



CLUSTER UNIVERSITY OF SRINAGAR

Syllabus for PG Information Technology

Batch 2023

Course Code:
Credits: 4 (L- 3, T- 0, P-1)
Contact Hrs: 75 (Theory: 45, Tutorial: 30)

3rd SEMESTER: M.Sc. (IT) Batch 2023
Title: Cloud Computing [DSE 3] **Max. Marks: 100**
Theory External: 60; Min Marks: 24
Theory Internal (Continuous Assessment): 15 Marks,
Min Marks: 06
Practical Experimental Basis= 15, Min. Marks: 06
Practical Experimental (Continuous assessment) =10,
Min. Marks: 04

Objectives:

The objective of this course is to provide an in-depth and comprehensive knowledge of Cloud Computing issues, technologies, applications, implementations, Concepts of Virtualization, and Cloud delivery and Deployment Models and to examine cloud security issues, challenges, and practices.

Learning Outcomes:

After successful completion of the course, the students should be able to:

1. Articulate the main concepts, key technologies, strengths, limitations of cloud computing, and the possible applications for state-of-the-art cloud computing.
2. Identify the architecture and infrastructure of cloud computing, including cloud delivery and deployment models.
3. Analyse various cloud programming models and apply them to solve problems on the cloud.
4. Identify and analyse security challenges and risks in cloud computing.
5. Compare cloud platforms (Amazon Web Services, Google App Engine, Microsoft Azure) based on their architecture, services, and cost models.

Syllabus

Unit I

Introduction to Cloud Computing: Definition, Evolution, Characteristics, Benefits, and Challenges of Cloud Computing; Cloud Service Models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS); Cloud Deployment Models: Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud: Cloud reference model, Cloud service requirements, Comparing cloud providers with traditional IT service provider.

Unit II

Cloud Computing Architectures: Service-Oriented Architecture (SOA), Microservices Architecture, Multi-Tenant Architecture, Virtualized Data Centre (VDC) architecture. **Cloud**





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Virtualization Technology: Introduction to Virtualization, Types of Virtualization & its benefits, Implementation levels of Virtualization Structure/Tools and Mechanisms, Hypervisor: VMware, KVM, Xen; Virtualization of CPU, Memory, I/O Devices, Server, Storage, Network, and of data-center, High Availability (HA)/Disaster Recovery (DR) using Virtualization, Moving VMs. **Cloud Programming:** Parallel and Distributed Programming paradigms; Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo; Parallel computing: The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce.

Unit III

Cloud Security: Security Overview, Cloud Security Challenges and Risks, Software-as-a Service Security, Cloud Computing Security Architecture: Architectural Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Identity and Presence, Identity Management and Access Control, Autonomic Security Establishing Trusted Cloud.

Cloud Platforms and Applications: Comparing Amazon web services, Google AppEngine, Microsoft Azure from the perspective of architecture (Compute, Storage Communication) services and cost models; Cloud Applications and Future Trends.

Lab Course (Practical Work)

(1 Credit:30 hrs)

SETTING UP CLOUD: How to build private cloud using open source tools, understanding various cloud plugins, Setting up your cloud environment; Auto-provisioning, Custom images, Integrating tools like Nagios, and Integration of Public and Private cloud.

Recommended Books

1. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper (Wiley India Edition)
2. Enterprise Cloud Computing by Gautam Shroff, Cambridge
3. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India
4. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014
5. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej

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M. Goscinski, Wiley, 2011.

6. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011

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