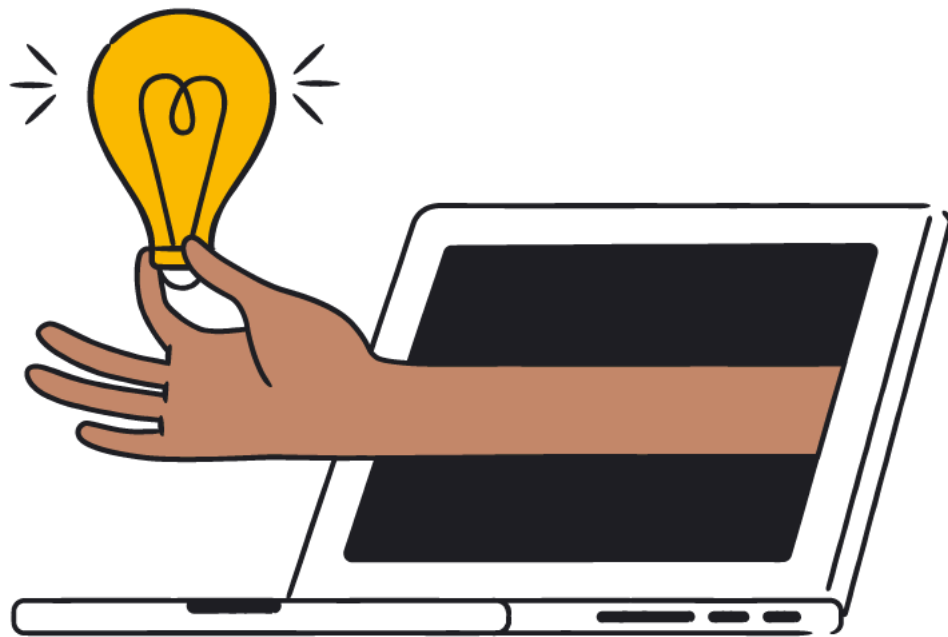# Google Cloud

# Educator Guide

This guide provides an overview of the Google Cloud Data Analytics Certificate and directions for integrating the program into your curriculum.

# 01 | About the Program

This learning path consists of a curated collection of on-demand courses that provide authentic, interactive experiences using Google Cloud technologies essential to roles in data analytics. A cloud data analyst uses cloud computing to prepare, process, and analyze data to support business decisions. Cloud data analysts play a critical role in translating complex data for stakeholders, enabling data-driven decision making that directly impacts business outcomes.

🕐 **101 hours time to complete**
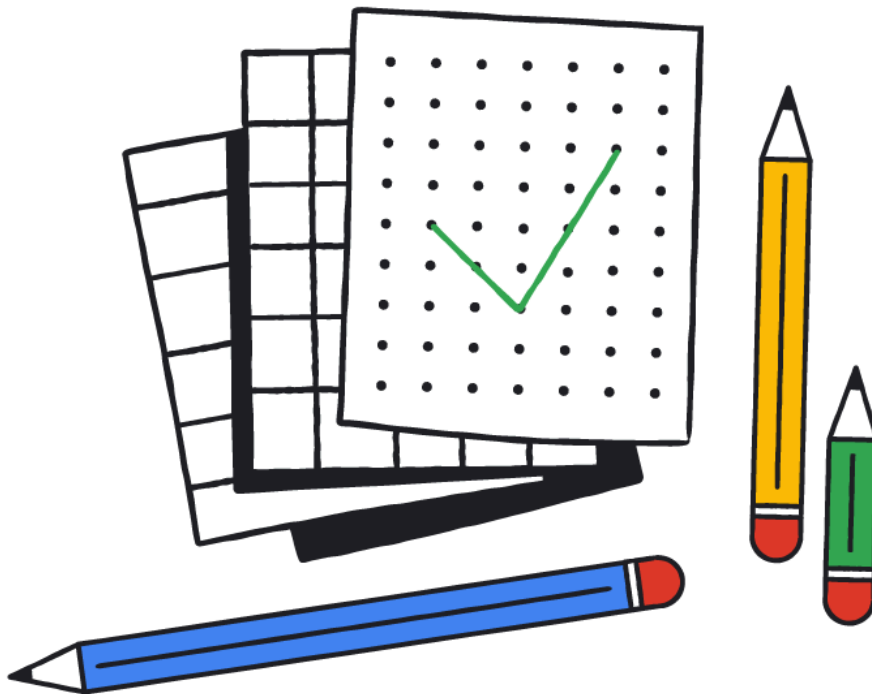
# 02 | Certificate Overview and Pacing

