PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering

SYLLABUS FOR 5th Sem BTech PROGRAMME

Distributed Computing

Type of Course: BTech

Prerequisite: Basic knowledge of Operating systems

Rationale: This course provides a broad introduction to distributed computing.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
LectHrs/	Tut Hrs/	Lab Hrs/		T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect- Lecture,**Tut** - Tutorial, **Lab** - Lab, **T** - Theory,**P**- Practical, **CE**- CE, **T** - Theory,**P**- Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Introduction & Model of Distributed Computations** What is distributed operating system, Background, need, features, Introduction to Distributed Computing	5	2
2	**Characteristics of Distributed Systems & system models** Examples of distributed systems, Resource sharing and the web, Architectural models, fundamental models	10	4
3	**Networking and Internetworking** Types of Networks, Network principles, Internet protocols	10	4
4	**Inter-process communication** Introduction, External data representation and marshalling, client-server communication, group communication	10	4
5	**Distributed Objects** Introduction, Communication between objects, Remote procedure call, events and notification	10	4
6	**Operating System support** Introduction, OS layer, Protection, Processes and threads, communication and invocation, OS architecture	15	6
7	**Security** Introduction, Overview of security techniques, cryptographic algorithms, digital signatures	5	2
8	**Distributed file system** Introduction, File Service architecture, Case study: Sun network file system	10	4
9	**Transactions and Concurrency control, Distributed Transactions**	15	6

	Transactions, nested transactions, Locks, Optimistic concurrency control, Flat and nested distributed transactions, atomic commit protocols, concurrency control in distributed transactions, distributed deadlocks, Transaction recovery		
10	**Authentication in Distributed Systems** Introduction, Protocols based on Symmetric cryptosystems, protocols based on asymmetric cryptosystems, Password based authentication, Authentication Protocol failures, Self-stabilization.	10	4

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Distributed Systems concepts and Design by George coulouris, Jean Dollimore and Tim Kindberg
2. Distributed Systems Paperback – 31 March 2017 by Coulouris George (Author), Dollimore Jean (Author), Kindberg Tim (Author), Blair Gordon (Author)
3. Distributed Computing by Ajay Kshemkalyani and Mukesh Singhal

Course Outcome:

After Learning the course, the students shall be able to:

1. Understand the design principles in distributed systems and the architectures for distributed systems.
2. Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting etc.
3. Analyze fault tolerance and recovery in distributed systems and algorithms for the same.
4. Analyze the design and functioning of existing distributed systems and file systems.
5. Implement different distributed algorithms over current distributed platforms.