Distributed Computing (S2-23\_SSZG526)

### **## Module 1 – INTRODUCTION**

**Recorded Lecture – 1.1**

Contents

* Introduction Part I - Definition
* Relation to Computer system components
* Motivation

<https://www.youtube.com/watch?v=eQV6_dtlZ0s&t=13s>

**Recorded Lecture – 1.2**

Contents

* Introduction Part II - Relation to parallel multiprocessor**/**multicomputer systems
* Design issues and challenges

[**https://www.youtube.com/watch?v=DhAjtxvu7qo&t=2s**](https://www.youtube.com/watch?v=DhAjtxvu7qo&t=2s)

**Recorded Lecture – 1.3**

Contents

* Distributed Communication models (RPC, SUN RPC, Rpcgen...)

[**https://www.youtube.com/watch?v=P\_8M2e6co8c&t=1s**](https://www.youtube.com/watch?v=P_8M2e6co8c&t=1s)

### **## Module 2 - A model of distributed computations**

**Recorded Lecture – 2.1**

Contents

* A distributed program
* A model of distributed executions
* Models of Communication Networks
* Global state of a distributed system
* Cuts of a distributed computation

[**https://www.youtube.com/watch?v=2MZZEGyJvVw&t=1s**](https://www.youtube.com/watch?v=2MZZEGyJvVw&t=1s)

**## Recorded Lecture -2.2**

Contents

Logical time

* Introduction
* A framework for a system of logical clocks
* Scalar time

[**https://www.youtube.com/watch?v=nphLkqoqGwU&t=1s**](https://www.youtube.com/watch?v=nphLkqoqGwU&t=1s)

**## Recorded Lecture – 2.3**

Contents

Logical time

* Vector time
* Efficient implementation of vector clocks

[**https://www.youtube.com/watch?v=qDNmhGNaWMU&t=1s**](https://www.youtube.com/watch?v=qDNmhGNaWMU&t=1s)

### **## Module 3 - Global state and snapshot recording algorithms**

**## Recorded Lecture – 3.1**

Contents

* Introduction
* System model and definitions

<https://www.youtube.com/watch?v=UNqWywjWkpw&t=4s>

**## Recorded Lecture – 3.2**

Contents

* Snapshot algorithms for FIFO channels

[**https://www.youtube.com/watch?v=WLcuzadevEs&t=1s**](https://www.youtube.com/watch?v=WLcuzadevEs&t=1s)

### **## Module 4 - Message ordering and Group communication**

**## Recorded Lecture – 4.1**

Contents

* Group communication
* Causal order (CO)
* Birman-Schiper- Stephenson protocol

[**https://www.youtube.com/watch?v=10cV0ibarlo&t=5s**](https://www.youtube.com/watch?v=10cV0ibarlo&t=5s)

**## Recorded Lecture – 4.2**

Contents

* Schiper-Eggli- Sandoz protocol

[**https://www.youtube.com/watch?v=HLSO3ldosHM&t=4s**](https://www.youtube.com/watch?v=HLSO3ldosHM&t=4s)

### **## Module 5 - Distributed mutual exclusion (DME)**

**## Recorded Lecture – 5.1**

Contents

* Introduction
* Preliminaries

[**https://www.youtube.com/watch?v=Tvl-W6bXEUE&t=1s**](https://www.youtube.com/watch?v=Tvl-W6bXEUE&t=1s)

**## Recorded Lecture – 5.2**

Contents

* Lamport’s algorithm

[**https://www.youtube.com/watch?v=F4oCiTIaU74&t=1s**](https://www.youtube.com/watch?v=F4oCiTIaU74&t=1s)

**## Recorded Lecture – 5.3**

Contents

* Ricart-Agrawala algorithm

[**https://www.youtube.com/watch?v=YbXmJOTr5PM&t=1s**](https://www.youtube.com/watch?v=YbXmJOTr5PM&t=1s)

**## Recorded Lecture – 5.4**

Contents

* Maekawa’s algorithm

[**https://www.youtube.com/watch?v=sZjwW5egGIE&t=1s**](https://www.youtube.com/watch?v=sZjwW5egGIE&t=1s)

**## Recorded Lecture – 5.5**

Contents

* Suzuki-kasami’s broadcast algorithm

[**https://www.youtube.com/watch?v=8ghaigJQNn0&t=1s**](https://www.youtube.com/watch?v=8ghaigJQNn0&t=1s)

