# 19CS31E2 - DISTRIBUTED SYSTEMS

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| **Course Category:** | Professional Elective | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-0 |
| **Prerequisite:** | Student needs to have basic knowledge of any operating systems and networking. | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Course Objectives** | * Understand foundations of Distributed Systems. * Ability to communicate between distributed objects. * Introduce the idea of peer to peer services and various file systems. * Understand the Security techniques used in distributed systems**.** | | |

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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Underdstand the basic characterization of distributed systems. |
| CO2 | Enabling the basics of networking and internetworking with interprocess communication. |
| CO3 | Understand the Communication between distributed objects. |
| CO4 | Explore the architecture of distributed file systems. |
| CO5 | Understand the peer to peer services withtransactions and concurrency control. |
| CO6 | Exposure to concurrency control in distributed transactions and security. |

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| **Course Content** | UNIT-I  Characterization Of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and Web, Challenges, System Models: Introduction, Architectural and Fundamental Models.  UNIT-II  Networking And Internetworking: Types of Networks, Network Principles, Internet Protocols, Case Studies: Ethernet, Wifi, Bluetooth and Atm.  Interprocess Communication: The Api For The Internet Protocols, Client-Server Communication,Group Communication, Case Study: Interprocess Communication In Unix.  UNIT-III  Distributed Objects and Remote Invocation: Communication Between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: Java Rmi.  Distributed File Systems: Introduction, File Service Architecture, Case Study- Sun Network File Systems.  UNIT-IV  Name Services: Introduction, Name Services and The Domain Name System, Case Study of The Global Name Service.  Peer to Peer Systems: Introduction, Napster and Its Legacy, Peer to Peer Middleware, Routing Overlays.  UNIT-V  Transactions And Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.  UNIT-VI  Distributed Transactions: Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.  Security: Introduction, Overview of Security Techniques, Cryptographic Algorithms, Digital Signatures, Case Studies-Kerberos, 802.11 Wifi. |
| **Text Books and References** | **Text Books:**   1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2. Distributed Systems, S.Ghosh, Chapman and  Hall/CRC, Taylor & Francis Group, 2010.   **Reference Books:**   1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press. 2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI. 3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition. |
| **E-Resources** | 1. [**https://nptel.ac.in/courses**](https://nptel.ac.in/courses) 2. [**https://freevideolectures.com/uiversity/iitm**](https://freevideolectures.com/uiversity/iitm) |