



# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India  
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
ITC702	Cloud Computing	3	-	-	3	-	-	3
		Examination Scheme						
		ISE		MSE		ESE		
		10	30	100 (60%Weightage)				

<b>Pre-requisite Course Codes</b>	TEITC502 (Operating Systems)	
After successful completion of the course, student will be able to:		
<b>Course Outcomes</b>	CO1	Differentiate between different cloud computing techniques.
	CO2	Compare various cloud computing providers/software.
	CO3	Handle open source cloud implementation and administration.
	CO4	Understand risks involved in cloud computing.

Module No.	Topics	Ref.	Hrs.
1	<b>Introduction to Cloud Computing</b> Introduction– Component of CC, Comparing CC with Virtualization, Grids, Utility Computing, client-server model, P to P Computing, Impact of CC on Business, Key Drivers for Cloud Computing, Cloud computing Service delivery model. Cloud Types – Private, Public and Hybrid, when to avoid public cloud, Cloud API	3	02
2	<b>Virtualization</b> Introduction & benefit of Virtualization, Implementation Levels of Virtualization, VMM Design Requirements and Providers, Virtualization at OS level, Middleware support for Virtualization, Virtualization structure/tools and mechanisms: Hypervisor and Xen Architecture, Binary Translation with full Virtualization, Para Virtualization with Compiler Support. Virtualization of CPU, Memory and I/O Devices, Hardware support for Virtualization in Intel x86 processor, CPU Virtualization, Memory Virtualization and I/O Virtualization, Virtualization in Multi core processors.	1, 3	04
3	<b>Cloud computing Services</b> XaaS, IaaS, PaaS- Leveraging PaaS for Productivity Languages for PaaS- DBaaS(Database as a services) – SaaS (Software as a service) – Comparison of various cloud computing providers/ Softwares.	1,3	04



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4	<b>Cloud Computing and Business Value</b> Key Business Drivers for CC- Cloud computing and out sourcing – Types of Scalability – Security issues in Cloud Computing- time to Market Benefits- Distribution over Internet – Three levels of Business value from Cloud computing.	1,3	04
5	<b>Open Source Cloud Implementation and Administration</b> Eucalyptus and Open Stack Architecture Features –Components – Various mode of operations – Installation and configuration process of both open source – Cloud Administration and Management Task – Creating User Interface (Web Interface ) of Private cloud.	1,3	04
6	<b>Cloud Deployment Techniques</b> Factors for Successful Cloud Deployment – Network Requirements – Potential Problem areas in a cloud Network and their Mitigation – Cloud Network Topologies – Automation and Self-service feature in a cloud –cloud performance.	1,3	04
7	<b>Security:</b> Security for Virtualization Platform – Host security for SaaS, 4 PaaS and IaaS – Data Security – Data Security Concerns – Data Confidentiality and Encryption – Data Availability – Data Integrity – Cloud Storage Gateways – Cloud Firewall	1,3	04
8	<b>Architecture for Cloud Application:</b> Cloud Application requirements- Architecture for traditional Vs Cloud Applications- Multi-ties Application Architecture SOA for Cloud applications – Resource oriented SOA – Method –oriented SOA and Event Driven SOA – Parallelization within Cloud Applications – Leveraging In memory Operations for Cloud Application	1,3	04
9	<b>Cloud Programming:</b> Programming Support for Google Apps engine: GFS, Big 4 Tables, Google's NO SQL System, Chubby, Google Distributed Lock Service, Programming Support for Amazon EC2: Amazon S3, EBS and Simple DB etc.	1,4	04
10	<b>Adoption and Use of Cloud</b> Adoption of Public cloud by SMBs- Public Cloud Adoption phase for SMBs- Vendor liability and Management Adoption process of Public clouds by Enterprises – Managed Private clouds Migrating Application to the cloud – Impact of Shared Resources and Multi-Tenancy on cloud Applications – Phases during Migration an Application to An IaaS Cloud	2,3	04
11	<b>Risks of Cloud Computing and Related Costs</b> Risk Assessment and Management – Risk of Vendor Lock-in – Risk of Loss of control over IT services- Risk of Poor Provisioning – Risk of Multi-tenant environment – Risk failure of cloud provider – SLA risk –security, malware and Internet Attacks – Risk with Application Licensing.	1,3	02



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<b>12</b>	<b>AAA Administration for Clouds</b> AAA model – SSO for Clouds – Authentication management and Authorization management in clouds – Accounting for Resource utilization.	1,3	02
<b>13</b>	<b>Security as a service</b> What can security as service offer- Benefits for Security as a service Issues with Security as a Service- Identity Management as a Service	1,3	02
<b>14</b>	<b>Mobile Cloud Computing</b> Introduction, Definition, Architecture, Benefits, challenges in mobile and at cloud shield	1	02
Total hours of instructions			48

## References:

1. Rajkumar Buya," *Cloud computing principles and Paradigms*", Wiley.
2. Kai Hwang," *Distributed and cloud computing*", MK Publications.
3. Cloud computing, black book, Dreamtech publication.
4. Using Google Apps engine O'reilly Publication