# Prasad V. Potluri Siddhartha Institute of Technology:: Vijayawada.
## Department of Computer Science and Engineering
### I/II M.Tech. (CSE) - (First Semester)

**17CSCS1T2** **DISTRIBUTED COMPUTING** **Credits: 4**

**Lecture: 4 Periods/week** **Internal Assessment: 40 Marks**
**Semester end examination: 60 Marks**

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**Course Description:**

The course is outlines the features of the synchronous and asynchronous executions of processes in distributed environment. It also focus on message ordering and group communication, clock synchronization techniques and shared memory concepts in distributed computing environment.

**Course Outcomes:**

At the end of the course the student will be able to:

**CO1:** Understand the different computing environments
**CO2:** Describe the framework of distributed computing and its execution.
**CO3:** Demonstrate the message ordering and Group communication paradigms in Distributed Systems.
**CO4:** Illustrate the importance of shared memory concept in distributed Computing Environment.

**UNIT – I**

**Distributed Computing Introduction: Definition,** Relation to Computer System Components, Relation to Parallel Multiprocessor/Multicomputer Systems, Message Passing Systems versus Shared Memory Systems, Primitives for Distributed Communication, Synchronous versus Asynchronous Executions, Design Issues and Challenges.

**UNIT – II**

**Model of Distributed Computations:** A Distributed Program, A Model of Distributed Executions, Models of Communication Network, Global State of a Distributed System, Cuts of a Distributed Computation, Past and Future Cones of an Event, Models of Process Communications, **Logical Time**: Introduction, A Framework for a System of Logical Clocks, Scalar Time, Vector Time.

**UNIT – III**

**Message Ordering and Group Communication:** Message Ordering Paradigms, Asynchronous Execution with Synchronous Communication, Group Communication, Causal Order: The Raynal-Schiper-Toueg Algorithm, The Kshemkalyani-Singhal Optimal Algorithm Total Order: Centralized Algorithm for Total Order, Three-Phase Distributed Algorithm.

**UNIT – IV**

**Distributed Shared Memory:** Abstraction and Advantages, Memory Consistency Models, Strict consistency/Atomic consistency/Linearizability, Sequential Consistency, Causal Consistency, PRAM (Pipelined RAM) or Processor Consistency, Slow Memory, Hierarchy of Consistency Models; Shared Memory Mutual Exclusion, Lamport's Bakery Algorithm, Lamport's WRWR Mechanism and Fast Mutual Exclusion, Wait-freedom.

**TEXT BOOKS**

1. Ajay D. Kshemkalyani and Mukesh Singhal "Distributed Computing: Principles, Algorithms, and Systems", Cambridge University Press, 2008.
2. Andrew S. Tanenbaum and Maarten van Steen, " Distributed Systems, Principles and Paradigm" Prentice Hall, 2013