Intermediate: Cloud Platform (Google Cloud Platform - GCP)

Description:

This course provides an in-depth introduction to **Google Cloud Platform (GCP)** for developers and system administrators seeking to build, deploy, and manage cloud-native applications. You'll work with essential GCP services such as **Compute Engine**, **Cloud Storage**, **Cloud SQL**, **Firestore**, **Cloud Functions**, and **Cloud Run**. The curriculum emphasizes infrastructure design, automation, security, and cost-effective cloud operations. Practical labs and real-world examples ensure that learners acquire both conceptual knowledge and technical expertise.

Learning Outcomes:

By completing this course, students will:

- Understand the architecture and core services of Google Cloud.
- Deploy and manage virtual machines using Compute Engine.
- Use serverless computing via Cloud Functions and Cloud Run.
- Store and retrieve data using Cloud Storage and Firestore.
- Design and connect secure networks with VPC.
- Automate deployments using GCP Deployment Manager.
- Monitor applications using Cloud Monitoring and Logging.
- Optimize for scalability, security, and cost-effectiveness.

Course Duration:

- **Total Duration:** 6 Weeks
- **Sessions per Week:** 2
- **Session Length:** 1.5 hours
- **Total Instructional Hours:** 18 hours

6-Week Learning Plan

Week 1: Introduction to GCP & IAM

Topics:

- GCP global infrastructure overview
- Projects, Billing, and Resource Hierarchy
- IAM (users, roles, service accounts)
- GCP Console, Cloud Shell, and SDK

Hands-on:

- Set up a GCP project using Free Tier
- Create service accounts and configure IAM roles

Week 2: Compute & Serverless Architecture

Topics:

- Compute Engine: VM creation, SSH access, snapshots
- Cloud Functions: event-driven serverless computing
- Cloud Run: container-based serverless deployment

- When to use Compute vs Functions vs Run

Hands-on:

- Deploy a VM using Compute Engine
- Create and deploy a Cloud Function
- Deploy a containerized app using Cloud Run

Week 3: Storage & Databases

Topics:

- Cloud Storage buckets: permissions, lifecycle, versioning
- Cloud SQL (MySQL/PostgreSQL)
- Firestore (NoSQL database for real-time apps)
- Data backup and export

Hands-on:

- Upload files to Cloud Storage
- Set up and connect to a Cloud SQL instance
- Use Firestore for CRUD operations in a web app

Week 4: Networking & Security

Topics:

- VPC networks, subnets, firewalls, and routing
- Cloud NAT, VPN, and hybrid connectivity basics
- Identity-Aware Proxy (IAP) and private access
- Managing firewall rules and securing endpoints

Hands-on:

- Design and configure a secure VPC
- Restrict access using firewall rules and IAP

Week 5: Monitoring, Logging & Automation

Topics:

- Cloud Monitoring: metrics, dashboards, alerts
- Cloud Logging and diagnostics
- Introduction to Deployment Manager (IaC)
- Writing and deploying configuration templates

Hands-on:

- Create alerts using Monitoring
- Automate infrastructure with Deployment Manager

Week 6: Final Project & Optimization

Topics:

- Cost estimation tools and budget alerts
- Best practices for cost and performance optimization
- Infrastructure review and security checklist
- Final review and deployment walkthrough

Final Project:

- Deploy a serverless full-stack web app using Cloud Run, Firestore, and Cloud Storage
- Implement monitoring, IAM roles, and budgeting
- Use Deployment Manager to define infrastructure

Final Deliverables:

- A live deployed GCP project (URL + dashboard access)
- Infrastructure configuration via Deployment Manager
- GitHub repository with source code and configs
- Cost breakdown & optimization report
- Certificate of Completion by CodeHills

Course Fees (Pakistan):

- **Standard Fee:** PKR 15,000