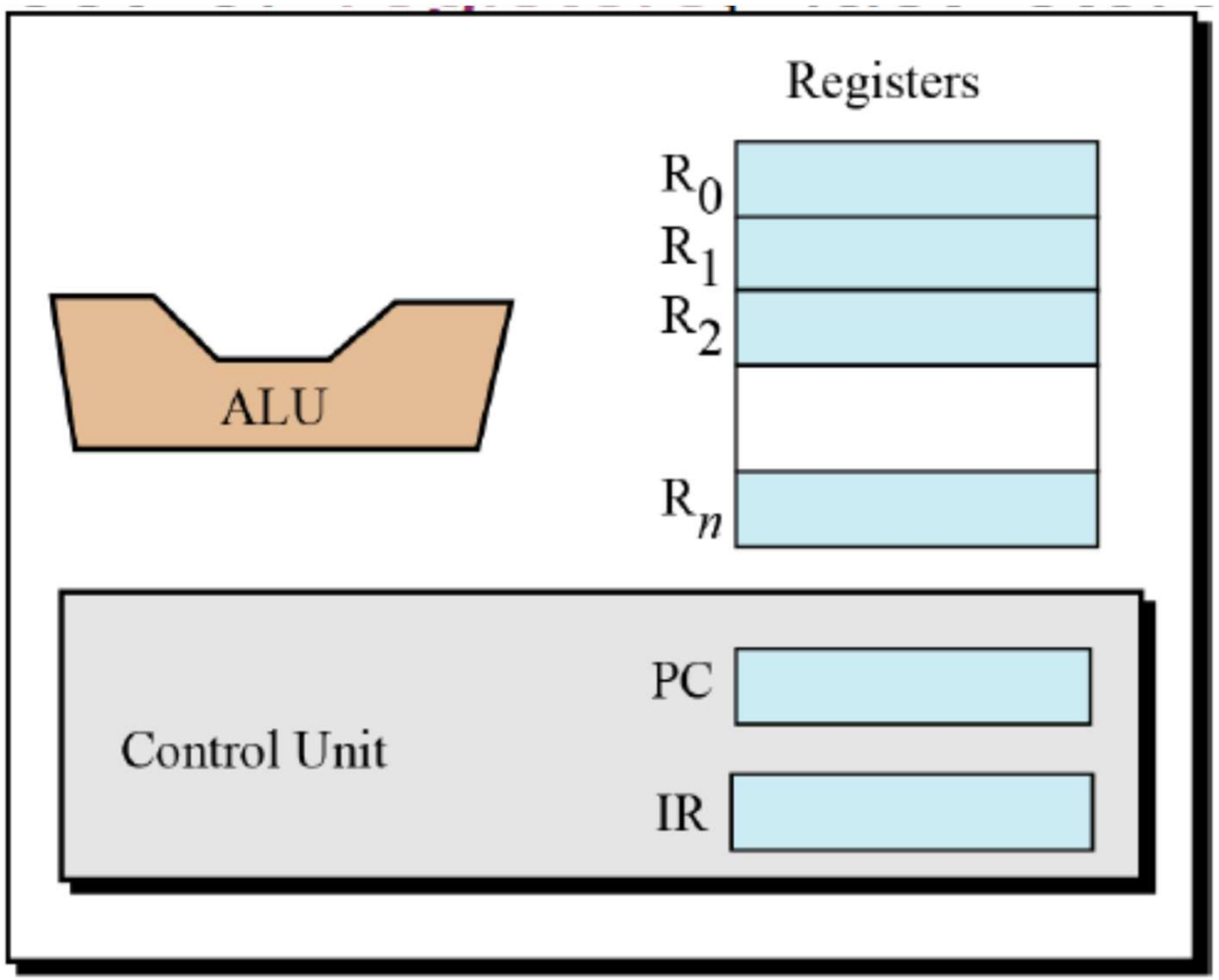
# Course Introduction

## A Digital Computer



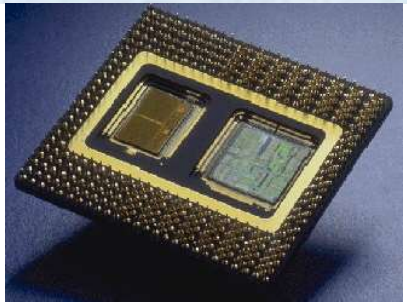
# Course Introduction

## Central Processing Unit (CPU)



# Course Introduction

## History of Intel x86 processors



- 4004: 4-bit processor; 8-bit processors 8080, 8085.
- 8086: 16-bit processors, introduced in 1979: 20-bit address bus (AB), 16-bit data bus (DB), 5/8/10 MHz.
- 80186: a faster version of the 8086. Also 20-bit AB and 16-bit DB. Never widely used in computer systems.
- 80286: introduced in 1982, It has a 24-bit AB, which implies 16MB of memory address space.
- 80386: Intel introduced its first 32-bit processor in the 1985. It has 32-bit AB and 32-bit DB. It follows their 32-bit architecture known as IA-32.
- Pentium: was introduced in 1993 (20th anniversary). it uses a 64-bit wide DB, 60/66 MHz.
- Itanium: 64-bit processor, released in 2001; formerly called IA-64, the Itanium uses a 64-bit AB to provide substantially larger address space. Its DB is 128 bits wide.

