

CloudTech Pvt Ltd

Google Cloud DevOps Training Course Outline

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Module 1: Introduction to DevOps & Google Cloud

- DevOps principles & lifecycle (Plan → Code → Build → Test → Deploy → Monitor)
 - Google Cloud global infrastructure (Regions, Zones, Edge POPs)
 - Resource hierarchy (Organizations, Folders, Projects)
 - Google Cloud Console, gcloud CLI, Cloud Shell
 - Shared responsibility model in GCP
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Module 2: Source Control & Collaboration

- **Cloud Source Repositories** (Git hosting)
 - Git branching & collaboration best practices
 - Integrating with GitHub & GitLab
 - Work tracking & issue management with **Google Cloud + Jira integrations**
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Module 3: Continuous Integration (CI)

- **Cloud Build** (serverless CI/CD platform)
 - Build configuration with `cloudbuild.yaml`
 - Running automated tests in builds
 - Caching & build artifacts with GCS (Google Cloud Storage)
 - Container builds & vulnerability scanning with **Artifact Registry**
 - Event-driven builds with Pub/Sub & GitHub triggers
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Module 4: Continuous Delivery / Deployment (CD)

- **Google Cloud Deploy** basics (progressive delivery)
 - Deployment strategies:
 - Rolling updates
 - Blue/Green deployments
 - Canary releases
 - CD to **GKE (Kubernetes)**, **Cloud Run**, **App Engine**, **Compute Engine**
 - Rollback automation
 - Multi-environment promotion (dev → staging → prod)
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Module 5: Infrastructure as Code (IaC)

- **Google Cloud Deployment Manager** (YAML templates)

- **Terraform on GCP** (commonly used)
 - **Pulumi** (optional multi-cloud IaC)
 - Policy enforcement with **Config Validator & Policy Controller (OPA/Gatekeeper)**
 - Secret management with **Secret Manager**
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Module 6: Containers & Orchestration

- Docker basics on GCP
 - **Artifact Registry** for container images
 - **Google Kubernetes Engine (GKE)** deep dive
 - **Cloud Run** (serverless containers)
 - GKE Autopilot vs Standard
 - GitOps with Config Sync / Anthos Config Management
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Module 7: Serverless DevOps

- **Cloud Functions** deployment with CI/CD
 - Cloud Run for serverless containers
 - Event-driven workflows with **Cloud Pub/Sub & Workflows**
 - Automating serverless deployments with Cloud Build & Cloud Deploy
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Module 8: Monitoring, Logging & Observability

- **Cloud Monitoring** (metrics, SLOs, dashboards, alerts)
 - **Cloud Logging** (centralized logs, Log-based metrics)
 - **Cloud Trace** (latency analysis)
 - **Cloud Profiler** (performance profiling)
 - **Cloud Error Reporting** (crash & exception tracking)
 - Integrating monitoring into CI/CD pipelines
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Module 9: Security & Compliance in DevOps

- Identity & Access Management (IAM) best practices
 - Service Accounts & workload identity federation
 - Secret management with **Secret Manager**
 - Binary Authorization (image signing for GKE)
 - Vulnerability scanning in Artifact Registry
 - Compliance automation with **Security Command Center**
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Module 10: Scaling & High Availability

- Auto-scaling in GKE, Compute Engine, and Cloud Run
- Load balancing with **Cloud Load Balancing** (global, regional)
- Multi-zone & multi-region deployments
- Traffic management & failover strategies

- CDN with **Cloud CDN**
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Module 11: Cost Optimization in DevOps

- Cost visibility with **Billing reports & Cost Explorer**
 - Quotas & budgets in Google Cloud
 - Optimizing Cloud Build & storage costs
 - Using Preemptible VMs / Spot VMs for workloads
 - Recommendations with **Recommender API**
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Module 12: Advanced Topics & Real-World Projects

- Multi-project DevOps setup with **Google Cloud Resource Hierarchy**
 - Hybrid & multi-cloud DevOps with **Anthos**
 - GitOps with Anthos Config Management + ArgoCD
 - Service Mesh with **Anthos Service Mesh (Istio)**
 - Case Study: End-to-End GCP DevOps pipeline project
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SampleProject

Objective: Build a full CI/CD pipeline on Google Cloud that:

- Uses **Cloud Source Repositories** or **GitHub** for code
- Runs CI with **Cloud Build**

- Deploys to **GKE / Cloud Run / App Engine** via **Cloud Deploy**
- Provisions infrastructure using **Terraform or Deployment Manager**
- Implements monitoring with **Cloud Monitoring, Logging, and Trace**
- Enforces security with **IAM, Binary Authorization, and Secret Manager**