Learners will complete five courses. Each course contains multiple weeks of material and several modules. Below is an overview of the course sequencing, including estimates of how much time each may take based on the quantity and difficulty of the content. However, note that learners may progress at different speeds. Click the course name to jump directly to the course description within this document.

| | | |
|---|---|---|
| [Introduction to Data Analytics in Google Cloud](#) | 🕐 | 18 hours |
| [Data Management and Storage in the Cloud](#) | 🕐 | 26 hours |
| [Data Transformation in the Cloud](#) | 🕐 | 18 hours |
| [The Power of Storytelling: How to Visualize Data in the Cloud](#) | 🕐 | 27 hours |
| [Put It All Together: Prepare for a Cloud Data Analyst Job](#) | 🕐 | 12 hours |

# 03 | Certificate Target Skills

- Describe how data analytics functions within a cloud environment

- Identify key roles that interact with data within an organization

- Explain how data is structured and organized in the cloud

- Describe different types of data collection and storage frameworks

- Use common cloud data tools to analyze data

- Apply data transformation techniques to solve a business problem

- Explain how developers use data analytics tools to address complex business needs

- Identify and use cloud-native data visualization tools to access, explore, and analyze data

- Communicate insights in a clear and impactful way using effective data storytelling methods

- Articulate cloud data analytics skills and project outcomes through job-search materials

- Create work examples to share with prospective employers

- Showcase cloud data analytics skills, knowledge, and technical expertise during interviews

# 04 | Getting started

**Equipment needed**

All learners must have a computer with reliable internet to access course content. Reliable internet access is necessary to complete interactive course activities and labs. Headphones are also a good option for a noisy environment.

**Educator expectations**

The Google Cloud Data Analytics Certificate supplements existing training. Learners can watch videos, access readings, and work on assessments on their own while educators provide opportunities for group discussion to assist with course completion.

An educator does not need to complete the program, but should be familiar with course content and concepts to support learners with certificate completion. Find additional guidance in the Educator Best Practices section.

**Learner expectations**

Learners enrolling in the certificate program are typically interested in learning more about data analytics and visualization or pursuing data analysis or data engineering as a potential career pathway. This is a self-directed program and learners may move at different speeds. The recommendations in this guide will help you keep learners on track.

# 05 | Types of Course Assets

### Videos

Videos led by Google instructors present each course's lecture content. Videos are typically 3–5 minutes in length and consist of instructional content, career support, interview prep, and inspirational personal stories from Google specialists.

### Labs, Activities, and Readings

Recommended activities, labs, and / or readings build on the topics discussed in the videos and cover related concepts.

# 06 | Course Overview

## Course 1

**Introduction to Data Analytics in Google Cloud**
18 hours | 04 modules | 01 lab | 01 activity

---

Summary

This course introduces cloud data analysis practices and the Google Cloud Data Analytics certificate program. Learners will explore the field of cloud computing and how cloud computing has impacted data analysis workflows. They will also examine the roles and responsibilities of a cloud data analyst as it relates to each stage of the data lifecycle from capture to destruction and be introduced to Google Cloud-based tools and how they are used to effectively structure, present, and report data. Learners will also begin to prepare for the job application and interview process by practicing interview techniques.

Objectives

- Explain how this certificate program will help prepare learners for a career in cloud data analytics.

- Define data analytics as it applies to cloud computing.

- Describe the common roles and responsibilities of an entry-level cloud data analyst.

- Identify common tools used by entry-level cloud data analysts.

