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## PARALLEL & DISTRIBUTED SYSTEM

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**Paper Code** CEN-606

**Course Credits** 4

**Lectures / week** 3

**Tutorial / week** 1

**Course Description** **UNIT – I**

Basic Concepts: Introduction to parallel processing, parallel processing terminology, decomposition, complexity, throughout, speedup, measures, data dependence, resource dependence, Bernstein's conditions levels of parallelism in programs. Program flow-control flow, data flow, Distributed systems – Introduction, advantages, and tightly-coupled loosely-coupled systems. Hardware and software requirements, design issues.

### **UNIT- II**

Parallel Processing – Structure & Organization: Taxonomy of parallel processes: granularity, basic architectures, multiprocessors, vector processors, pipeline:-both linear as well as non liner pipeline ,optimal design, Arithmetic pipeline, Instruction pipeline, Pipeline hazards and their solution ,reservation table, scheduling,;

### **UNIT- III**

Distributed Computing-introduction, definition , its history; Distributed Computing system definition and its evolution, reasons for its popularity, Strength and weaknesses of distributed computing, Different forms of Computing: Minicomputer model,workstation model,worksatation server model,Processor pool Moodel; Cluster:- definitions, reasons for its popularitycluster computer system architectutre, Windows cluster, solaris cluster, Linux cluster; Using cluster, distributed Computing System models: Distributed operating system, Introduction to DCE, architecture of Distributed Applications

### **UNIT- IV**

Clock: Types of Clock, Synchronization of clocks, types of Clock synchronization algorithms, lamport time stamps, Message passing:-

introduction,desirable features of a good message passing system,Issues in IPC by Message passing,synchronization, Buffering, Multidatagram messages,Encoding and decoding of message data, Process addressing,Failure handling,IPC, Distributed Election, types of election algorithms.

#### **UNIT – V**

#### **References / Text Books:**

Parallel & Distributed Programming: Parallel Programming environments, models, synchronous asynchronous programming, modulla-2, occamm, FORTRAN, DAP FORTRAN, C-linda, Actus, data flow programming, VAL etc., MPI, Open MP

#### **Computer Usage / Software Requires:**

- Michael J. Quinn, “Parallel Computing – Theory and Practice, 2<sup>nd</sup> Edition, McGraw Hill, 1994
  - Kai Hwang, “Advanced Computer Architecture – Parallelism, Scalability, Programmability”, McGraw Hill Inc, 1993.
  - Wilkinson, “Parallel Programming using networked computer” , Pearson Education India, 20006
  - S. G. Akl, “The Design and Analysis of parallel algorithms”, Englewood Cliffs, NJ, 1989
  - S. Tanenbaum, “Modern Operating System”, PHI, 1996.
  - R. H. Perrott, “Parallel Programming”, Addison Wesley, 1987.
  - T. G. Lewie and H. Ele-Revini, “Introduction to Parallel computing”, PHI, NJ, 1992.
  - S. Lakshmivardhan and S.K. Dhall, “Analysis and design of parallel algorithm – arithmetic and matrix problems”, McGraw Hill, 1990
  - J. M. Crichlow, “An introduction to distributed and parallel computing”, PHI, 1988
  - Pradeep K. Sinha,” Distributed Systems”
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