

<b>Course No.:</b>	<b>Name:</b> Foundation of Computer Systems	<b>Credits:</b> 3-0-0-6	<b>Prerequisites:</b> NIL
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### Course Objectives:

1. To provide an understanding of the components and functions of a computer system, including the CPU, memory, and I/O devices
2. To develop skills in assembly language programming and designing control units
3. To explore the concepts of pipelining and parallel processing, and the differences between RISC and CISC paradigms
4. To examine the memory organization of computer systems, including hierarchical memory systems, cache memories, and virtual memory
5. To study the basics of operating systems, including processes, threads, scheduling, and memory management
6. To learn about computer networks and their protocols, including link layer protocols, local area networks, and interconnecting networks with IP
7. To explore advanced concepts of distributed networked systems, such as virtualization, distributed file systems, and content networking

### Course Outcomes:

1. By the end of this course, students should be able to:
2. Understand the architecture of a computer system and how it works
3. Write and debug assembly language programs, and design control units using hardwired and microprogrammed methods
4. Describe the differences between RISC and CISC paradigms, and explain the concepts of pipelining and parallel processing
5. Understand the memory organization of a computer system, including cache memories and virtual memory
6. Understand the basic concepts of operating systems, including processes, threads, and scheduling
7. Understand the basics of computer networking and network protocols, and be able to configure a simple network
8. Understand the advanced concepts of distributed networked systems, such as virtualization and distributed file systems, and be able to design fault-tolerant systems for multimedia delivery.

### MODULES:

#### Module - 1 Review of concepts of computer architecture:(18 HOURS)

- Study of an existing CPU: architecture, instruction set and the addressing modes, assembly language programming.
- Control unit Design: instruction interpretation, hardwired and microprogrammed methods of design.
- Pipelining and parallel processing, RISC and CISC paradigms, I/O Transfer techniques: programmed, interrupt-driven and DMA;
- Memory organization: hierarchical memory systems, cache memories, cache coherence, virtual memory.

#### Module - 2 Review of concepts of operating systems: (6 HOURS)

- Processes, threads, Unix fork-exec model, Unix signals, Interprocess communication, scheduling, memory management.

### **Module - 3 Review of concepts of computer networks: (18 HOURS)**

- Link layer protocols, local area networks (Ethernet and variants), interconnecting networks with IP, routing, transport layer protocols.
- Advanced concepts of distributed networked systems: Virtualization, distributed file systems, mass storage systems, recovery and fault tolerance, content networking including multimedia delivery

#### **TEXTBOOKS :**

1. A. Silberschatz, P. B. Galvin and G. Gagne, Operating System Concepts, 7th Ed, John Wiley and Sons, 2004.
2. J. Kurose and K. W. Ross, Computer Networking: A Top down approach, 3rd Ed, Pearson India, 2004.
3. M. Singhal and N. Shivratri, Advanced Concepts in Operating Systems, McGraw Hill, 1994.
4. A. S. Tanenbaum and Van Steen, Distributed Systems: Principles and Paradigms, Prentice Hall India, 2007.