# 17IT3101 - DISTRIBUTED SYSTEMS

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| **Course Category:** | Program Core | **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 |
| **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 the successful completion of the course, the students will be able to: | |
| CO1 | Understand the basic characterization of distributed systems. |
| CO2 | Understand the basics of networking and internetworking with inter process communication. |
| CO3 | Understand the Communication between distributed objects and Explore the architecture of distributed file systems. |
| CO4 | Explore the name services and peer to peer systems. |
| CO5 | Understand the transactions and concurrency control. |
| CO6 | Explore the concurrency control in distributed transactions and security. |
| **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 network, 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> 2. <https://freevideolectures.com/university/iitm> | |