Course code	Course Name	L-T-P - Credits	Year of Introduction
IT306	Distributed Systems	3-0-0-3	2016

Pre-requisites: IT305 Operating Systems

Course Objectives:

- To understand the concepts that underlie distributed computing systems along with design and implementation issues.
- To study the key mechanisms and models for distributed systems.

Syllabus

Introduction to distributed systems, inter process communication, distributed files systems, Name service, Time and global states, election algorithms, distributed files systems and case study.

Expected Outcome:

The students will

i. gain a clear understanding of the concepts that underlie distributed computing systems along with design and implementation issues.
ii. use key mechanisms and models for distributed systems including logical clocks, causality, vector timestamps, and election algorithms.

Text Books:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems: Concepts and Design", Pearson 2009, 4th Edition.

References:

1. Andrew S Tanenbaum and Marteen Van Steen, "Distributed Systems Principles and Paradigms", Pearson Education / Prentice Hall of India , New Delhi, 2002.
2. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, New Delhi, 2004.
3. Mukesh Singhal, Niranjan G Shivarathri, "Advanced Concepts in Operating systems", Tata Mc Graw Hill Ltd.
4. Tanenbaum A S, " Modern Operating System", 3/e, PHI

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Characterization of Distributed Systems-Introduction-Examples-Resource Sharing and the Web-Challenges. System Models-Architectural-Fundamental. Inter process Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication-Group communication-Case study: Inter process Communication in UNIX.	7	15%

II	Distributed Objects and Remote Invocation-Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer-Protection-Processes and threads- Communication and invocation OS architecture.	7	15%
FIRST INTERNAL EXAMINATION			
III	Distributed File Systems-Introduction-File service architecture-Case Study: Sun Network File System-Enhancements and further developments. Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service	7	15%
IV	Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging.	5	15%
SECOND INTERNAL EXAMINATION			
V	Coordination and Agreement-Introduction-Distributed mutual exclusion – Elections ¬ Multicast communication-Consensus and related problems.	8	20%
VI	Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models. CORBA Case Study- Introduction-CORBA RMI-CORBA services.	8	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks: 100 Exam Duration: 3 hours

The question paper shall consist of Part A, Part B and Part C.

Part A shall consist of three questions of 15 marks each uniformly covering Modules I and II. The student has to answer any two questions (15×2=30 marks).

Part B shall consist of three questions of 15 marks each uniformly covering Modules III and IV. The student has to answer any two questions (15×2=30 marks).

Part C shall consist of three questions of 20 marks each uniformly covering Modules V and VI. The student has to answer any two questions (20×2=40 marks).

Note : Each question can have a maximum of 4 subparts, if needed