**Elective I: Parallel and Network Algorithm syllabus**

**Unit I**: Introduction: Parallel computation models, Parallel architectures and

topologies, Notion of space and time complexity in parallel and interconnect

network environment.

**Unit II**: Dependence Concept: Single Loop, Double Loop and Perfect Loop Nest.

Loop carried and Loop independence dependence, Preliminary loop

transformation techniques.

**Unit III**: Parallel Algorithms and Techniques 1: Parallel Searching and Sorting

Techniques. Hyper quick sort.

**Unit IV**: Parallel Algorithms and Techniques 2: Parallel solutions to linear

system of equations, finding roots of non-linear equations, Parallel discrete

Fourier transforms.

**Unit V**: Graph and Network Theory 1: Introduction, Shortest Paths, Spanning

Trees, Connected Components.

**Unit VI**: Graph and Network Theory 2: Parallel Breadth First Search and Depth

First Search, Greedy Algorithms and matroids, Coloring and Matching, Network

Flow.

**Text Books**:

1. Graphs, Networks, and Algorithms, Dieter Jungnickel, Third Edition,

Springer, 2010.

2. The Design and Analysis of Parallel Algorithms, S.G.Akl, PHI, 1989.

3. Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George

Karypis and Vipin Kumar, Second edition, Addison Wesley, 2003.

**Reference Books:**

1. An Introduction to Parallel Algorithms, J. JaJa, Addison Wesley, 1992.

2. Parallel Programming in C with MPI and OpenMP, M.J.Quinn, McGraw Hill,

2003.