Semester II	Subject Code: MSE21905	Lectures: 60

Learning Outcomes:

After successfully completing the course students will be able to

- articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for cloud computing
- identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
- explain the core issues of cloud computing such as security, privacy, and interoperability.
- identify problems, and explain, analyze, and evaluate various cloud computing solutions.
- provide the appropriate cloud computing solutions and recommendations according to the applications used.
- To create and deploy a cloud .

MSc Computer Science Syllabus First Year (2019-2024)
Cloud Computing

Semester II	Subject Code: MSE21905	Lectures: 60
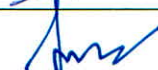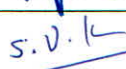
Objectives:

- The syllabus aims in equipping students with,
- the principles and paradigm of Cloud Computing
- role of Virtualization Technologies
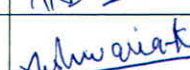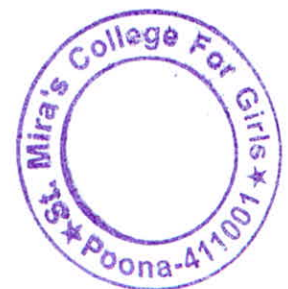- the ability to design and deploy Cloud Infrastructure
- cloud security issues and solutions.

Unit 1: Introduction	10

Ch 1. Introduction to Cloud Computing

- Overview
- Roots of Cloud Computing, Layers and Types of Cloud
- Desired Features of a Cloud
- Benefits and Disadvantages of Cloud Computing,
- Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks.
- Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, ServiceTechnology..

Unit 2: Architecture, Services and Applications	10

Ch 2. Architecture, Services and Applications
- Exploring the Cloud Computing Stack
- Connecting to the Cloud,
- Infrastructure as a Service, Platform as a Service ,Saas Vs. Paas,

BOS Members

Dr. Seema Chowhan (Subject Expert)	
Prof. Lonare (Subject Expert)	
Prof. Shilpa Khadilkar (Subject Expert)	S.V.K
Ms. Anuradha Bhamre (Industry Expert)	
Ms. Aishwarya Kaliyiluvla(Alumni)	
Prof. Ashwini Kulkarni (Chairman and Internal Faculty)	
Prof. Alka Kalhapure (Internal Faculty)	

- Using PaaS Application Frameworks, Software as a Service Cloud Deployment Models, Public vs Private Cloud
- Cloud Solutions, Cloud ecosystem, Service management,
- Computing on demand, Identity as a Service,
- Compliance as a Service
- Future of cloud computing and Emerging trends

Unit 3 :Abstraction and Virtualization	08

Ch 3. Abstraction and Virtualization
- Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications,
- Virtual Machines Provisioning and Manageability
- Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action,
- Provisioning in the Cloud Context Virtualization of CPU, Memory , I/O Devices, Virtual Clusters and Resource management,
- Virtualization for Data Center Automation

Unit 3 : Programming, Environments and Applications	10

Ch 4. Programming, Environments and Applications
- Features of Cloud and Grid platforms,
- Programming Support of Google App Engine,
- Programming on Amazon AWS and Microsoft Azure,
- Emerging Cloud Software Environments,
- Understanding Core Open Stack Ecosystem.
- Applications: Moving application to cloud.
- Microsoft Cloud Services
- Google Cloud Applications, Amazon Cloud Services,
- Cloud Applications (Social Networking, E-mail, Office Services, Google Apps, Customer Relationship Management).
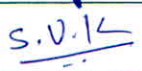
BOS Members   2

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Ms. Aishwarya Kaliyiluvla(Alumni)	Aishwarya K
Prof. Ashwini Kulkarni (Chairman and Internal Faculty)	
Prof. Alka Kalhapure (Internal Faculty)	Alka

Unit 4 : Security in cloud	10

Ch 5. Security In The Cloud

- Security Overview – Cloud Security Challenges and Risks
- Software-as-a-Service Security
- Security Governance – Risk Management – Security Monitoring
- Security Architecture Design
- Data Security
- Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.
- Autonomic Security Storage Area Networks,
- Disaster Recovery in Clouds.

References books

1. CRC Press, Brian J.S. Chee and Curtis Franklin *Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center,* ISBN 9788131222560.

2. McGraw Hill, Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi *Mastering Cloud Computing: Foundations and Applications Programming ,* ISBN: 978 1259029950,1259029956

4. Morgan Kaufmann Publishers,edition 2012.Kai Hwang, Geoffrey C Fox, Jack G Dongarra *Distributed and Cloud Computing, From Parallel Processing to the Internet of Things*

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