

# GUJARAT TECHNOLOGICAL UNIVERSITY

**SUBJECT NAME: Parallel & Distributed Computing (Core II)**

**SUBJECT CODE: 3715502**

**Semester I**

**Type of course: NA**

**Prerequisite:**

1. Computer Architecture

**Rationale:**

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	ESE	PA(I)	
3	2	0	4	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment;

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	Concepts of parallelism, Introduction Amdahl's law and Gustafson's law, Dependencies	6	10
2	Interconnection networks, Race conditions, mutual exclusion, synchronization, and parallel slowdown, Fine-grained, coarse- grained, and embarrassing parallelism	6	10
3	Types of parallelism, Bit-level parallelism, Instruction-level parallelism Data parallelism, Task parallelism, Classes of parallel computers, Multicore computing, Symmetric multiprocessing	6	10
4	Distributed computing, Cluster computing, Massive parallel processing, Grid computing Specialized parallel computers, MPI Programming.	7	20
5	Distributed Computing: Introduction & overview, Communication, Distributed OS & Processes, Synchronization Security, Consistency & replication, naming, Fault Tolerance	7	20

## Reference Books:

1. Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers by Barry Wilkinson, Pearson
2. An Introduction To Parallel Computing : Design And Analysis Of Algorithms 2ed 2nd Edition Author: Vipin Kumar, Ananth Grama, Anshul Gupta, George Karypis
3. An Introduction To Parallel Computing : Design And Analysis Of Algorithms 2ed 2nd Edition Author: Vipin Kumar, Ananth Grama, Anshul Gupta, George Karypis
4. Parallel Programming: For Multicore and Cluster Systems, 1/r, Gudula Ranger, Springer
5. Distributed Computing and Networking: 11th International Conference, ICDCN 2010, Kolkata, India, January 3-6, 2010, Proceedings (Lecture Notes in Computer Science and General Issues) 1st Edition. Edition
6. Distributed Computing Author: Seema Shah, Sunita Mahajan, Oxford Publications

## Course Outcome:

After learning the course the students should be able to:

1. Explain how parallelism can be done and able to parallelize a given Problem
2. Identify the different types of parallelism and evaluate the parallel platform
3. Describe the general concepts processor design, multi core computing, distributed computing and Cluster computing
4. Design and implement a parallel processing solution
5. Knowledge on Distributed Processing

## List of Experiments: (with Open Ended Problems)

Parallel Computing:

1. Amdahl's law and Gustafson's law,
2. Dependencies, Interconnection networks, Race conditions,
3. mutual exclusion, synchronization, and parallel slowdown,
4. Fine-grained, coarse-grained, and embarrassing parallelism,
5. Classes of parallel computers,
6. Symmetric multiprocessing,
7. MPI Programming.

Distributed Computing:

1. Distributed OS & Processes,
2. Synchronization Security
3. Consistency & replication,
4. naming,
5. Fault Tolerance