# Course Introduction

**CSC220 - Computer Organization (2-2-1) - Required Course**

**Pre-requisites:** MATH 151 - Discrete Mathematics

## Topics

- Data Representation: binary number systems, signed number systems, use of 1's and 2's complements in addition and subtraction
- Digital Circuit Design: Logic gates, Logic function, K-Map simplification
- Combinational Circuits: Multiplexer, De-multiplexer, Decoder, Arithmetic circuits
- Sequential Circuits: register, binary counters, and memory organization
- Arithmetic and Logic Unit Design, Central Processing Unit design
- Register, Register Transfer Language, and micro-operations instruction set
- CPU Design and Programming

# Course Introduction

## CSC 220: Course Learning Outcomes

| | CLOs | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge and Understanding** | |
| 1.1 | *Data Representation* | K2 |
| 1.2 | *Digital circuit design and simplification* | K2 |
| 1.3 | *Instruction set and machine programming* | K2 |
| 1... | | |
| **2** | **Skills :** | |
| 2.1 | *Combinational and sequential circuits design* | S1 |
| 2.2 | *Register, counter, and RAM design* | S1 |
| 2.3 | *Arithmetic and Logic Unit (ALU) design* | S1 |
| 2.4 | *Datapath and CPU design* | S1 |

# Course Introduction

## Text Books

1. M. Morris Mano, Charles R. Kime and Tom Martin, **Logic and Computer Design Fundamentals**, 5th (Global) Edition, Pearson Education Limited, 2016. ISBN: 9781292096124

2. Morris Mano, **Computer System Architecture** - 3rd Edition, Publisher: McGraw Hill

**Class Note** based on the main text (Available at the LMS)

# Course Introduction

**Assessment Methods:**

Final Exam: 40%
Quiz : --%
Midterm : 40%
Lab works: 15% (experiments 5%, test 10%, project 5%)
Home works: 5%

**Important Information**

**Last Date to Drop Course:**

Quiz : Unit- to be decided, Date to be decided
Midterm: Units- to be decided, Date decided by the college
Homework-1: to be decided
Homework-2 : to be decided
Final Exam: Unit 4-12.

# Course Introduction

## Attendance Rules

1. Absent if you come after 15 minutes

2. Can't attend final exam if absence rate is more than 25%

3. No medical certificate will be considered for attendance

# Course Introduction

## Schedule:

| Week | Lecture 1 | Lecture 2 | Tutorial | Lab | Homerwork | Exam |
|---|---|---|---|---|---|---|
| #01 (17 Jan, 21) | Orientation & Introduction | | | | | |
| #02 (Unit-1) | Number System | Number System | Tutorial-1 | | | |
| #03 (Unit-2) | Digital Circuits | Digital Circuits | Tutorial-2 | Lab-1 | | |
| #04 (Unit-3) | Simplification (K-map) | Simplification (K-map) | Tutorial-3 | Lab-2 | | |
| #05 (Unit-4) | Signed Number Representation | Signed Number Representation | Tutorial-4 | Lab-3 | HW 1 | |
| #06 (Unit-5) | Combinational circuit-1 | Combinational circuit-1 | Tutorial-5 | Lab-4 | | |
| #07 (Unit-6) | Combinational circuit-2 | Combinational circuit-2 | Tutorial-6 | Lab-5 | | Midterm (Unit ) |
| #08 (Unit-7) | Sequential Circuit | Sequential Circuit | Tutorial-7 | Lab-6 | | |
| #09 (Unit-8) | Registers and RTL | Registers and RTL | Tutorial-8 | Lab-7 | | |
| # 10 | | Revision | | | | |
| #11 (Unit-9) | Counters-RAM | Counters-RAM | Tutorial-9 | Lab-8 | HW 2 | |
| #12 (Unit-10) | ALU Design | ALU Design | Tutorial-10 | Lab Test | | Quiz (Unit ) |
| #13 (Unit-11) | Datapath Design | Datapath Design | Tutorial-11 | Lab-9 | | |
| #14 (Unit-12) | CPU design & Programming | CPU design & Programming | Tutorial-12 | Lab-10 | | |
| # 15 | | Revision | | Lab Project | | |
| | | | | Lab | | |
| #16 () | Preparatory Courses Final Exams | | | | | |
| #17 () | Final Exams (Unit 4-12) | | | | | |
| #18 () | | | | | | |