



Google Cloud Fundamentals for Researchers

Course description

In this course, researchers will learn about the fundamental concepts, services, and best practices for leveraging Google Cloud Platform (GCP) to accelerate their scientific endeavors. You will gain a solid understanding of how GCP's robust infrastructure, scalable compute, and advanced data analytics and machine learning tools can provide solutions to common research challenges, from data storage and processing to collaborative analysis and model deployment. Additionally, you will acquire practical insights into provisioning resources, managing costs, and ensuring the security and compliance of research data within the Google Cloud ecosystem. By the end of the course, you will be equipped to plan and implement cloud-based strategies for your research projects.

- Course level: Fundamental
- Duration: 2 days

Activities

This course includes presentations, hands-on labs, live demonstrations, and group exercises focused on real-world research scenarios.

Course objectives

In this course, you will learn to:

- Summarize core Google Cloud Platform concepts and their relevance to research workflows
- Discuss appropriate GCP services for common research needs such as data storage, compute, and analytics
- Describe how to provision and manage essential GCP resources effectively for scientific projects
- Recognize strategies for securing research data and ensuring compliance with relevant regulations
- Explain methods for cost optimization and resource monitoring within Google Cloud
- Plan and initiate a cloud-based research project on Google Cloud, considering collaboration and reproducibility

Intended audience

This course is intended for researchers and supporting staff with limited prior experience with Google Cloud:

- PhD students and post-doctoral researchers
- Principal Investigators (PIs) and lab managers
- Data scientists and research engineers
- Bioinformatics specialists
- IT support and research computing staff
- Anyone looking to leverage cloud computing for scientific research

Prerequisites

We recommend that attendees of this course have:

- Basic understanding of computing concepts and data management
- Familiarity with the command line interface (CLI) is beneficial but not strictly required

Course outline

Module 1: Introducing Google Cloud for Research

- What is cloud computing? Benefits for scientific research
- Overview of Google Cloud Platform (GCP) and its global infrastructure
- Key GCP services relevant to researchers (compute, storage, networking, AI/ML)

- Navigating the GCP Console and using fundamental tools (Cloud Shell, gcloud CLI)
- Demo: Exploring the GCP Console and creating a basic project

Module 2: Managing Research Data in Google Cloud

- Google Cloud Storage: object storage for large datasets (buckets, object lifecycle management)
- Cloud Filestore: managed Network Attached Storage (NAS) for file-based workloads
- BigQuery: petabyte-scale data warehouse for analytical research
- Data ingestion and transfer strategies (gsutil, Storage Transfer Service, Transfer Appliance)
- Hands-on Lab: Storing and organizing research data in Cloud Storage and performing basic operations

Module 3: Compute Resources for Research Workloads

- Compute Engine: Virtual Machines (VMs) for flexible compute (instance types, GPUs, custom images)
- Managed Instance Groups: scaling compute resources for high-throughput tasks
- Google Kubernetes Engine (GKE): container orchestration for reproducible environments
- Serverless compute options: Cloud Functions for event-driven tasks, Cloud Run for containerized applications
- Hands-on Lab: Launching a Compute Engine instance for a specific research task and connecting to it

Module 4: Networking and Security for Research Projects

- Virtual Private Cloud (VPC): defining your research network (subnets, firewall rules)
- Identity and Access Management (IAM): managing permissions for users and service accounts
- Data encryption in Google Cloud: at rest and in transit considerations
- Security best practices for sensitive research data (HIPAA, GDPR, etc.)
- Monitoring and logging: Cloud Monitoring and Cloud Logging for operational insights
- Hands-on Lab: Configuring IAM roles for a collaborative research project and setting up basic firewall rules

Module 5: Scalable Data Analytics and Machine Learning

- BigQuery for large-scale data analysis: querying, schema design, public datasets
- AI Platform Notebooks (Vertex AI Workbench): managed Jupyter notebooks for collaborative ML development
- Vertex AI: managed platform for training, deploying, and managing ML models
- Pre-trained AI APIs: Vision AI, Natural Language AI, Speech-to-Text for quick integration
- Demo: Performing a complex query on a public genomics dataset in BigQuery

Module 6: Collaboration and Reproducibility in Research

- GCP Project organization: resource hierarchy for team collaboration
- Sharing resources and data securely with collaborators using IAM
- Cloud Source Repositories: managed Git for version control of code and analyses
- Infrastructure as Code (IaC) with Deployment Manager or Terraform (introductory concepts)
- Best practices for creating reproducible research environments on GCP
- Hands-on Lab: Setting up a shared GCP project for a research team and granting appropriate access

Module 7: Cost Management and Resource Optimization

- Understanding GCP billing: project-level and service-level costs
- Setting budgets and alerts: preventing unexpected expenditures
- Strategies for cost optimization: right-sizing instances, committed use discounts, auto-scaling
- Resource utilization monitoring with Cloud Monitoring
- Data lifecycle management for cost savings in Cloud Storage
- Hands-on Lab: Setting up a budget for a research project and exploring cost management dashboards

Module 8: Course Wrap-up and Next Steps

- Recap of key Google Cloud concepts for researchers
- Additional resources for continued learning (documentation, Google Cloud for Research programs)
- Exploring Google Cloud certifications relevant to researchers
- Q&A and discussion on applying GCP to attendees' specific research challenges

Your course overview ends here.
But your cloud journey doesn't!

Unlock advanced training and certification pathways with **CloudThat**.



About CloudThat

Established in 2012, CloudThat is an award-winning company and the first in India to offer cloud training and consulting services for individuals and enterprises worldwide. Recently, it won Google Cloud's New Training Partner of the Year Award for 2025, becoming the first company in the world in 2025 to hold awards from all three major cloud giants: AWS, Microsoft, and Google. CloudThat notably won consecutive AWS Training Partner of the Year (APJ) awards in 2023 and 2024 and the Microsoft Training Services Partner of the Year Award in 2024, bringing its total award count to an impressive 12 awards in the last 8 years.

CloudThat specializes in Cloud Migration, Data Platforms, DevOps, IoT, and cutting-edge technologies like Gen AI & AI/ML. As a Microsoft Solutions Partner, AWS Premier Tier Training Partner, Google Cloud Platform Partner, and collaborator with leading organizations like HPE, Oracle, Nvidia and Databricks, CloudThat has trained over 850,000 professionals across 600+ cloud certifications, empowering students and professionals worldwide to advance their skills and careers.

To know more about our cloud certification training, email at sales@cloudthat.com or call us at [+91-8880002200](tel:+91-8880002200) or [+1-8555588830](tel:+1-8555588830) for those from outside India.