# Course program - Distributed Systems 2017

1. Basic Abstractions
   1. Processes and messages
   2. Process Failures
      1. Crashes
      2. Crashes with Recovery
      3. Omissions
      4. Arbitrary Faults / Byzantine Failures
   3. Links
      1. Fair Loss Links
      2. Stubborn Links
      3. Perfect Links
      4. Quiescent Links
   4. Timing assumptions
      1. Asynchronous Systems
      2. Synchronous Systems
      3. Partially Synchronous Systems
   5. Time in DS
      1. Physical Clock (+ Christian’s and Berkley’s algorithms)
      2. Logical Clock (+ Lamport’s and Ricart-Agrawala’s algorithms)
   6. Failure Detection
      1. Perfect Failure Detector
      2. Eventually Perfect Failure Detectors
   7. Leader Election
      1. Eventual Leader Election
2. Broadcast
   1. Best Effort Broadcast
   2. Regular Reliable Broadcast
   3. Uniform Reliable Broadcast
   4. Probabilistic Broadcast
   5. FIFO and Casual Broadcast
   6. Broadcast - Convergecast message pattern
   7. Atomic Broadcast
   8. Byzantine Consistent broadcast
   9. Byzantine Reliable broadcast
3. Consensus
   1. Regular Consensus (Flooding Consensus)
   2. Uniform Consensus (Flooding Uniform Consensus)
   3. Rotating Coordinator Consensus
   4. Byzantine Tolerant Consensus
   5. Non Blocking Atomic Commitment
   6. Paxos
4. Ordered Communication
   1. Causal Order
   2. Total Order (Uniform/Non Uniform Agreement)
5. Publish/Subscribe Systems
   1. Event Routing Systems
      1. Event/Subscription Flooding
      2. Filter-based Routing
      3. Rendez-Vous Routing
6. Software Replication
   1. Active Replication
   2. Passive Replication
   3. Linearizability
   4. Eventual Consistency
   5. CAP theorem
7. Registers
   1. Regular Register
   2. Atomic Register