



Ganpat University
॥ विद्यया समाजोत्कर्षः ॥

Faculty of
Computer Applications



Programme		B.Sc. Honours (CA & IT)				Branch	Computer Applications		
Semester		VI				Version	1.0.0.0		
Effective from Academic Year			2026-27			Effective for the batch Admitted in		June 2024	
Subject code		U16A2CE		Subject Name		Cloud Engineering			
Teaching scheme						Examination scheme(Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CCE	SEE	Total
	L	TU	P	TW					
Credit	2	-	2	-	4	Theory	50	50	100
Hours	2	-	4	-	6				

Objective:

Learn to deploy, manage, and monitor Google Cloud resources efficiently. Gain hands-on skills in cloud security, networking, storage, and end-to-end solution implementation.

Pre-requisites:

- Basic understanding of cloud computing concepts, including service and deployment models.
- Fundamental programming or scripting experience , basic knowledge of database and SQL ,Computer Network
- Familiarity with at least one cloud platform is recommended

Learning Outcome:

Name of CO	Description
CO1	Demonstrate cloud infrastructure and virtual networking administration
CO2	Implement IAM, storage, database, and monitoring services in Google Cloud
CO3	Deploy load balancing, autoscaling, and infrastructure automation solutions
CO4	Manage containerized applications using Kubernetes and GKE
CO5	Implement Terraform automation, monitoring, and cloud operations management

Mapping of CO and PO:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	3	1	2	1	2	1	1	1
CO2	3	2	2	2	3	1	2	2	2	1	1	1
CO3	3	2	3	2	3	3	2	2	3	2	2	1
CO4	3	2	3	2	3	2	2	3	3	2	2	2
CO5	3	2	3	2	3	2	2	3	3	2	2	3

Content:

Unit	Content	Hrs.
1	Cloud Infrastructure Administration and Virtual Networking Google Cloud infrastructure organization, resource hierarchy, Cloud Console and Cloud Shell operations, project and resource management, virtual networks, subnetworks, IP addresses, routes, firewall rules, virtual machine deployment, VM customization, Compute Engine administration and infrastructure deployment	06
2	Storage, IAM and Cloud Resource Operations Identity and Access Management (IAM), IAM roles and permissions, Cloud Storage services, storage classes, relational and NoSQL databases, Cloud SQL, Firestore, Bigtable, quotas and billing management, customer-supplied encryption keys, operational resource management and cloud resource monitoring	06
3	Scaling, Load Balancing and Infrastructure Automation Interconnecting networks, advanced networking concepts, network connectivity, load balancing concepts, HTTP and network load balancing, autoscaling, infrastructure automation, managed	06

	services, deployment automation and operational scaling strategies	
4	Kubernetes and Container Orchestration Containers and container lifecycle, container orchestration, Kubernetes fundamentals, Kubernetes architecture, Kubernetes operations, Google Kubernetes Engine (GKE), cluster deployment and management, workload deployment, scaling and management of containerized applications	06
5	Terraform Automation and Cloud Operations Engineering Infrastructure as Code (IaC) principles, Terraform fundamentals, Terraform configurations, Terraform modules, Terraform state management, infrastructure provisioning, deployment automation, cloud operations management, monitoring, logging, troubleshooting and operational optimization	06
Practical Content:		
List of practical specified by subject teacher based on above mentioned topics		
Reference Books:		
1	Erl, T., & Monroy, E. B. (2023). Cloud Computing: Concepts, Technology, Security, and Architecture (2nd ed.). Pearson	
2	Koziorowska, A., & Marusiak, W. (2023). Google Cloud Associate Cloud Engineer Certification and Implementation Guide. Packt Publishing.	
3	Praveen Kukreti (2023). Google Cloud Platform All-In-One Guide: Get Familiar with a Portfolio of Cloud-based Services in GCP. BPB Publications.	
Web Reference:		
1	https://cloud.google.com/docs	
2	https://cloud.google.com/learn/certification/cloud-engineer	
3	https://www.skills.google/	
MOOC/Certificate Course:		
1	https://www.coursera.org/professional-certificates/cloud-engineering-gcp	
2	https://cloud.google.com/learn/certification/cloud-engineer	
3	https://skills.google.com/learn/certificates/cloud-computing-foundations	
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 with Bloom's Taxonomy levels, and ensure complete syllabus coverage.	