- Explain the stages of the data lifecycle and how it applies to cloud data analytics.

- Describe key roles that interact with data within an organization.

# Course 2

**Data Management and Storage in the Cloud**
26 hours | 04 modules | 06 labs

---

## Summary

This course explores how data is stored and organized in the cloud. Learners will be introduced to the key components of data organization including schemas and modern data architectures. They will also apply the tools and techniques used to trace, access, and store data. Learners will continue to practice job application and interview preparation techniques.

## Objectives

- Identify flat and nested data types in BigQuery and their use cases.

- Identify the key components that make up modern data architectures including data warehouses and lakehouses.

- Define normalized and denormalized data.

- Differentiate how data is stored in SQL and NoSQL databases.

- Differentiate between batch and streaming data sources, formats, and frequency.

- Access data lineage information using Dataplex.

- Write effective queries using SQL.

- Explain how partitioning can improve query performance and reduce costs.

- Define key components of data governance.

- Explain the role of Dataproc clusters and notebooks in data analysis.

# Course 3

## Data Transformation in the Cloud

18 hours | 03 modules | 03 labs | 01 activity

### Summary

This course examines the process of transforming data into a usable format for storage and analysis in the cloud. Learners will follow the data journey, from collection to insights, to learn how to apply transformation strategies to data sets to address business needs using Structured Query Language (SQL).  Learners will also explore transforming high volumes of data with a data pipeline and continue to practice job application and interview preparation techniques.

### Objectives

- Describe the steps of the data journey and how they are used to drive data-driven decision making.
- Identify the role of data transformation in preparing data for analysis.
- Explain how data discovery and collection can identify data that can be used to meet a specific business need.
- Explain the benefits and challenges of transforming data on the cloud.
- Use cloud tools and methods to transform data.
- Identify the key components of a data pipeline and how they are used to address business needs.
- Explain the difference between extract, transform, and load (ETL) and extract, load, and transform (ELT)
- Identify the differences between batch and streaming data ingestion and the role of data mapping in defining data source relationships.

- Explore data profiling and cleansing for data error identification and repair.

- Identify the key components of a data transformation plan.

## Course 4

**The Power of Storytelling: How to Visualize Data in the Cloud**
27 hours | 05 modules | 03 labs | 02 activities

**Summary**

This course focuses on developing skills in the five key stages of visualizing data in the cloud: storytelling, planning, exploring data, building visualizations, and sharing data with others. Learners will also gain experience using user interface and user experience (UI)/UX) skills to wireframe impactful, cloud-native visualizations and work with cloud-native data visualization tools to explore datasets, create reports, and build dashboards that drive decisions and foster collaboration. Learners continue to practice interview techniques as they prepare to apply for jobs.

**Objectives**

- Expand on the importance of data visualization and storytelling in cloud data analysis.

- Describe the key components of a cloud visualization workflow and data visualization techniques.

- Define basic UI/UX principles and their application in data visualization design.

- Understand and translate stakeholder needs into effective data visualizations through wireframes.

- Explain the role and advantages of cloud-native data visualization tools to access, explore, and analyze data.

- Identify how the relationships between dimensions and measures are used to model data.

- Create effective visualizations and explain how visualizations are used and shared by data consumers to collaborate and foster decision-making.

- Explain how version control is used to record changes and manage files.

- Describe how LookML is used to build semantic data models.

- Describe how derived tables can be used to increase capability and flexibility of analysis.

# Course 5

**Put It All Together: Prepare for a Cloud Data Analyst Job**
12 hours | 03 modules | 02 labs | 03 activities

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**Summary**

This course builds upon the foundational knowledge and skills from courses 1-4 by applying them to a capstone project covering the entire cloud data analysis process. By the end of the course, learners will have a portfolio of practical work examples to showcase their skills to potential employers. Learners will also update resumes and practice interview techniques to help prepare them for applying and interviewing for jobs.

**Objectives**

- Assess feasibility of a business request and the ability to translate into actionable data analysis.

- Collect raw data from various sources.

