FBEF1011 PARALLEL & DISTRIBUTED COMPUTING (3-1-0)

Module - I (14 Hour)

Introduction to parallel computing. Parallel programming platforms: Trends in microprocessor Architectures, Limitations of memory system performance, Dichotomy of parallel computing platforms, physical organization of parallel platforms, communication costs in parallel machines, Routing mechanisms for interconnection network, Impact of process processors mapping and mapping techniques

Module –II (13 Hours)

Principles of parallel algorithm design: Preliminaries, Decomposition techniques, Characteristics of tasks and interactions, Mapping techniques for load balancing, Methods for containing. Interactions overheads, Parallel algorithm models. Basic communication operations: One-to-All Broadcast and All-to-One Reduction, All-to-All broadcast and reduction All-Reduce and prefix sum operations, scatter and gather, All-to-All personalized communication, circular shift, Improving the speed of some communication operation

Module – III (13 Hours)

Analytical modeling of parallel programs: Performance metrics for parallel systems, Effect of granularity of performance, scalability of parallel system, Minimum execution time and minimum cost-optimal execution time, Asymptotic analysis of parallel programs, other scalability metrics. Programming using the message passing paradigm:

Principle of message – Passing programming, Send and receive operations, The message passing interface, Topologies and embedding, Overlapping communication with computation, collective communication and computation operations, Groups and communicators.

Dense matrix algorithm:

Matrix-vector multiplication, Matrix-matrix algorithm, Solving a s.

Text Book:

1. Introduction to Parallel Computing, Second Edition, Ananth Gram, Anshul Gupta, George Karypis, Vipin Kumar Person Education.

2. Parallel computing Theory and Practice, Second Edition, Michael J. Quinn, TMH.

3. Advanced Computer Architecture: Parallelism, Scalability, Programmability, Kai **Hwang**, McGraw-Hill.

Reference Books :

1. Distributed Computing: Principles and Applications ,Mei-Ling **Liu**, 2004, Pearson Education, Inc. New Delhi.

Introduction to Distributed Algorithms ,Gerard**Tel**, Second edition, 2002, Cambridge University Press / Foundation Books India, New Delhi.