

PCS5J104 PARALLEL ALGORITHMS (4-0-0)

Module – I (10 Hrs)

Introduction: Need for High Performance Computer, Motivation for Parallelism, Methods to achieve High Performance, Parallel Programming Platforms- Control structure of parallel platform, Pipelining, Superscalar Architecture, Super Pipelined Architecture, VLIW Architecture, Pipelining vs. Parallelism.

Module – II (10Hrs)

Interconnection Networks for Parallel Computer: Static Interconnection Networks, Network Topologies, Evaluation of Static Network, Dynamic Interconnection Networks, Evaluation of Dynamic Network, Routing Mechanism for Interconnection Network.

Module – II (10 Hrs)

Designing Parallel Algorithms: Temporal Parallelism, Data Parallelism, Task Decomposition, Concurrency, Granularity selection, Inter-Task Dependency, Dependency Graph, Parallel Algorithm Models, Models of Computation, Performance Metrics of Parallel Algorithm, Amdahl's Law.

Module – II (10 Hrs)

Parallel Programming: Sorting, Searching, Matrix Multiplication, Data dependency and Loop Optimizations, Message Passing Programming, Shared Memory Programming, Data Parallel Programming, Performance evaluation of Parallel Computer.

Text Book

1. A. Grama, A. Gupta, G. Karypis, V. Kumar, Introduction to Parallel Computing, Pearson.
2. V. Rajaraman, C. S. R. Murthy, Parallel Computers Architecture and Programming, PHI.

References:

1. M. J. Quinn, Designing Efficient Algorithms for Parallel Computers, McGraw-Hill
2. W. P. Petersen, P. Arbenz, Introduction to Parallel Computing, Oxford University Press.
3. B. Wilkinson, M. Allen, Parallel Programming, Pearson.
4. H. Attiya, J. Welch, Distributed Computing Fundamentals, Simulations and Advanced Topics, Wiley.
5. T. G. Lewis, Parallel Programming: A Machine-Independent Approach, IEEE Computer Society Press.
6. M. R. Bhujade, Parallel Computing, New Age.