- Process and store data on the cloud using BigQuery.

- Analyze and visualize data using Looker Enterprise.

- Activate and share actionable insights with stakeholders.

- Develop career resources for a role in cloud data analytics.

- Prepare and practice interview techniques for a cloud data career.

# 07 | Curriculum Lesson Planning

## Course 1

**Introduction to Data Analytics in Google Cloud**
18 hours total course time

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### Week 1                                          07 hours total week time

| Module 1 | Introduction to cloud computing |
|---|---|
| **04 hours 00 minutes** | This module begins with an introduction to the Google Cloud Data Analytics certificate. The learner will investigate the question: 'What is cloud data analytics?' spanning its history through its current defining characteristics. The module also addresses the program's resources, plans, and expectations to assist learners in successfully completing the certificate.<br><br>● 11 videos<br>● 9 readings<br>● 3 quizzes |

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| Module 2 | Data analytics in the cloud |
|---|---|
| **03 hours 00 minutes** | This module explores the difference between traditional and cloud data analytics and the impact of the cloud on data analytic workflows. Learners will also examine various billing models in cloud computing and the Google Cloud Architecture Framework.<br><br>● 10 videos<br>● 5 readings<br>● 4 quizzes |

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## Discussion Questions

1. How can cloud computing help an organization achieve its data analytics goals? [Course 1, Module 1, Videos: Cloud computing infrastructure & Benefits of cloud computing]

2. How does BigQuery make data analysis more accessible and scalable compared to traditional solutions? [Course 1, Module 1, Video: Introduction to BigQuery]

3. When choosing a cloud deployment model, what key factors are important to prioritize? Are these factors the same for every organization? [Course 1, Module 2, Videos: Steps for effective cloud migration & Explore cloud deployment models]

---

## Week 2                                          11 hours total week time

**Module 3**          **The data lifecycle**

**04 hours 40 minutes**

This module introduces the stages of the data lifecycle from data capture to destruction. Learners will explore the benefits of lifecycle management, including data protection and improved data governance. Learners will also define the data team's role in the data lifecycle and how lifecycle management relates to cost control and data governance.

- 11 videos
- 1 activity
- 8 readings
- 5 quizzes

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**Module 4**          **The role of a cloud data analyst**

**06 hours 14 minutes**

This module describes the role of a data analyst in an organization and strategies for handling stakeholder's data requests. Learners will also be introduced to the key differences and similarities between data analytics on-premises and data analytics in the cloud.

- 15 videos
- 1 lab
- 12 readings
- 5 quizzes

## Discussion Questions

1. What is a data management plan and what are the benefits of implementing one? [Course 1, Module 3, Video: Introduction to data management]

2. What are the stages of the data lifecycle and how do different roles in data analysis work within each stage? [Course 1, Module 3, Videos: Stages of the data lifecycle, The data lifecycle in action, & Common roles on a data team]

3. What are some key responsibilities and skills of a data analyst? [Course 1, Module 4, Videos: all]

# Course 2

## Data Management and Storage in the Cloud
26 hours total course time

## Week 3                                                                    13 hours total week time

| Module 1 | Introduction to data management and storage in the cloud |
|---|---|
| 08 hours 36 minutes | This module explains how data is managed and stored in the cloud. Learners will learn about flat and nested data types, data storage options, and methods of processing data. |

  ● 12 videos
  ● 2 labs
  ● 14 readings
  ● 4 quizzes

| Module 2 | Key components of data organization |
|---|---|
| 03 hours 55 minutes | This module examines how data is organized in the cloud. Learners will acquire a foundation in data governance and accessibility and broaden |

their understanding of modern data architectures by exploring a data lakehouse.

