



CS 515

PARALLEL COMPUTER ARCHITECTURE

UNIT-I

Parallel Computer Architecture : Trends, Convergence of Parallel Architecture, Fundamental Design Issues.

Programming for Performance : Partitioning for Performance, Data Access and Communication in a Multi memory System., Implications for Programming Models.

UNIT-II

Shared Memory Multiprocessors : Cache Coherence, Memory Consistency, Design Space for Snooping Protocols, Assessing, Assessing Protocol Design Trade-offs, Synchronization, Implications for Software.

Snoop-Based Multiprocessor Design : Correctness Requirements, Multilevel Cache Hierarchies, Split-Transaction Bus, Extending Cache Coherence.

UNIT-III

Directory-Based Cache Coherence : Scalable Cache Coherence, Overview of Directory Based approaches, Assessing Directory Protocols and Trade-Offs, Design Challenges for Directory Protocols, Memory-Based Directory Protocols, Cache-Based Directory Protocols.

UNIT-IV

Interconnection Network Design : Basic Definitions, Basic Definitions, Basic Communication Performance, Organizational Structure, Interconnection Topologies, Evaluating Design Trade Offs in Network Topology, Routing, Switch Design, Flow Control, Case Studies.

UNIT -V

Latency Tolerance : Overview of Latency Tolerance, Latency Tolerance in Explicit Message Passing, Latency Tolerance in a Shared Address Space, Block Data Transfer in a Shared Address Space, Proceeding Past Long-Latency Events, Pre communication in a Shared Address Space-, Multithreading in a Shared Address Space, Lockup-Free Cache Design.

Suggested Reading :

1. Id. Culler, Jaswinder Pal Singh and Anoop Gupta, "Parallel Computer Architecture Kaufmann, Elsevier Science, India, 2002.
2. Kai Hwang, "Advanced Computer Architecture", McGraw Hill, 1999.
3. John L. Hennessy & David Patterson, "Computer Architecture A Quantitative Approach", Morgan Kaufmann Publishers, Inc 1996.