GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering
Level: UG
Subject Code : 3164806
Subject Name : Cloud Computing

w. e. f. Academic Year:	A.Y. 2024-25
Semester:	6
Category of the Course:	Open Elective

Type of course:	Elective
Prerequisite:	Fundamentals of Distributed Computing
Rationale:	This course aims students to understand the hardware, software concepts and architecture of cloud computing. Students realize the importance of Cloud Virtualization, Abstractions and Enabling Technologies

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
1	Evaluate strength and limitation of cloud computing	E
2	Analyse different cloud deploy and services architecture model	AP
3	Understand various enterprise application in cloud computing	U
4	Apply the virtualization concepts	Ap

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	0	3	70	30	00	00	100

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Course Content:

Unit No.	Content	No. of Hours
1.	**Introduction**: Cloud Computing, Layers and Types of Clouds, Cloud Infrastructure Management, Challenges and Applications. Virtualization: Virtualization of Computing, Storage and Resources. Cloud Services: Introduction to Cloud Services IaaS, PaaS and SaaS	04
2.	**Software as a Service (SaaS):** Evolution of SaaS, Challenges of SaaS Paradigm, SaaS Integration Services, SaaS Integration of Products and Platforms. Infrastructure As a Services (IaaS): Introduction, Background & Related Work, Platform As a service (PaaS): Integration of Private and Public Cloud, Technologies and Tools for Cloud Computing, Resource Provisioning services	06
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	10
4	**Cloud Infrastructure and Cloud Resource Management:** Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources. Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards	07
5.	**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 computing, Secure Execution Environments and Communications, , Identity Management and Access control Identity management, Access control, Autonomic Security Storage Area Networks, Disaster Recovery in Clouds.	07

6.	**Cloud Middleware:** OpenStack, Eucalyptus, Windows Azure, CloudSim, EyeOs, Aneka, Google App Engine	05
7.	**Cloud Based Case-Studies:** Overview of Cloud services, Designing Solutions for the Cloud, Implement & Integrate Solutions, Emerging Markets and the Cloud, Tools for Building Private Cloud: IaaS using Eucalyptus, PaaS on IaaS - AppScale	05

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
25	**30**	**10**	**05**	**–**	**–**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Rajkumar Buyya, James Broberg, Andrzej M Goscinski, Cloud Computing: Principles and Paradigms, Wiley publication.
2. Toby Velte, Anthony Velte, Cloud Computing: A Practical Approach, McGraw-Hill Osborne Media.
3. George Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly Publication.
4. John Rhoton, Cloud Computing Explained: Implementation Handbook for Enterprises, Recursive Press.

(b) List of Open Source Software/learning website:

1. technolamp.blogspot.com
2. www.intelligentedu.com/
3. NITTR Instructional Resources Videos
4. https://www.mygreatlearning.com/academy/learn-for-free/courses/cloud-computing-service-models
5. www.intelligentedu.com/
6. NITTR Instructional Resources Videos
7. https://www.techtarget.com/searchcloudcomputing/definition/cloud-computing
8. https://www.geeksforgeeks.org/virtualization-cloud-computing-types/
9. https://cloud.google.com/learn/what-is-cloud-computing#section-3
10. https://www.javatpoint.com/virtualization-in-cloud-computing
11. https://www.tutorialspoint.com/cloud_computing/cloud_computing_virtualization.htm

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