

# COURSE STRUCTURE OF B. TECH IN COMPUTER SCIENCE & ENGINEERING, HIT

<b>Subject Name: Computer Organization</b>					
<b>Paper Code: CSEN 2203</b>					
<b>Contact Hours per week</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Total</b>	<b>Credit Points</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>4</b>

## **Module No-1: Basics of Computer Organization: (10L)**

Basic organization of the stored program computer and operation sequence for execution of a program, Von Neumann & Harvard Architecture. RISC vs. CISC based architecture. (4L)

Fetch, decode and execute cycle, Concept of registers and storage, Instruction format, Instruction sets and addressing modes. (6L)

## **Module No-2: Basics of ALU Design: (10L)**

Binary number representation; Fixed and Floating point representation of numbers. (2L)

Adders: Serial and Parallel adders, Ripple Carry / Carry Lookahead / Carry Save; (4L)

Multipliers & Divider Circuits: Multiplication of signed binary numbers Booth Multipliers; (4L)

## **Module No-3: Basics of Control Unit Design and Pipelining: (12L)**

**Design of a control unit:** Data path design. (8L)  
Single Cycle Datapath for : ALU design / Data Movement Instructions / Control Unit Design;  
Multi cycle microarchitecture; concept of states and transitions;  
Hardwired and Microprogrammed control. The state machine;  
Horizontal and Vertical micro instruction, Microprogrammed control design techniques;

**Pipelining:** (4L)  
Basic concepts, Instruction and arithmetic pipeline; Elementary concepts of hazards in pipeline and techniques for their removal.

## **Module No-4: Memory and I/O Organization: (10L)**

Memory system overview, Cache memory organizations, Techniques for reducing cache misses, Hierarchical memory technology: Inclusion, Coherence and locality properties, Virtual Memory, Memory mapped IO. (6L)

Introduction to I/O interfaces. Interrupts, Interrupt hardware, Enabling and Disabling interrupts, Concept of handshaking, Polled I/O, Priorities, Daisy Chaining. Vectored interrupts; Direct memory access, DMA controller. Instruction sequencing with examples. (4L)

# **COURSE STRUCTURE OF B. TECH IN COMPUTER SCIENCE & ENGINEERING, HIT**

## **Text Books:**

1. Computer Organization, 5th Edition, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, MGH
2. Computer System Architecture, 3rd Edition, Morris M. Mano, Pearson
3. Computer Organization and Design: The Hardware/Software interface, David A. Patterson and John L. Hennessy, 3rd Edition, Elsevier, 2005.
4. NPTEL materials on Computer Organization.