CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: **BACHELOR OF TECHNOLOGY (Electronics and Communication)**

Semester: **VIII**

Course Code: **202060802**

Course Title: **Cloud Computing**

Course Group: Professional Elective Course

Course Objectives: The main objective of this course is to introduce concepts related to the analysis, design and implementation of computation and storage clouds. Further, they study various Application of Cloud and develop understanding of various Service of Cloud and security concept in cloud. With the completion of the course, the student will be in position: to understand the necessary theoretical background for computing and storage clouds environments.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	2	4	50/18	50/17	25/9	25/9	150/53

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction of Cloud:** 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.	02
2	**Cloud Services:** 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, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, VM Provisioning and Migration in Action. Platform As a service (PaaS): Integration of Private and Public Cloud, Technologies and Tools for Cloud Computing, Resource Provisioning services	08

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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.	**08**
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.	**08**
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	**08**
6	**Cloud Middleware:** OpenStack, Eucalyptus, Windows Azure, CloudSim, EyeOs, Aneka, Google App Engine.	**06**
		45

List of Practicals / Tutorials:

1	Introduction of Cloud Computing and Linux Commands.
2	To study EC2 Service and create an instance using AWS.
3	To Study Cloud watch service using SNS for Notification.
4	To study S3 bucket service and interrogation with EC2.
5	To study migration of AWS using snapshot.
6	To study load balancing and Autoscaling of server using AWS.
7	To study Cloud front and Cloud formation in AWS.
8	To study IAM service for Authorization of user.
9	To study RDS data base and various plan for data retrieval.
10	To study VPN network and understand how to create private VPN network.
11.	**Complex Lab Problem:** To install and host WordPress website on cloud.

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Reference 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

Supplementary learning Material:	
1	NPTEL and Coursera Video lectures.
2	AWS Documentation.

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
15	**20**	**25**	**15**	**15**	**10**	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Compare the strengths and limitations of cloud computing	**20**
CO-2	Identify the architecture, infrastructure and delivery models of cloud computing	**30**
CO-3	Apply suitable virtualization concept.	**25**
CO-4	Choose the appropriate cloud player, Programming models and approach	**25**

Curriculum Revision:	
Version:	2.0
Drafted on (Month-Year):	June -2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025

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