- 10 videos
- 1 lab
- 5 readings
- 5 quizzes

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## Discussion Questions

1. Compare common cloud-based data storage options. Why might an organization choose one option over the other? [Course 2, Module 1, Video: Structured, unstructured, and semi-structured data]

2. Discuss the challenges of data accessibility for an organization. How can these challenges be mitigated? [Course 2, Module 2, Videos: Introduction to data catalogs & Technical and business metadata]

3. Reflect on the current state of data lakehouse architecture. What potential future trends or innovations do you foresee in this field, and how might they impact the way organizations structure and utilize their data? [Course 2, Module 2, Videos: Overview of data lakehouse architecture & Components of data lakehouse architecture]

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## Week 4                                        14 hours total week time

| Module 3 | Steps to find data |
| --- | --- |
| 05 hours 00 minutes | This module details the steps to find and share data on the cloud. Learners will explore tracing, accessing, storing, and sharing data with Google's cloud data storage and management tools and practice identifying data sources using cloud tools. |

- 7 videos
- 1 lab
- 8 readings
- 4 quizzes

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| Module 4 | Techniques to access data |
|----------|---------------------------|
| **08 hours 38 minutes** | This module goes deeper into the techniques used to access data on the cloud. Learners will examine how schemas are defined and how SQL is used to retrieve data. Learners will also discover various ways to use cloud-based tools to access, analyze, and manage data, including using partitioned tables. |

- 13 videos
- 2 labs
- 14 readings
- 6 quizzes

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## Discussion Questions

1. What is data discovery, curation, and unification? Which cloud-based tools can you use to perform these functions? [Course 2, Module 3, Videos: Data discovery, curation, and unification & Benefits of using Dataplex]

2. What is machine learning and how can it support data analytics? [Course 2, Module 4, Videos: Steps and models for accessing data with machine learning, Introduction to machine learning with Vertex AI and BigQuery, Overview of Google Colab, & Key processes and benefits of Dataproc]

3. What are the benefits of partitioning tables? When might partitioning a table not be the best choice? [Course 2, Module 4, Videos: Essentials of database partitioning, Methods for partitioning tables, & Strategies for querying partitioned tables]

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# Course 3

## Data Transformation in the Cloud

18 hours total course time

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## Week 5                                    12 hours total week time

| Module 1 | Introduction to data transformation in the cloud |
|---|---|
| **05 hours 54 minutes** | This module investigates data preparation and transformation in the cloud. Learners will identify the benefits and challenges of transforming data and follow the data journey to investigate common tools and techniques used to collect, process, and store data. |

- 8 videos
- 1 lab
- 11 readings
- 3 quizzes

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| Module 2 | Handle raw data with data pipelines |
|---|---|
| **06 hours 13 minutes** | This module introduces data pipelines. Learners will follow the stages that data travels through in a data pipeline to prepare raw data for storage and analysis, and examine the methods used in each stage of the process. Learners will also apply their knowledge to build a simple SQL pipeline. |

- 11 videos
- 1 lab
- 9 readings
- 5 quizzes

---

# Discussion Questions

1.  What are the stages of the data journey? Describe what happens in each stage. [Course 3, Module 1, Videos: all]

2.  What is a data pipeline? How does it support the work of a data analyst? [Course 3, Module 2, Video: Data pipelines in the cloud]

3.  Why is data cleaning and profiling an important part of the data transformation process? [Course 3, Module 2, Video: Introduction to profiling and cleaning data]

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## Week 6                                   10 hours total week time

**Module 3**          Cloud data optimization strategies

**05 hours 42 minutes**    This module identifies the key benefits and challenges of implementing a data transformation plan capable of handling the volume and velocity of modern data and optimizing the data for analysis. Learners will also apply common data transformation strategies to a dataset to clean data, generate summary metrics, join data, and create derived data.

- 10 videos
- 3 labs and activities
- 8 readings
- 4 quizzes

Week 6 continues into Course 4, Module 1.

