

# CSE423:VIRTUALIZATION AND CLOUD COMPUTING

L:3 T:0 P:0 Credits:3

**Course Outcomes:** Through this course students should be able to

CO1 :: illustrate the main aspects, essential technologies, mechanisms of Virtualization technology and key concepts of distributed computing.

CO2 :: identify the appropriate technologies, algorithms and approaches for the provisioning of various resources and implementation of cloud computing

CO3 :: understand the major concerns associated with cloud computing such as cloud architecture, service oriented architecture, capacity planning and service level agreement.

CO4 :: estimate the economical cloud solution and issues by considering suitable cost estimation strategy and laws of cloudonomics

CO5 :: enumerate the fundamental aspects of cloud security, risks related to cloud and demonstrate the use of cloud database.

CO6 :: understand the emerging technologies of cloud computing, authentic cloud platform and how it bring changes in the traditional cloud computing models

## Unit I

**Virtualization techniques** : virtualization technology, overview of x86 virtualization, types of virtualization, concept of VLAN , SLAN and VSAN and benefits, concept of VLAN ,VSAN and benefits

**Overview of Distributed computing** : Parallel and Distributed Systems, Parallel Computing, Parallel Computer Architecture, Distributed Systems, Differences and Similarities among Different Types of Computing

## Unit II

**Introduction to Cloud Computing** : Cloud Computing in a Nutshell, Roots of Cloud Computing., Layers and Types of Clouds., Desired Features of a Cloud, Cloud Infrastructure Management., Examining the Characteristics of Cloud Computing, cloud types

**Migrating into a Cloud** : Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud VM Migration, Cloud Middleware and Best Practices, Concept and Need of Cloud Middleware, QoS Issues in Cloud, Data Migration and Streaming in Cloud, Interoperability

## Unit III

**Understanding cloud architecture** : exploring the cloud computing stack, Workload distribution architecture, Capacity planning, Cloud bursting architecture, Disk provisioning architecture, Dynamic failure detection and recovery architecture, Cloud Computing Architecture, Service Level Agreements, Service Oriented Architecture

## Unit IV

**Cloud Computing Technologies and Applications** : Cloud Content Delivery Network Services, Multi-CDN, Features of Meta CDN, Mobile Cloud Computing, InterCloud Issues, Machine Learning in the Cloud, Benefits and Limitations of Machine Learning in the Cloud, Types of Cloud Based Machine Learning Services, AIaaS, GPUaaS, Key benefits and applications of using GaaS, Parameters for Selecting Cloud GPU Providers

**Cloud Economics** : Developing an Economic Strategy, Exploring the Costs, Laws of cloudonomics, Cost estimation, Economics of Cloud

## Unit V

**Cloud security** : Cloud Security Fundamentals, Cloud Risk, Cloud Risk Division, Policy and Organizational Risks, Technical Risks, Legal Risks, Other Risks, Cloud Computing Security Architecture, VM Security Challenges

**Cloud Database** : Operational Model for Cloud Database, Types of Cloud Database, Cloud File System, Distributed File System Basics, Concept of GFS and HDFS, Comparison of Features

## Unit VI

**Container technology** : Introduction to containers, container architectures, Docker containers, Kubernetes

**Cloud Platforms in Industry** : Amazon Web services, Google App Engine, Microsoft Azure, Case studies

**Other aspects of Cloud** : Edge Computing, Fog Computing, IIoT, Green Cloud computing practices, Complexity in Cloud-native systems

**Text Books:**

1. CLOUD COMPUTING (FUNDAMENTALS,INDUSTRY APPROACH AND TRENDS by RISHABH SHARMA, WILEY

**References:**

1. MASTERING CLOUD COMPUTING by RAJKUMAR BUYYA,CHRISTIAN VECCHIOLA ,S.THAMARAI SELVI, MCGRAW HILL EDUCATION

2. CLOUD COMPUTING: A HANDS-ON APPROACH by ARSHDEEP BAHGA, VIJAY MADISETTI, UNIVERSITIES PRESS PVT. LTD