CSE 401 DISTRIBUTED COMPUTING SYSTEMS

[3 1 0 4]

1. INTRODUCTION:
   Definition of a Distributed System, Goals, Architectural Models, Fundamental Models
   (Chapter 1.1, 1.2 of text book 2, Chapter 2 of text book 1) (3 hrs)

2. INTER-PROCESS COMMUNICATION:
   External Data Representation, Client-server communication, Group Communication, Case Study—Inter process communication in UNIX
   (Chapter 4.3-4.6 of text book 1) (3 hrs)

3. DISTRIBUTED OBJECT AND REMOTE INVOCATION:
   Introduction, Communication between Distributed Object, Remote Procedure call, Event and notifications, Case Study: Java RMI
   (Chapter 5 of text book 1) (4 hrs)

4. PROCESSES:
   Threads, Virtualization, Clients, Servers, Code Migration
   (Chapter 3 of text book 2) (4 hrs)

5. DISTRIBUTED FILE SYSTEM:
   Introduction, File Service architecture, Case Study: Sun Network File System
   (Chapter 8.1-8.3 of text book 1) (2 hrs)

6. NAME SERVICES:
   Introduction, Name services and DNS, Directory services, Case Study: Global name service, Case Study: X.500 directory service
   (Chapter 9 of text book 1) (4 hrs)

7. SYNCHRONIZATION:
   Clock Synchronization, Logical clocks, Mutual Exclusion, Global Positioning of Nodes, Election Algorithm
   (Chapter 6 of text book 2) (8 hrs)

8. CONSISTENCY AND REPLICATION:
   Introduction, Data-Centric Consistency Models, Client-Centric Consistency Models, Replica Management, Consistency Protocols
   (Chapter 7 of text book 2) (8 hrs)

9. FAULT TOLERANCE:
   Introduction to fault tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group communication, Distributed Commit, Recovery
   (Chapter 8 of text book 2) (6 hrs)

10. SECURITY:

Introduction to security, Secure Channels, Access control
(Chapter 9.1-9.3 of text book 2) (6 hrs)

Text books:

1. George Coulouris, Jean Dollimore, Tim Kindberg: "Distributed Systems, Concepts and Design": Pearson Education, 4th edition, 2009.
2. Andrew S. Tannenbaum, Maarteen Van Steen: "Distributed Systems, Principles and Paradigms": PHI (EEE), 2nd edition, 2009.

References:

1. Ajay D. Kshemkalyani, Mukesk Singhal, "Distributed Computing: Principles, Algorithms, and Systems", Cambridge University Press/ Foundation Books India, New Delhi, 2008.
2. Mei- Ling Liu, "Distributed Computing: Principles and Application", Pearson Education, Inc. New Delhi. 2004.