FACULTY OF COMPUTER APPLICATIONS

Programme	BCA Honors		Branch/Spec.	Computer Applications	
Semester	V		Version	1.0.0.0	
Effective from Academic Year	2026-2027		Effective for the batch Admitted in	June 2024	
Subject Code	U35B4FCC	Subject Name	FUNDAMENTAL OF CLOUD COMPUTING		

Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	-	-	-	4	Theory	50	50	100
Hours	4	-	-	-	4	Practical	-	-	-

Objective:

To provide students with in-depth theoretical knowledge of cloud architecture and design principles, focusing on building scalable, secure, and cost-efficient cloud solutions using leading platforms like AWS, Google Cloud, and Azure. The syllabus aims to develop skills for designing cloud infrastructures aligned with modern industry standards and best practices.

Pre-requisites:

Need to know about Basic understanding of computer systems, networking, and web technologies.

Course Outcomes:

Name of CO	Description
CO1	Understand fundamental cloud concepts, service models, and deployment architectures.
CO2	Identify virtualization technologies and their role in cloud infrastructure.
CO3	Analyze cloud architecture components and service-oriented design principles.
CO4	Evaluate cloud security challenges, solutions, and privacy protection strategies.
CO5	Understand cloud storage types, data management, and distributed storage

	solutions.
CO6	Explore emerging trends, cloud standards, and future directions in cloud computing.

Mapping of CO and PO												
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	0	2	0	0	1	2	2
CO2	3	2	2	2	2	0	2	0	0	1	2	2
CO3	3	3	3	3	3	0	2	2	0	1	2	3
CO4	3	3	2	2	2	3	2	0	0	3	2	2
CO5	3	3	2	2	3	0	2	0	0	1	2	2
CO6	3	3	3	2	3	0	3	3	2	2	2	3

Content:

Unit		Hrs
1	**Introduction to Cloud Computing** Cloud Computing Overview: Definition, Evolution, and Characteristics; Comparison: Traditional IT vs. Cloud Computing; Types of Cloud Services: IaaS, PaaS, SaaS; Cloud Deployment Models: Public, Private, Hybrid, Community Cloud; Benefits and Challenges of Cloud Computing; Use Cases: Real-world Cloud Adoption; Cloud Computing vs. Grid Computing vs. Utility Computing; Basic Cloud Architecture and Components	10
2	**Virtualization in Cloud Computing** Virtualization: Concept, Types (Hardware, OS, Server, Storage, Network); Hypervisors: Type 1 and Type 2; Virtual Machines (VM) and Containers (Docker, Kubernetes Introduction); Resource Virtualization and Provisioning; Virtualization Benefits and Challenges; VM Migration and Load Balancing Basics; Virtualization vs. Cloud Computing	10
3	**Cloud Architecture, Services, and Models** Cloud Architecture Framework; Service-Oriented Architecture (SOA) and Cloud; Multi-Tenancy in Cloud Computing; Elasticity and Scalability in Cloud Environments; Resource Pooling and On-Demand Services; Advanced Service Models: FaaS, CaaS, DaaS; Microservices in Cloud Computing; Application Design for Cloud	10
4	**Cloud Security and Privacy** Cloud Security Concepts: CIA Triad (Confidentiality, Integrity,	10

	Availability); Security Threats in Cloud (Data Breach, Account Hijacking, DDoS); Security Management in Cloud: Identity & Access Management (IAM), Encryption; Cloud Security Standards: ISO 27001, NIST; Privacy in Cloud: Data Protection Laws (GDPR, HIPAA overview); Virtualization Security Issues; Disaster Recovery and Business Continuity in Cloud	
5	**Cloud Storage and Data Management** Cloud Storage Overview: Types (Block, File, Object Storage); Cloud Storage Providers (Amazon S3, Google Cloud Storage); Data Backup, Replication, and Recovery in Cloud; Big Data and Cloud Storage Integration; Data Consistency and Availability in Cloud; Distributed File Systems (HDFS Basics); Content Delivery Networks (CDN) in Cloud	10
6	**Cloud Trends, Standards, and Future Scope** Cloud Standards and Organizations (IEEE, NIST); Emerging Cloud Trends: Edge Computing, Serverless Computing, AI in Cloud; Green Cloud Computing and Energy Efficiency; Mobile Cloud Computing; Cloud Migration Strategies; Cloud Service Providers: AWS, Azure, Google Cloud - Basic Overview; Case Studies on Cloud Implementations (Netflix, Dropbox, etc.); Future of Cloud Computing: Quantum Computing, Industry 4.0 Integration	10

Practical Content:
NA

Text Books:	
1	**Rajkumar Buyya, James Broberg, Andrzej Goscinski.** Cloud Computing: Principles and Paradigms, Wiley, 1st ed., 2011.

Reference Books:	
1	**Thomas Erl, Ricardo Puttini, Zaigham Mahmood.** Cloud Computing: Concepts, Technology & Architecture, Pearson Education, 1st ed., 2013.
2	**Anthony T. Velte, Toby J. Velte, Robert Elsenpeter.** Cloud Computing: A Practical Approach, McGraw-Hill, 1st ed., 2010.
3	**Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi.** Mastering Cloud Computing: Foundations and Applications Programming, Morgan Kaufmann, 1st ed., 2013.

Web References / MOOC / Certification Course	
1	https://digitalcloud.training/free-aws-certification-training/
2	https://www.coursera.org/professional-certificates/aws-cloud-solutions-architect
3	https://www.coursera.org/specializations/gcp-professional-architect-course
4	https://cloud.google.com/learn/training
5	https://dhoto.lecturer.pens.ac.id/lecture_notes/internet_of_things/ CLOUD%20COMPUTING%20Principles%20and%20Paradigms.pdf

Question Paper Scheme:
End Semester Examination Duration: (2 Hours Theory Examination) **Note for Examiner: -** Q-1 Any Five out of Seven (25 Marks)

Q-2 Any Two out of Three (06 Marks)
Q-3 Mandatory question (05 Marks)
Q-4 Any Two out of Three (08 Marks)
Q-5 Any Two out of Three (06 Marks)

The question paper must comprehensively address all Course Outcomes (COs), align Taxonomy levels, and ensure complete syllabus coverage.