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# Course 4

**The Power of Storytelling: How to Visualize Data in the Cloud**
27 hours total course time

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## Week 6, continued

| Module 1 | Introduction to the power of storytelling: How to visualize data in the cloud |
|---|---|
| **04 hours 04 minutes** | This module provides the tools and strategies to unlock the power of data storytelling to build effective visualizations that clearly communicate data insights. Learners will focus on data visualization planning, UI/UX design principles and accessibility. |

- 11 videos
- 9 readings
- 3 quizzes

---

## Discussion Questions

1. What are some common techniques used to prepare raw data for analysis? Describe why a cloud data analyst may use each technique. [Course 3, Module 3, Videos: Challenges of data transformation, Video Data aggregation can make it easier to extract meaningful insights , & Overview of how joins combine data from different tables]

2. How does data visualization help communicate important data insights? What are some design considerations to take into account? [Course 4, Module 1, Video: Dashboard design for effective communication]

3. What are some design considerations to take into account when building a data visualization? [Course 4, Module 1, Videos: The importance of UX/UI design, Design decisions for data visualizations, & Additional design concepts to consider, Design principles and strategies for dashboards]

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# Week 7                                    12 hours total week time

| Module 2 | Methods for visualization planning and design |
|---|---|
| 06 hours 22 minutes | This module explores the best ways to visualize different data types and the visualization methods that work best for each type of data. Learners will also identify ways to translate stakeholder requests into effective, clear dashboards and reports that will provide actionable insights and context. |

- 9 videos
- 2 activities
- 8 readings
- 5 quizzes

---

| Module 3 | Access, explore, and report on data in the cloud |
|---|---|
| 05 hours 29 minutes | This module examines the role of cloud-native data visualization tools in the data analysis workflow. Learners will discover ways to model  and explore a data set, define dimensions and measures, and apply their knowledge to build a report using a cloud data visualization tool to share data insights. |

- 10 videos
- 1 lab
- 7 readings
- 5 quizzes

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## Discussion Questions

1. As a data analyst, how can you tailor your communication to the diverse needs and preferences of different stakeholders, ensuring a more inclusive and effective collaboration? [Course 4, Module 2, Videos: Introduction to business intelligence dashboards, Benefits of scorecards & SMART questions for stakeholders]

2. What are some of the different data sources you will interact with as a data analyst? How will you access each of these? [Course 4, Module 3, Video: Considerations for connecting to cloud data]

3. What are dimensions and measures and how do they relate to data modeling? [Course 4, Module 3, Videos Dimensions and measures in data models & Basics of modeling data.]

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## Week 8                                                    11 hours total week time

**Module 4**          **Enterprise business analytics**

**05 hours 15 minutes**       This module investigates the needs of enterprise business users when visualizing data including data governance and self-serve analytics. Learners will also gain  experience exploring an enterprise data set and building a dashboard to meet a business need.

- 9 videos
- 1 lab
- 7 readings
- 4 quizzes

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**Module 5**          **Explore the developer environment**

**05 hours 39 minutes**       This module explores the developer environment and introduces LookML, a modeling language used to create semantic data models. Learners will model dimensions and measures using LookML in the developer environment,  explore the use of LookML to improve the user experience, address complex business needs, and optimize performance.

- 11 videos
- 1 lab
- 9 readings
- 5 quizzes

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## Discussion Questions

1. How does data drilling help cloud data analysts delve deeper into their data? [Course 4, Module 4, Videos: Visualization tools for enterprise data exploration & Data drilling up, down, and through]

2. What are some advantages to using a data modeling language like LookML? What are some disadvantages? [Course 4, Module 5, Video: Introduction to data modeling languages]

3. Explain how you can use a derived table to solve complex business problems. [Course 4, Module 5, Video: Derived tables for complex data problems]

---

# Course 5

## Put It All Together: Prepare for a Cloud Data Analyst Job
12 hours total course time

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### Week 9                                                    12 hours total week time

| Module 1 | Introduction: Prepare for a cloud data analyst job |
|---|---|
| 03 hours 57 minutes | This module reviews cloud data-focused career resources designed to effectively navigate the job market. Learners will also get useful tips for polishing their resume and preparing for interviews. |

- 8 videos
- 1 activity
- 6 readings
- 4 quizzes

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| Module 2 | The capstone project |
|---|---|
| 05 hours 57 minutes | This module focuses on the capstone project. Learners will apply their knowledge and skills of cloud data analytics from across all the courses to complete a series of tasks and challenges that follow the entire data journey from collection to activation. |

