NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI –620 015.

Department of Computer Science & Engineering

COURSE PLAN

1. Course Outline			
Course Title	Design and Analysis of Parallel Algorithms		
Course Code	CSPE12		
Department	CSE	**No. of Credits**	3
Pre-requisites Course Code	CSPC29	**Faculty Name**	Mrs.T.Siron Anita Susan
E-mail	siron@nitt.edu	**MobileNo.**	9488269859
Course Type	Elective Course		

2. Course Overview

Teaches and gives Knowledge of parallel algorithms and complexity. Explains various parallel algorithm problems.

3. Course Objectives

- To understand the parallel computing.
- To understand parallel computing algorithms and models
- To analyze parallel algorithms for PRAM machines and various interconnection networks

4. Course Outcomes (CO)

- 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 Outcome (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	B	M	S	S	B	B	B

Ability to comprehend and apply parallel algorithms to real world applications	S	S	M	M	B	M	B	M
Ability to design and develop optimal parallel algorithms	S	B	M	M	B	S	B	B

S = 0.6 M = 0.4 B = 0.0

5. Course Teaching and Learning Activities

Weeks	hours	Title	Mode of Delivery
1	1	**Introduction to Parallel Computers** - SIMD	Chalk and board
	2	SM-SIMD algorithms	Chalk and board
	3	EREW , CREW	Chalk and board
2	4	Shared memory SIMD	Chalk and board
	5	Tree and mesh interconnection computers	Chalk and board
	6	Classifying MIMD algorithms	Chalk and board
3	7	**Selection and sorting**- Sequential algorithm	Chalk and board, PPT
	8	Algorithm for parallel selection	Chalk and board
	9	**Sorting** - Sorting on a linear array	Chalk and board
4	10	Broadcasting a datum	Chalk and board
	11	Computing all sums	Chalk and board
	12	Sorting on a mesh	Chalk and board, PPT
5	13	Sorting on EREW SIMD computer	Chalk and board
	14	MIMD enumeration sort	Chalk and board
	15	Parallel quick sort	Chalk and board, PPT
6	16	hyper quick Sorting on other networks	Chalk and board
	17	**Matrix operations** - Mesh transpose	Chalk and board, PPT
	18	Shuffle transpose and EREW transpose	Chalk and board, PPT
7	19	Mesh multiplication	Chalk and board, PPT
	20	Cube multiplication	Chalk and board, PPT
	21	Matrix by vector multiplication	Chalk and board, PPT
8	22	Tree multiplication.	Chalk and board, PPT
	23	**Numerical problems** - Linear equations, SIMD Algorithm	Chalk and board
	24	Roots of nonlinear equations	Chalk and board
9	25	MIMD algorithm	Chalk and board
	26	Partial differential equations	Chalk and board
	27	Computing Eigen values	Chalk and board
10	28	Monte Carlo methods	Chalk and board
	29	Parallel random number generator	Chalk and board
	30	Random number distribution	Chalk and board
11	31	**Graph problems –** Definitions, Graph coloring	Chalk and board, PPT

	32	Computing the connectivity matrix	Chalk and board
	33	Finding connected components	Chalk and board
12	34	Traversal	Chalk and board
	35	Minimal alpha-beta tree	Chalk and board, PPT
	36	Minimum cost spanning tree	Chalk and board
13	37	Addition and multiplication tree	Chalk and board

6. Course Assessment Methodology

Sl. No	Mode of Assessment	Week/Date	Duration	Marks
1.	Cycle Test - 1	5^{th} week	1 Hour	20
2.	Cycle Test - 2	11^{th} week	1 Hour	20
3.	Assignment	4^{th} & 8^{th} week		10
4.	End Semester Exam	November last Week	3 Hours	50
			Total	100

7.Essential Readings

Text Book

1. *S. G. Akl, "The Design and Analysis of Parallel Algorithms", Prentice Hall of India, 1989*

Reference Books

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 : Theory & Practice", Tata McGraw Hill, 2003

3. S. Lakshmivarahan and S. K. Dhall, "Analysis and Design of Parallel Algorithms - Arithmetic and Matrix Problems", Tata McGraw Hill, 1990

Course Exist Survey
Student feedback form will be collected at the end of the course through MIS

Course Policy
Attendance- Students having 75% to 100% attendance are eligible for writing the End semester Examination. Students having attendance between 65% & 75% with valid reasons can write the end semester exam after attending extra classes. Students havingless than 65% have to redo the course. Student should not absent for the assessment. If the reason for absence is genuine, the student can reappear for reassessment.

For Senate's Consideration		
Course Faculty	CC Chairperson	HOD