

# CS1202

## PARALLEL PROCESSING

**Unit 0:** Introduction - Modern Parallel Computers - Types of Concurrency – Programming. 3 Periods

**Unit 1:** Parallel Architecture – Interconnection Network – Processor arrays – Multiprocessors – Multi Computers – Flynn’s taxonomy. 6 Periods.

**Unit 2:** Parallel Algorithm Design – Foster’s Design Methodology – Example Problems. 4 Periods

**Unit 3:** Message Passing programming Model – MPI – Point to Point & Collective Calls. 4 Periods.

**Unit 4:** Algorithms for Illustrations – Sieve of Eratosthenes – Floyd’s Algorithm.(To discuss all the concepts introduced so far). 4 Periods

**Unit 5:** Performance analysis – Speed up and Efficiency – Amdahl’s Law – Gustafson’s Bartsis Law – Karp Flatt Metric – Isoefficiency Metric. 4 Periods

**Unit 6:** Matrix Vector Multiplication – Monte Carlo Methods – Matrix Multiplication – Solving linear System - finite Difference Methods - sorting algorithm - combinatorial Search. 16 Periods

**Unit 7:** Shared Memory Programming – Open MP. 4 Periods.

**Total : 45 Periods.**

### **Text Book:**

Parallel Programming in C with MPI and OpenMP By Michale J Quinn, Tata McGraw Hill 2004.

### **Reference Book:**

Introduction to Parallel Computing by Anantha Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson education LPE, Second edition, 2004.

Introduction - Modern Parallel Computers - Types of Concurrency – Programming.

Parallel Architectures – Interconnection Networks – ~~Processor arrays – Multiprocessors – Multi Computers~~ – Flynn’s taxonomy.

Parallel Algorithm Design – Foster’s Design Methodology – Example Problems. (Parallel Patterns from UIUC and UCB)

Message Passing programming Model – MPI – Point to Point & Collective Calls.

Algorithms for Illustrations – Sieve of Eratosthenes – Floyd’s Algorithm.

Performance analysis

- Speed up and Efficiency

- Amdahl’s Law

- Gustafson’s Barsis Law

- Karp Flatt Metric

- Isoefficiency Metric.

Matrix Vector Multiplication

Monte Carlo Methods

Matrix Multiplication

Solving linear System

finite Difference Methods

sorting algorithm

combinatorial Search.

Shared Memory Programming – Open MP.