Course Syllabi: UCS401 Computer System Architecture (L : T : P :: 3 : 1 : 0)

1. **Course number and name:** UCS401; Computer System Architecture

2. **Credits and contact hours:** Credits: 3.5; Hours: 4

3. **Text book, title, author, and year**

   - *Mano, Morris M., Computer System Architecture, Prentice Hall (1992) 3rd ed.*
   - *Hayes, J.P., Computer Architecture and Organization, McGraw Hill (1998) 3rd ed.*
   - *Hennessy, J.L., Patterson, D.A, and Goldberg, D., Computer Architecture a Quantitative Approach, Pearson Education Asia (2006) 4th ed.*
   - *Leigh, W.E. and Ali, D.L., System Architecture: software and hardware concepts, South Wester Publishing Co. (2000).*

   a. Other supplemental materials
      - Nil

4. **Specific course information**
   a. Brief description of the content of the course (catalog description)
   Basics of Digital Electronics: Codes, Logic gates, Flip flops, Registers, Counters, Multiplexer, Demultiplexer, Decoder, Encoder.
   Register Transfer and Micro operations: Register transfer Language, Register transfer, Bus & memory transfer, Logic micro operations, Shift micro operation.
   Basic Computer Organization: Instruction codes, Computer instructions, Timing & control, Instruction Cycles, Memory reference instruction, Input/Output & Interrupts, Complete computer description & design of basic computer.
   Control Unit: Hardwired vs. Micro programmed control unit.
   Central Processing Unit: General register organization, Stack organization, Instruction format, Data transfer & manipulation, Program control, RISC, CISC.
   Computer Arithmetic: Addition & subtraction, Multiplication Algorithms, Division algorithms.
   Input-Output Organization: Peripheral devices, I/O interface, Data transfer schemes, Program control, Interrupt, DMA transfer, I/O processor.
   Memory Unit: Memory hierarchy, Processor vs. memory speed, High-speed memories, Cache memory, Associative memory, Interleave, Virtual memory, Memory management.
   Introduction to Parallel Processing: Pipelining, Characteristics of multiprocessors, Interconnection structures, Interprocessor arbitration, Interprocessor communication & synchronization.
   Case Studies: Case studies of some contemporary advanced architecture for processors of families like Intel, AMD, IBM etc./ **Seminar on State-of the-art technology.**

5. **Specific goals for the course**
   After the completion of the course, the students will be able to:
   - Explain the basics of digital electronics.
   - Elaborate basic computer organization, control unit and central processing unit.
   - Do binary addition, subtraction, multiplication and division.
   - Explain the input output organization of a processor.

- Differentiate between various types of memories.

6. **Brief list of topics to be covered**
    - Basics of Digital Electronics
    - Register Transfer and Micro operations
    - Basic Computer Organization
    - Introduction to Parallel Processing