NOC:Distributed Systems

COURSE LAYOUT

Week 1: Introduction to DS, Message Passing, Leader Election, Distributed Models, Causality and Logical Time
1. Introduction to Distributed Systems
2. Basic Algorithms in Message Passing System
3. Leader Election in Rings
4. Distributed Models of Computation, Causality & Logical Time

Week 2: Logical Time, Global State & Snapshot and Distributed Mutual Exclusion-Non-Token and Quorum based approaches
1. Size of Vector Clock, Matrix Clocks, Virtual Time and Physical Clock Synchronization
2. Global State and Snapshot Recording Algorithms
3. Distributed Mutual Exclusion and Non-Token based Approaches
4. Quorum Based Distributed Mutual Exclusion Approaches

Week 3: Distributed Mutual Exclusion-Token based approaches, Consensus & Agreement, Checkpointing & Rollback Recovery
1. Token Based Distributed Mutual Exclusion Approaches
2. Consensus and Agreement Algorithms
3. Checkpointing & Rollback Recovery

Week 4: Deadlock Detection, DSM and Distributed MST
1. Deadlock Detection in Distributed Systems
2. Distributed Shared Memory
3. Distributed Minimum Spanning Tree

Week 5: Termination Detection, Message Ordering & Group Communication, Fault Tolerance and Self-Stabilization
1. Termination Detection in Distributed System
2. Message Ordering and Group Communication
3. Fault tolerance
4. Self-Stabilization

Week 6: Distributed Randomized Algorithms, DHT and P2P Computing
1. Distributed Randomized Algorithms-I
2. Distributed Randomized Algorithms-II
3. Distributed Hash Table & Peer to Peer Computing-I
4. Peer to Peer Computing-II

Week 7: Case Studies: GFS, HDFS, Map Reduce and Spark
1. Google File System and HDFS
2. Distributed Execution using Map Reduce-I
3. Map Reduce-II
4. Introduction to Spark

Week 8: Case Studies: Sensor Networks, Authentication & Security in DS
1. Introduction to Sensor Networks
2. Distributed Algorithms for Sensor Networks
3. Authentication in Distributed Systems
4. Security in Distributed Systems and Block Chain