Course code: Course Title	Course Structure			Pre-Requisite
SE322: Parallel Algorithms	L	T	P	Data Structures and Algorithms
	3	1	0	

Course Objective: To introduce parallel algorithms and compare it with its sequential equivalent.

S. NO	Course Outcomes (CO)
CO1	Analyze and implement parallel algorithms for dense matrix computations to enhance computational efficiency.
CO2	Analyze decomposition and mapping techniques
CO3	Understand and apply parallel sorting algorithms for efficient data processing.
CO4	Understand and apply parallel searching and selection algorithms to optimize data retrieval and processing.
CO5	Apply graph algorithms such as graph coloring, minimum spanning tree, and shortest path algorithms.

S.No.	Contents	Contact Hours
UNIT 1	Introduction: Need for parallel computers, Models of computation, Analyzing parallel algorithms, Expressing parallel algorithms	3
UNIT 2	Dense Matrix algorithms: Matrix vector Multiplication, Matrix matrix multiplication	4
UNIT 3	Decomposition & Mapping techniques: Database query processing, 15 puzzle problem, Parallel discrete event simulation, Image dithering, Dense LU factorization	5
UNIT 4	Sorting: Hyper quick sort, Merge sort, Bitonic merge sort, odd even transposition, Enumeration sort (sorting on the CRCW model, CREW model and EREW model)	10
UNIT 5	Searching and selection: Searching on a sorted sequence (EREW, CREW, CRCW), Searching on a random sequence (EREW, CREW, CRCW, Tree and Mesh), Sequential selection algorithm, Parallel selection algorithm (EREW parallel solution)	10
UNIT 6	Graph Algorithm: Graph coloring, Minimal spanning tree, Shortest path algorithm	10
	TOTAL	42

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1.	Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar, "Introduction to Parallel Computing", Addison Wesley, 2nd Edition.	2003
2.	S.G. Akl, "The Design and Analysis of Parallel Algorithms", PHI.	1989
3.	F.T. Leighton, "Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes", MK Publishers, San Mateo California.	1992
4.	Barry Wilkinson, Michael Allen, "Parallel Programming Techniques and Applications using Networked Workstations and Parallel Computers", Prentice Hall, 2nd Edition.	2004

5.	Michael J. Quinn, "Parallel Computer Theory and Practice", McGraw Hill, 2nd Edition.	**1994**