**## Recorded Lecture – 5.6**

Contents

* Raymond’s tree-based algorithm

[**https://www.youtube.com/watch?v=0m7een\_FMMQ&t=1s**](https://www.youtube.com/watch?v=0m7een_FMMQ&t=1s)

### **## Module 6 - Deadlock detection in distributed systems**

**## Recorded Lecture – 6.1**

Contents

* Introduction
* System model
* Preliminaries

[**https://www.youtube.com/watch?v=S1ugAbUL3v8&t=1s**](https://www.youtube.com/watch?v=S1ugAbUL3v8&t=1s)

**## Recorded Lecture – 6.2**

Contents

* Chandy-Misra- Haas algorithm for the AND model

[**https://www.youtube.com/watch?v=eHOLzg58xLQ&t=1s**](https://www.youtube.com/watch?v=eHOLzg58xLQ&t=1s)

**## Recorded Lecture – 6.3**

Contents

* Chnady-Misra- Haas algorithm for the OR model

[**https://www.youtube.com/watch?v=zNwBw5JfrUM&t=1s**](https://www.youtube.com/watch?v=zNwBw5JfrUM&t=1s)

### **## Module 7 - Consensus and agreement algorithms**

**## Recorded Lecture – 7.1**

Contents

* Problem definition

[**https://www.youtube.com/watch?v=Qgd62uv\_ig0**](https://www.youtube.com/watch?v=Qgd62uv_ig0)

**## Recorded Lecture – 7.2**

Contents

* The Byzantine agreement and other problems

[**https://www.youtube.com/watch?v=gX-ISHbvmXU&t=1s**](https://www.youtube.com/watch?v=gX-ISHbvmXU&t=1s)

**## Recorded Lecture – 7.3**

Contents

* Consensus algorithm for Byzantine failures

[**https://www.youtube.com/watch?v=IxJu3MYCs4I&t=1s**](https://www.youtube.com/watch?v=IxJu3MYCs4I&t=1s)

### **## Module 8 - Peer-to- Peer Computing**

**## Recorded Lecture – 8.1**

Contents

* Introduction

[**https://www.youtube.com/watch?v=WW2\_c6txQUs&t=1s**](https://www.youtube.com/watch?v=WW2_c6txQUs&t=1s)

**## Recorded Lecture – 8.2**

Contents

* Data indexing and overlays
* Napster
* Unstructured overlays

[**https://www.youtube.com/watch?v=pQrld-R0HXk&t=1s**](https://www.youtube.com/watch?v=pQrld-R0HXk&t=1s)

**## Recorded Lecture – 8.3**

Contents

* Chord distributed hash table

[**https://www.youtube.com/watch?v=vIAbZ94CiBQ&t=1s**](https://www.youtube.com/watch?v=vIAbZ94CiBQ&t=1s)

**## Recorded Lecture – 8.4**

Contents

* Security concerns in Peer to Peer networks

[**https://www.youtube.com/watch?v=qLznMvTTHLM&t=1s**](https://www.youtube.com/watch?v=qLznMvTTHLM&t=1s)

### **## Module 9 - Computer clusters for scalable parallel computing**

**## Recorded Lecture – 9.1**

Contents

* Introduction
* Clustering for massive parallelism
* Computer clusters and MPP architectures

[**https://www.youtube.com/watch?v=haRmtFiAFxs&t=1s**](https://www.youtube.com/watch?v=haRmtFiAFxs&t=1s)

**## Recorded Lecture – 9.2**

Contents

* Design principles of Computer clusters
* Cluster job and resource management

[**https://www.youtube.com/watch?v=3NQXug14aTU&t=1s**](https://www.youtube.com/watch?v=3NQXug14aTU&t=1s)

**## Recorded Lecture – 9.3**

Contents

* Grid Computing systems and resource management

[**https://www.youtube.com/watch?v=jNHZX6rBic4&t=1s**](https://www.youtube.com/watch?v=jNHZX6rBic4&t=1s)

**## Recorded Lecture – 9.4**

Contents

* Internet of Things (IoT)

[**https://www.youtube.com/watch?v=Hq4EWaigUDI&t=1s**](https://www.youtube.com/watch?v=Hq4EWaigUDI&t=1s)