

COURSE CODE	COURSE TITLE	L	T	P	C
1152IT119	PARALLEL COMPUTING	3	0	0	3

Course Category:

~~Foundation (0) / Program Core (1) / Program Elective (2) / Allied Elective (3) / University Elective (4) / Value Education Elective (5) / Independent Learning (6) / Industry Higher Learning Institute Interaction (7).~~

Course Content:

UNIT 1

Principles of parallel algorithm design - decomposition techniques - mapping & scheduling computation – templates - Programming shared-address space systems - Cilk Plus – OpenMP- Pthreads

UNIT 2

Parallel computer architectures - shared memory systems and cache coherence - distributed-memory systems - interconnection networks and routing

UNIT 3

Programming scalable systems - message passing: MPI - global address space languages - Analytical modeling of program performance - speedup, efficiency, scalability, cost optimality, iso efficiency

UNIT 4

Collective communication – Synchronization - Non-numerical algorithms - Sorting, graphs, dynamic programming. Numerical algorithms - dense matrix algorithms, sparse matrix algorithms

UNIT 5

Performance measurement and analysis of parallel programs - GPU Programming- Problem solving on clusters using MapReduce - Warehouse-scale computing

Text book:

1. *Introduction to Parallel Computing, Second Edition*, AnanthGrama, George Karypis, Vipin Kumar, Anshul Gupta, Addison-Wesley, 2003, ISBN: 0201648652 (Recommended, but not required)

Reference Book:

1. Parallel Programming in C with MPI and OpenMP by M J Quinn
2. Introduction to Parallel Computing by AnanthGrama, George Karypis, Vipin Kumar, and Anshul Gupta.
3. Programming Massively Parallel Processors by D.Kirk and W. Hwu