- 4 videos
- 2 labs
- 1 activity
- 5 readings
- 1 quiz

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## Discussion Questions

1.  What are some of the types of roles available to data analysts? What roles appeal to you? Why? [Course 5, Module 1, Video: The cloud data analytics hiring process]

2.  What is a data analyst portfolio and what should be included in your portfolio? [Course 5, Module 1, Video: Share your project work with a portfolio]

3.  How can you use your capstone project to showcase your skills and support your job search? [Course 5, Module 2, Videos: all]

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## Week 10                                              01 hour 26 minutes total week time

| Module 3 | **Put your Cloud Data Analytics Certificate to work** |
|---|---|
| 02 hour 05 minutes | This module guides learners through completing the final tasks necessary to earn the Google Cloud Data Analyst Certificate badge and prepare for the job search. |

- 3 videos
- 1 activity
- 6 readings

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## Discussion Questions

1.  What are some ways you can explore professional opportunities in data analytics? [Course 5, Module 3, Video: Google Cloud Data Analytics Certificate wrap-up]
2.  Based on your job market research, what key skills and attributes are employers seeking for cloud data analyst roles? How can you align your learning and application strategies with these market demands? [Course 5, Module 3, Video: Google Cloud Data Analytics Certificate wrap-up]

# Appendix

Course Assessments

## Formative assessments

Formative assessments give learners an opportunity to practice skills throughout the course and include ungraded practice quizzes, in-video questions, ungraded activities, and graded activities. Depending on the course and platform, formative assessments may vary.

**Practice quizzes** allow learners to check their understanding of key concepts and provide valuable feedback. While practice quizzes are optional and do not count towards completion of the course, they are strongly recommended to help learners better understand course concepts. There is no time limit or attempt limit on practice quizzes.

**Self-review activities** give learners practice in applying the skills they are learning. Learners will assess their own work by comparing it to an exemplar.

**Instructional labs** are interactive activities that encourage learners to practice specific tasks and help them integrate knowledge they have gained in the course.

## Summative assessments

Summative assessments include graded quizzes and labs that learners need to pass to receive the certificate. Depending on the course and platform, formative assessments may vary.

**Graded quizzes** allow learners to demonstrate their understanding of each of the main learning objectives in a course.

- All graded quizzes are required to complete each course. Learners must score 80% or higher to pass each quiz. Quizzes are automatically graded with real-time results.
- Learners are limited to three graded quiz attempts per 24 hours. Their highest-scoring attempt is saved and counts as their final score for the quiz.

> **Challenge labs** allow learners to demonstrate and practice the skills learned in a course.
>
> - Labs are graded in one of two ways: Pass / fail (checks whether a learner completes the lab or not), and / or tracks activity completion to measure how accurately a learner completes a set of assigned tasks.

## Best Practices and Learner Considerations

Accessibility and connectivity challenges can make learning difficult for anyone. Having some strategies to implement on a regular basis can make learners feel comfortable and focus on course modules:

Discuss with all learners what **accessibility features** are available.

**Encourage learners to share any additional resources** or support needed to progress through the program.

All course videos have **associated text subtitles and transcripts** of the speaker's audio. Learners can turn on the subtitles by clicking the speech bubble icon in the bottom right corner of the screen.

**Consider recording group sessions, with approval from all learners** in attendance, so learners unable to attend can access at their convenience.

Brainstorm with your learners around how they prefer to stay engaged. **Consider polls, chats, virtual white boards, screen shares, and other apps** that allow learners to participate and collaborate.

**Create a proactive communication strategy** to stay ahead of learners' needs so you can check in with learners more frequently than your scheduled office hours.

**Create a sense of community** among learners. Come up with an icebreaker to get the conversations started and **help learners feel comfortable**. Set up a group chat so learners can get to know each other, ask questions, and provide feedback to one another.

Identify and **build various touch points** into your program design where learners can share their career goals, and you can connect them with additional resources.

**Seek feedback**. Ask learners what's working and what isn't.