



**Department of Computer Science and Engineering
National Institute of Technology, Tiruchirappalli**

1. Course Outline			
Course Title	DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS		
Course Code	CSPE12		
Programme, Department & Section	B.Tech. – CSE	No. of Credits	3
Pre-requisites Course Code	CSPC29	Faculty Name	Dr. M.Sridevi
E-mail	msridevi@nitt.edu	Telephone No.	0431 - 2503216
Course Type	PE		
Session in Academic Year	July - November 2017 Session (Odd Semester)		

2.Course Overview
- This course mainly describes about the parallel algorithms and analyze of it.
3. Course Objectives
<ul style="list-style-type: none"> - To understand parallel computing algorithms and models - To analyze parallel algorithms for PRAM machines and various interconnection networks
4. Course Outcomes (CO)
<ul style="list-style-type: none"> - Ability to analyze parallel algorithms for PRAM machines - Ability to comprehend and apply parallel algorithms to real world applications - Ability to design and develop optimal parallel algorithms

5. Course Outcomes (CO)	Aligned Programme Outcome (PO)							
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8
Ability to analyze parallel algorithms for PRAM machines	S	S	S	S	M	M	B	M
Ability to comprehend and apply parallel algorithms to real world applications	S	S	S	S	S	S	B	M
Ability to design and develop optimal parallel algorithms	S	S	S	S	S	S	B	M

S = 0.6

M = 0.4

B = 0.0

6. Course Teaching and Learning Activities							
SL.No	Title	Type		Mode of delivery			
		L	T	C&T	PPT	VL/VC	DEMO
UNIT I							
1.	Introduction to parallel and sequential algorithms	√		√			
2.	Different types of Parallel Computers	√		√			
3.	Types of Shared memory SIMD models	√		√	√		
4.	Interconnection networks and their types	√		√	√		
5.	Classifying MIMD algorithms	√		√			
6.	Analysis the algorithm based on running time, processors and used	√		√			
7.	Sequential and parallel search algorithms on different SIMD models	√		√			
8.	Assignments						√
UNIT II							
9.	Sequential Selection algorithm	√		√			
10.	Parallel Selection algorithm and time complexity analysis		√	√			
11.	Broad casting a datum and Computing all sums	√		√			
12.	Sequential sorting and Sorting on a linear array	√		√			
13.	Sorting using merge split	√		√			
14.	Sorting on CRCW model	√		√			
15.	Sorting on CREW model	√		√			
16.	Sorting on EREW model	√		√			
17.	Parallel quick sort	√		√			
18.	Hyper Quick sort using hypercube						
19.	Assignments						√
UNIT III							
20.	Matrix operations	√		√			
21.	Sequential and parallel matrix multiplication	√		√			
22.	Matrix transpose on shuffle network	√		√			
23.	EREW matrix transpose	√		√			
24.	Matrix multiplication on Mesh network	√		√			
25.	Matrix multiplication on Cube	√	√	√			
26.	CRCW matrix multiplication						√
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SL.No	Title	Type		Mode of delivery			
		L	T	C&T	PPT	VL/VC	DEMO
27.	Matrix by vector multiplication on linear array	√		√			
28.	Multiplication on tree network	√		√			
29.	Assignments						√
UNIT IV							
30.	Solving linear equation using parallel Gauss-elimination and Gauss - Jordan	√		√			
31.	MIMD algorithm for Gauss – Seidel method	√		√			
32.	Finding roots of non – linear equations using bisection and Newton’s methods	√		√			
33.	Solving partial differential equations	√	√	√			
34.	Computing Eigen values and parallel random number generators	√		√			
35.	Assignments						√
UNIT V							
36.	Computing the connectivity matrix	√		√			
37.	Finding connected components using cube SIMD model	√		√			
38.	Traversal, Minimal alpha beta tree	√		√			
39.	Computing minimum cost spanning tree	√		√			
40.	Assignments						√

7. Course Assessment Methods				
Sl. No.	Mode of Assessment	Week / Date	Duration	Marks
1	Cycle Test 1	After completion of two units	60 minutes	20
2	Cycle Test 2 / Quiz	After completion of four units	60 minutes	20
3	Programming Assignments	Every Unit	-	10
4	End Semester Exam	As Per Academic Schedule	3 hours	50
Total				100

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

Text Books:

1. S. G. Akl, "The design and analysis of parallel algorithms", prentice Hall of India, 1989.

References:

1. B. Wilkinson and M. Allen, "Parallel Programming - techniques and applications using networked workstations and parallel computers", 2nd Edition, Pearson Education, 2005.
2. Michael J. Quinn, "Parallel computing: thory and practice", Tata mCgraaw Hill, 2003.
3. S. Lakshmivarahan and S.K. Dhall, " Analysis and design of parallel algorithms – Arithmetic and matrix problems", Taat McGraw hill.

9. Course Exit Survey

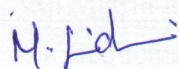
- Feedbacks are collected from the student before end semester examination through MIS or any other standard format followed by the institute.
- Suggestions from the students are incorporated for making the course more understanding and interesting.
- Students, through their Class Representatives, may give their feedback at any time to the course faculty which will be duly addresses.
- The students may also give their feedback during Class Committee Meeting.

10. Course Policy (including plagiarism, academic honesty, attendance, etc.)

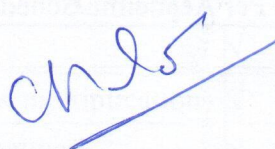
Attendance: Minimum 75% is mandatory to write the end semester examination. Students having attendance 65% to 74% are eligible for the end semester exam only after attending the extra classes and submitting assignments. Students have to redo the course, if they have less than 65% of attendance.

Medical Certificate/ On Duty Certificate should be submitted immediately after rejoining.

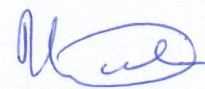
For Senate's Consideration



Course Faculty
(M-SRIDEVI)



Class Committee Chairperson



HOD / CSE