

# **CS201**

# **Computer Organization**

## **B. Tech. II (CSE) Sem-3**

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# ?

- Future Work Area ?
  - Not the Hardware...
  - Software areas
    - like programming, computer system design, or the installation and maintenance

# Computer Organization

- Concern with ‘How does a computer work?’
- Considers all physical aspects of computer systems
  - The way in which various circuits and structural components come together to make up fully functional computer systems is the way the system is organized
- Logical aspects of system as seen by the programmer
  - e.g., instruction sets, instruction formats, data types, addressing modes
- While the Computer Architecture considers design and components

# Subject Overview

- Goal is to Provide the Knowledge of :
  - Computer system's functional components, their characteristics, their performance, and their interactions
  - Computer architecture in order to structure a program so that it runs more efficiently on a real machine
- Study of:
  - The laws of computer organization and design for RISC architectures
  - Performance Measures
  - Interfaces between hardware and software
    - Instruction Set Design, Datapath and control path
  - Influence of instruction set on performance
  - Computer arithmetic
  - Memory hierarchy and their influence on performance
  - Elements of interfacing and I/O organization
  - Design of a processor with pipelining is analyzed

**B.Tech. II (CSE) Semester – III**  
**COMPUTER ORGANIZATION (CORE-2)**  
**CS201**

**Scheme**

L	T	P	Credit
3	1	2	05

**1. Course Outcomes (COs):**

**At the end of the course, the students will be able to**

CO1	acquire knowledge of basics of computer architecture, its components with peripheral devices, instruction set architecture, instruction execution using data path and control unit interface.
CO2	apply knowledge of combinational and sequential logic circuits to mimic simple computer architecture to solve the given problem.
CO3	analyze performance of various instruction set architecture, control unit, memories, various processor architectures.
CO4	evaluate programming solutions to implement fast methods of ALU, FP unit implementations, processor architectures and instruction set architectures.
CO5	implement fast methods of ALU, FP unit implementations and to design and develop hardware solution for given instruction coding scheme of an Instruction Set Architecture or vice versa using available technology tools.

# PreRequisites

- Data Structures and Algorithms
  - Arrays, pointers,
- Logic Design
  - Number system, basic computer arithmetic
  - Logic circuits

# Can help in

- ***System design tools***

- Application of design theories that is used at the lowest level of system design AT higher levels
  - ***Example:*** The interface between a processor and its memory chips are used to design the addressing scheme of an IP network

- ***Software design tools***

- To optimized/simplify the logic portions of software to run faster

- ***Improved troubleshooting skills***

- To isolate a problem quicker and with greater accuracy

- ***Interconnectivity***

- Writing software to control the hardware

- ***Marketability***

- The software engineer with experience in hardware design has a significant advantage over hardware engineers in this market

# Can help in

- To select the most cost effective computer for a large organization
  - Larger cache or a higher processor clock rate
- To do a particular task,
  - Design a software program on a processor
  - Design a hardware component to do so



# Schedule

Credit: 5

- Lectures : 3
- Tutorial : 1
- Practical : 2

# Tutorial & Practical

## Tutorial

- Test
  - Designing, Calculation and Analysis using examples
- Online quizzes
  - Format
    - Objective type: Select the best choice
    - Questions on material already discussed in class

