



Subject: Cloud Networking and Infrastructure Management- BCACT10402

Type of course: Major Core

Prerequisite: Basic understanding of computer networking concepts, operating systems, and fundamental cloud computing principles

Rationale:

Cloud networking and infrastructure management are essential components of modern IT environments, enabling organizations to efficiently manage scalable, secure, and high-performance systems over the cloud. This course provides students with a comprehensive understanding of cloud networking concepts such as virtual networks, IP addressing, load balancing, and network security, along with infrastructure management practices including virtualization, containerization, monitoring, and automation. The course also emphasizes real-world applications, cost optimization, and performance management, preparing students for roles such as cloud administrator, cloud network engineer, and infrastructure specialist.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	SEE		CEE		
			Theory		Practical	MSE	LWA	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

- 3 Credits * 25 Marks = 75 Marks (each credit carries 25 Marks) Theory
- 1 Credits * 25 Marks = 25 Marks (each credit carries 25 Marks) Practical
- SEE 100 Marks will be converted in to 50 Marks
- CCE 100 Marks will be converted in to 50 Marks
- It is compulsory to pass in each individual component.



Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Cloud Networking Fundamentals & IP Management Introduction to Cloud Networking, Traditional Networking vs Cloud Networking Virtual Networks (VPC / VNet Basics), IP Addressing in Cloud(Public IP vs Private IP, Static vs Dynamic IP), Subnetting in Cloud (Subnet Creation & Segmentation, CIDR Basics, DNS in Cloud (Domain Name System Basics, Managed DNS Services), Network Routing Basics(Route Tables, Internet Gateway Concept).	9	20%
2	Cloud Connectivity & Traffic Management Types of Cloud Connectivity(Internet-basedAccess,Private Connectivity), Hybrid Connectivity(VPN (Site-to-Site VPN), Client VPN (Remote Access), Dedicated Connection (Intro level), Load Balancing in Cloud (Types of Load Balancers (Layer 4 & Layer 7 – basic), Traffic Distribution Methods) , Traffic Management (DNS-based Routing, Latency-based Routing), Content Delivery Network(Caching Concept, Static Content Delivery).	9	20%
3	Cloud Infrastructure & Compute Management Cloud Compute Services(Virtual Machines , Instance Types (General, Compute Optimized – simple idea)), Storage Services(Block Storage,Object Storage, File Storage), Resource Provisioning(Manual vs Automated Provisioning), Introduction to Containers(Container Concept, Docker Basic Workflow),Serverless Basics(Function as a Service).	9	20%
4	Monitoring, Security & Cost Management Cloud Monitoring Basics(Metrics and Logs, Alerts and Notifications),Infrastructure Monitoring Tools(Basic idea of dashboards), Cloud Security in Networking(Firewall Basics, Security Groups, Network Access Control), Identity & Access Basics (IAM), Cost Management in Cloud(Pay-as-you-go Model, Cost Optimization Techniques, Resource Usage Tracking).	9	20%
5	Infrastructure Automation & Real-World Applications Introduction to Infrastructure Automation(Concept of Automation, Benefits in Cloud), Basic Infrastructure as Code(Templates Concept), Backup & Disaster Recovery(Backup Types, Recovery Strategies), High Availability Basics(Multi-Zone Concept, Failover Basics)	9	20%



Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Cloud Networking Fundamentals Students will design a basic cloud network diagram using tools like draw.io or PowerPoint. They will create a virtual network (VPC/VNet), define public and private subnets using CIDR, assign IP ranges, and include components like Internet Gateway, Route Table, and DNS flow. submit it on the GMIU Web Portal.	10
2	Cloud Connectivity & Traffic Management Students will simulate cloud connectivity setup by creating a diagram showing Internet access, VPN (site-to-site or client VPN), and basic load balancing. They will also demonstrate how traffic is distributed using simple examples and routing methods. submit it on the GMIU Web Portal.	10
3	Multi-Tier Application Architecture Students will design a simple three-tier architecture including presentation layer, application layer, and database layer in a cloud environment and submit it on the GMIU Web Portal.	10
4	Cloud API and Service Integration Students will explain how cloud services communicate using APIs and how applications integrate multiple cloud services. Submit it on the GMIU Web Portal.	10
5	Containerization using Docker Students will create and run a Docker container on their system. They will install Docker, pull a sample image (such as Ubuntu), and run the container using basic Docker commands. Students will also verify the running container, stop it, and remove it and make the video screen recording or Screenshot of the Project and upload it on GMIU Portal.	10
Total		50

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	25%	45%	15%	15%	0	0

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.



Course Outcome:

After learning the course the students should be able to:	
CO1	Understand fundamental concepts of cloud networking, IP addressing, subnetting, DNS services, and network routing mechanisms in cloud environments.
CO2	Explain cloud connectivity models, hybrid networking solutions, load balancing techniques, and traffic management methods used in cloud infrastructure.
CO3	Apply knowledge of cloud infrastructure services including virtual machines, storage solutions, resource provisioning methods, containers, and serverless computing concepts.
CO4	Analyze cloud monitoring, security mechanisms, identity and access management, and cost management strategies for efficient cloud operations.
CO5	Understand infrastructure automation concepts, infrastructure as code, backup and disaster recovery strategies, and high availability design for real-world cloud applications.

List of Practical

Sr. No	Description	Unit No	Hrs
1	Create a free account on any cloud platform (AWS / Azure / GCP). Explore the dashboard and list at least 5 cloud services available.	1	2
2	Create a virtual network using AWS Tier or any simulator (like Cisco Packet Tracer / draw.io). Define: Network range (CIDR) At least 2 subnets (public & private).	1	2
3	Create a virtual machine (free tier) and identify: Public IP Private IP Restart the instance and observe whether IP changes (static/dynamic).	1	2
4	Study and configure Domain Name System (DNS) services and understand domain name resolution in cloud platforms.	1	4
5	Demonstrate cloud connectivity concepts by enabling internet access and studying remote connectivity methods.	2	4
6	Deploy and configure a virtual machine instance and access it remotely using cloud platform tools.	2	4
7	Create and manage cloud storage services and perform data upload, storage, and retrieval operations.	3	2
8	Study container concepts and understand basic serverless computing functionality in cloud environments.	4	2
9	Monitor cloud resources and configure basic security settings including firewall rules and access control mechanisms.	5	4
10	Study backup, disaster recovery, automation concepts, and high availability mechanisms in cloud infrastructure.	5	4
Total			30



Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher, in addition to conventional teaching method by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

- [1] Cloud Computing: Concepts, Technology & Architecture - Thomas Erl, Ricardo Puttini, Zaigham Mahmood
- [2] Cloud Computing: A Hands-On Approach - Arshdeep Bahga, Vijay Madisetti
- [3] Cloud Computing for Dummies - Judith Hurwitz, Daniel Kirsch
- [4] Cloud Computing: Principles and Paradigms - Rajkumar Buyya, James Broberg, Andrzej Goscinski

