

Course Title: Cloud Computing

Course No: CSC-458

Credit Hours: 3

Full Marks: 60+20+20

Pass Marks: 24+8+8

Nature of the course: Theory (3Hrs.) + Lab (3Hrs.)

Course synopsis: This course gives an introduction to cloud computing and its techniques. The topics covered include; introduction to cloud computing, cloud architecture, cloud service models, Service Oriented Architectures, security in cloud computing, disaster management in clouds.

Goal: Cloud computing has become a great solution for providing a flexible, on-demand, and dynamically scalable computing infrastructure for many applications. Cloud computing also presents a significant technology trends, and it is already obvious that it is reshaping information technology processes and the IT marketplace. Thus objective of this course is to introduce the aspects of cloud computing issues.

Course Contents:

Unit1: Introduction

10 Hrs.

Defining the Cloud, The Emergence of Cloud Computing, Cloud-Based Services, Grid Computing or Cloud Computing, Components of Cloud Computing, Cloud Computing Deployment Models: Public, Private, Hybrid, Benefits of Using a Cloud Model, Legal Issues in Using Cloud Models, Characteristics of Cloud Computing, Evolution of Cloud Computing, Challenges for the Cloud computing, Grid Computing, Distributed Computing in Grid and Cloud

Unit2: Cloud Service Models

15 Hrs.

Communication-as-a-Service (CaaS): Advantages of CaaS, Fully Integrated, Enterprise-Class Unified Communications, Infrastructure-as-a-Service (IaaS): Modern On-Demand Computing, Amazon's Elastic Cloud, Amazon EC2 Service Characteristics, Monitoring-as-a-Service (MaaS), Protection Against Internal and External Threats, Platform-as-a-Service (PaaS): The Traditional On-Premises Model, The New Cloud Model, Key Characteristics of PaaS, Software-as-a-Service (SaaS): SaaS Implementation Issues, Key Characteristics of SaaS, Benefits of the SaaS Model, Jericho Cloud Cube Model

Unit 3: Building Cloud Networks

9 Hrs.

Evolution from Managed service providers (MSP) to Cloud Computing, Single Purpose architectures to multi-purpose architectures, Data center virtualization, Cloud data center, Service Oriented Architectures (SOA), Combining and SOA, Characterizing SOA, Open Source Software in data centers

Unit 4 : Security in Cloud Computing

11 Hrs.

Cloud Security Challenges, Software-as-a-Service Security: Security management, Risk Management, Security Monitoring and Incident Response, Security Architecture Design, Vulnerability Assessment, Data Privacy and Security, Application Security, Virtual Machine Security, disaster Recovery, Disasters in cloud, Disaster management

Laboratory work: As a part of lab work, the students are highly encouraged

- To simulate the concept of virtualization using virtualization programs/systems.
- To understand and practice examples of cloud services and applications.
- To understand and implement distributed storage and security issues in cloud computing.

Reference Books:

1. *Cloud Computing: Implementation Management and Security*, John W. Rittinghouse and James F. Ransome (Recommended for Unit 1, 2, 3 4)
2. *Cloud Application architecture*, George Reese (Recommended for Unit 4)
3. *Cloud Computing for Dummies*, Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper(Recommended for Unit 3)
4. *Handbook of cloud computing*, Borko Furht, Armando Escalante (Recommended for Unit 1)
5. *Cloud Computing and SOA Convergence in your Enterprise*, a step by step guide, David S. Linthicum (Recommended for Unit 1, 2, 3)