# CS201 Computer Organization

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

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http://172.16.1.10/moodle

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

## **Computer Organization**

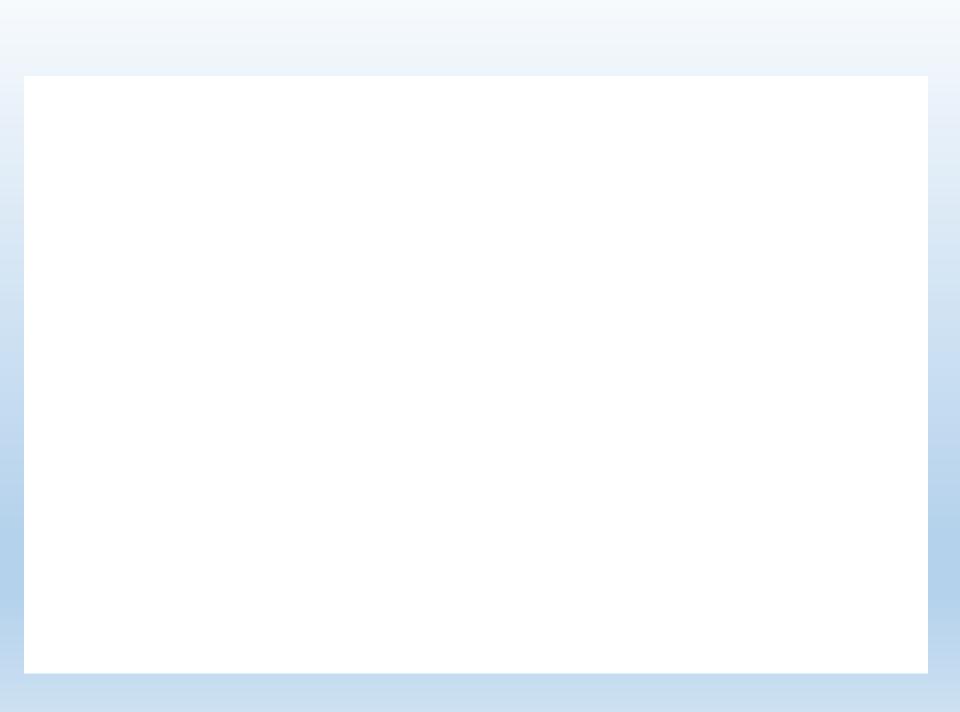
- •Concern with 'How does a computer work?'
- Considers all physical aspects of computer systems
  - •The way in which various circuits and structural components come together to make up fully functional computer systems is the way the system is organized
- Logical aspects of system as seen by the programmer
  - •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



# 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. Hannessy, David A. Patterson- "Computer organization and Design", **3/E**, Morgan Kaufmaan, reprint -2003 **OR**
- Computer Organization HW/SW Interface, Patterson and Hennessy, 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**

Software Tools 1,2,3,4

**Operating System** 

# Next

**Computer Organization**