FACULTY OF ENGINEERING AND TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: **Master of Technology (Artificial Intelligence)**

Semester: **I**

Course Code: **202310101**

Course Title: **Distributed Systems**

Course Group: **Programme Elective-II**

Course Objectives:

Click or tap here to enter text.Students will learn basic concepts and paradigms of distributed systems. Students will learn how to combine computational power of multiple computers to solve complex computational problems.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	**Tutorial 1**	**Practical 1**		**Theory**		**J/V/P***		**Total**
				Internal	**External**	**Internal**	**External**	
3	0	2	4	50/20	50/20	25/10	25/10	150/60

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to Distributed Computing Systems: Evolution of distributed computing systems, Distributed computing systems models, issues in the design of distributed operating systems.	7
2	Inter-process Communication in Distributed Systems: Message passing, synchronization, buffering, failure handling, group communication.	6
3	Remote Procedure Calls: Remote Procedure Call (RPC) models, transparency of RPC, RPC messages, marshaling arguments and results, exception handling, lightweight RPC.	6
4	Distributed Shared Memory: General architecture of Distributed Shared Memory (DSM), granularity, replacement strategies, thrashing.	7
5	Distributed Process Management: Synchronization – clock synchronization, event ordering, mutual exclusion; election algorithm, process migration, threads.	7

6	Distributed File System: File accessing models, file-sharing semantics, file-caching semantic, case-study: Network file systems.	7

List of Practical's / Tutorials:

1	Write a program to implement hello world service using RMI
2	Write a program to implement calculator using RMI
3	Write a program to implement time service using RMI
4	Write a program to implement hello world service using RPC
5	Write a program to implement date service using RPC
6	Write a program to implement Echo SOCKET in JAVA
7	Write a program to implement Echo server using RPCGEN
8	Write a program to implement producer-consumer concept using THREAD
9	Write a program to find the length of string using THREAD
10	Experiments on Hadoop Distributed File System
11	Infinite Sequence, Infinite Series, Geometric Series, Telescoping Series, The nth term test for a Divergent Series. The Integral Test, Comparison Tests, D Alembert's Ratio Test and Cauchy's Root Test
12	Alternating Series, Absolute and Conditional Convergence, Power Series and Convergence, The Radius and Interval of Convergence of a Power Series

Reference Books:

1	P.K. Sinha, Distributed Operating Systems, Concept and Design, Prentice Hall of India, 1997.
2	A.S Tannenbaum, M.V. Steen, Distributed Systems, Principles and Paradigms, Prentice Hall of India, 2002. 3. Vijay K. Garg, Elements of Distributed Computing Wiley – IEEE 2002.

Supplementary learning Material:

1	NPTEL Distributed Computing Systems: https://nptel.ac.in/courses/106/106/106106107/
2	NPTEL Distributed Systems: https://nptel.ac.in/courses/106/106/106106168/

Pedagogy:
- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Internal Evaluation:
The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	**U**	**A**	**N**	**E**	**C**	
20%	30%	30%	10%	5%	5%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand the Evolution and Issues of Distributed system	**15**
CO-2	Understand the concepts of Inter process communication and Remote Procedure Call in Distributed Environment.	**30**
CO-3	Understand the concept of Distributed process management.	**30**
CO-4	Understand the concept of Distributed File System	**25**

Curriculum Revision:	
Version:	2.0
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025