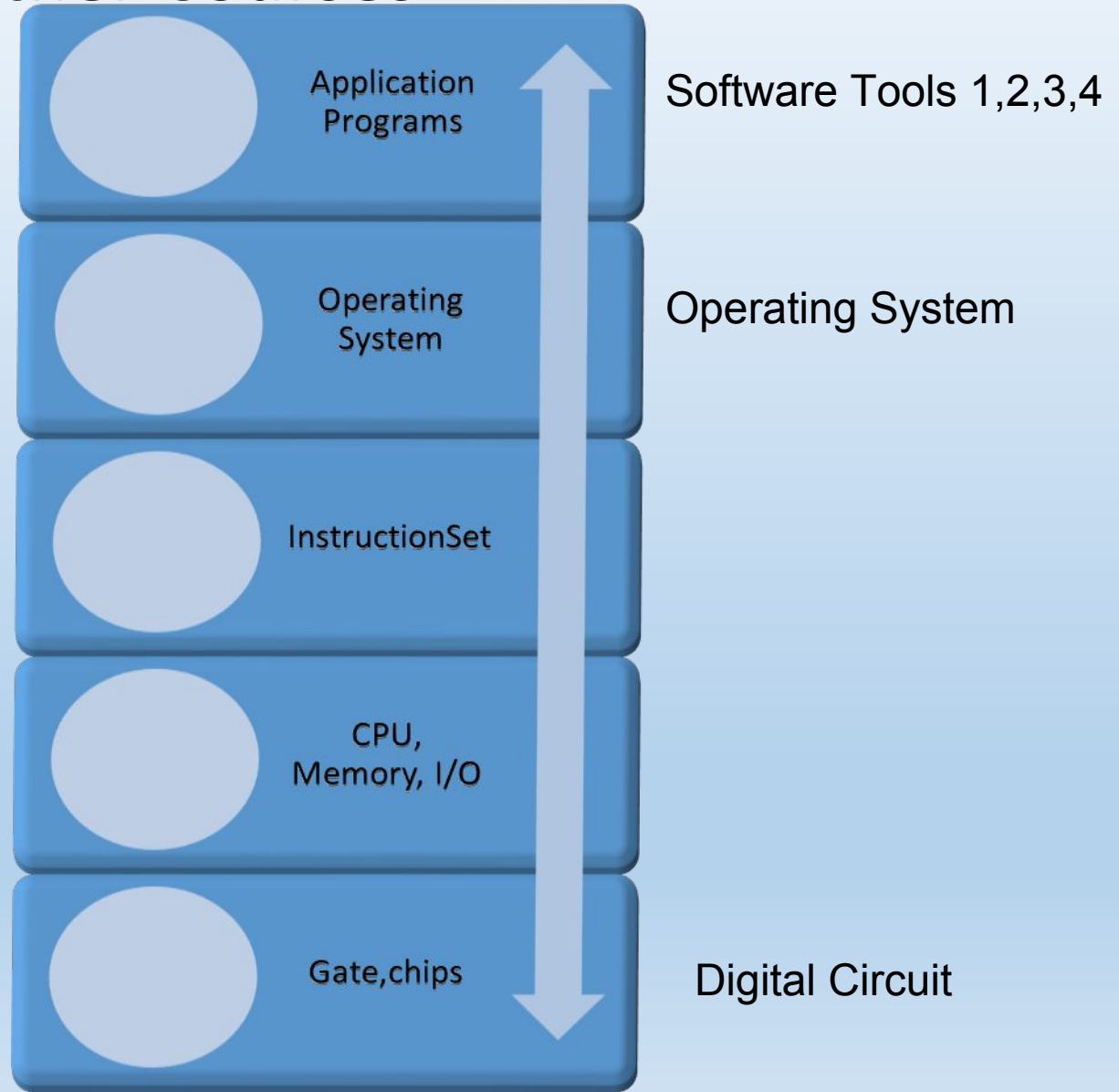
## Practical

- Related to the Design and Implementation...

# Books

- John L. Hanneasy, David A. Patterson- “Computer organization and Design”, **3/E**, Morgan Kaufmaan, reprint -2003 **OR**
- Computer Organization – HW/SW Interface, Patterson and Hennesy, 5<sup>th</sup> edition
- Stallings,” Computer Organization & Architecture : Designing For Performance”, 4/E, PHI EEE ed, 1997
- Tanenbaum – “Structured Computer Organization “, PHI EEE, reprint 1995
- Morris Mano – “Computer Systems Architecture”, 3/E, PHI, reprint 1997
- Hamacher – “Computer Organization”, McGraw-Hill IS ed, 1994

# Relation to Other Courses



# Next

[Computer Organization](#)