



**Course Plan**

1. Course Outline			
<b>Course Title</b>	Design and Analysis of Parallel Algorithms		
<b>Course Code</b>	CS613		
<b>Department</b>	CSE	<b>No. of Credits</b>	3
<b>Pre-requisites Course Code</b>	NIL	<b>Faculty Name</b>	Dr.C.Mala
<b>E-mail</b>	<a href="mailto:mala@nitt.edu">mala@nitt.edu</a> ,	Telephone No: 0431-2503208	
<b>Course Type</b>	Elective Course		

2. Course Overview
<b>Pre-requisites:</b> Knowledge of algorithms and complexity. Basic knowledge of data structures and computer architecture.
3. Course Objectives
<input type="checkbox"/> To learn about parallel computing models <input type="checkbox"/> To design and analyze parallel algorithms for SM SIMD and MIMD machines <input type="checkbox"/> To design and analyze parallel algorithms for interconnection networks
4. Course Outcomes (CO)
<input type="checkbox"/> Ability to design parallel algorithms for SIMD machines <input type="checkbox"/> Ability to design parallel algorithms for MIMD machines <input type="checkbox"/> Ability to analyze parallel algorithms for SIMD and MIMD machines

5. Course Outcome (CO)	Aligned Programme Outcome (PO)							
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8
Ability to design parallel algorithms for SIMD machines	S	B	M	S	B	B	M	B
Ability to design parallel algorithms for MIMD machines	S	B	M	S	B	M	M	B
Ability to analyze parallel algorithms for SIMD and MIMD machines	S	M	S	S	M	S	M	B

S = 0.6

M = 0.4

B = 0.0

## 6. Course Teaching and Learning Activities

Sl. No	Topic	Mode of Delivery
<b>Unit -I</b>		
1	Introduction to different models of computation	Pen-Board
2	Array Processors	
3	Multiprocessors	Pen-Board
4	Interconnection networks	Pen-Board
5	Shared memory models control and algorithms	Pen-Board
6	Parallel algorithms for Array processors	Pen-Board
<b>Unit -II</b>		
1	Broadcast, All sums algorithm	Pen-Board
2	Selection Algorithm	Pen-Board
3	Parallel selection	Pen-Board
4	Searching a random sequence on PRAM models, tree and mesh	Pen-Board
5	Searching a sorted sequence on PRAM models tree and mesh	Pen-Board
<b>Unit -III</b>		
1	Need for Merging , Merging on PRAM models	Pen-Board
2	Merging on PRAM models	Pen-Board
3	ODD EVEN Merge	Pen-Board
4	Sorting on EREW,CREW and CRCW SIMD models	Pen-Board
5	MIMD Enumeration sort	Pen-Board
<b>Unit -IV</b>		
1	SIMD algorithms for Matrix operations- Transposition	Pen-Board
2	Matrix by matrix multiplication	Pen-Board
3	Matrix by vector multiplication	Pen-Board
4	Numerical problems- solving systems of linear equations	Pen-Board
5	Finding roots of non linear equations on PRAM models	Pen-Board
<b>Unit -V</b>		
1	Graphs algorithms	Pen-Board

2	Finding connected components	Pen-Board
3	Sparse graphs and Dense graphs	Pen-Board
4	Minimum spanning tree	Pen-Board
5	Biconnected components	Pen-Board
	<b>Total</b>	35 hours

### 7. Course Assessment Methodology

Sl. No	Mode of Assessment	Week/Date	Duration	Marks
1.	Cycle Test - 1	6 <sup>th</sup> week	1 Hour	20
2.	Cycle Test - 2	12 <sup>th</sup> week	1 Hour	20
3.	Assignment	8 <sup>th</sup> week		10
4.	End Semester Exam	November last Week	3 Hours	50
Total				100

### 8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)

#### Text Books

1. Kai Wang and Briggs, "Computer Architecture and Parallel Processing", McGraw Hill, 1985.
2. S. G. Akl, "Design and Analysis of Parallel Algorithms", Prentice Hall Inc., 1992.
3. Joseph Jaja, "An Introduction to parallel Algorithms", Addison Wesley, 1992.

### For Senate's Consideration

Course Faculty

CC Chairperson

HOD