Introduction to AI and Machine Learning on Google Cloud

Course Duration: 8 Hours **Course code: IAMLGC**

1. Course Overview

This course provides a foundational understanding of Artificial Intelligence (AI) and Machine Learning (ML) using Google Cloud. It introduces core AI/ML concepts, Google Cloud AI services, and practical approaches to building, training, and deploying machine learning models. Learners will explore how to leverage Google Cloud tools like Vertex AI, BigQuery ML, and AutoML to solve real-world business problems.

2. What you'll learn?

By the end of the course, you will be able to:

- Understand fundamental concepts of AI and Machine Learning
- Differentiate between AI, ML, and Deep Learning
- Explore Google Cloud AI and ML services
- Build and train basic ML models using Vertex AI
- Use AutoML for no-code/low-code model development
- Work with datasets using BigQuery ML
- Understand model evaluation and performance metrics
- Deploy ML models on Google Cloud
- Apply AI/ML solutions to real-world use cases

3. Target Audience

- Beginners in AI and Machine Learning
- Data Analysts and Aspiring Data Scientists
- Cloud Engineers and Developers
- Business Analysts and IT Professionals

- Students and Freshers interested in AI DevOps Engineers

4. Pre-Requisites

Before taking this course, you should have:

- Basic understanding of computers and cloud concepts
- Familiarity with any programming language (preferably Python)
- Basic knowledge of statistics (optional but helpful)

5. Course content

Module 1: Course Introduction

- Course objectives and structure
- Overview of AI and ML landscape
- Introduction to Google Cloud Platform (GCP)

Module 2: Fundamentals of AI and Machine Learning

- What is Artificial Intelligence
- What is Machine Learning
- Types of Machine Learning (Supervised, Unsupervised, Reinforcement)
- AI vs ML vs Deep Learning

Module 3: Google Cloud AI & ML Services Overview

- Introduction to Google Cloud AI ecosystem
- Overview of Vertex AI
- AutoML and pre-trained APIs
- Use cases of AI services

Module 4: Introduction to Data for ML

- Importance of data in ML
- Structured vs unstructured data
- Data collection and preprocessing basics

- Data storage options in GCP

Module 5: Working with Vertex AI

- Navigating Vertex AI interface
- Using Vertex AI Workbench
- Creating datasets
- Training simple ML models

Module 6: AutoML for Beginners

- Introduction to AutoML
- Training models without coding
- Evaluating AutoML models
- Use cases and limitations

Module 7: BigQuery ML

- Introduction to BigQuery ML
- Running ML models using SQL
- Training and evaluating models
- Use cases for data analysts

Module 8: Model Evaluation and Improvement

- Performance metrics (accuracy, precision, recall)
- Overfitting and underfitting
- Model tuning basics
- Improving model performance

Module 9: Model Deployment on Google Cloud

- Deploying models using Vertex AI
- Batch vs real-time predictions
- API-based model access

- Version control basics

Module 10: Introduction to AI APIs

- Using pre-trained APIs (Vision, Speech, NLP)
- Integrating APIs into applications
- Real-world implementation examples

Module 11: Responsible AI Basics

- Ethical considerations in AI
- Bias and fairness
- Data privacy and security
- Responsible AI practices

Module 12: Real-World Use Cases

- AI in business applications
- Industry use cases (healthcare, retail, finance)
- Problem-solving with ML

Module 13: Hands-On Labs and Mini Projects

- Building a basic ML model
- Using AutoML for predictions
- Working with datasets in BigQuery
- Deploying a simple model

Module 14: Introduction to MLOps (Basics)

- What is MLOps
- Model lifecycle management
- Introduction to automation in ML workflows
- Module 15: Final Assessment & Capstone Project
- End-to-end ML project

- Model building and deployment
- Evaluation and presentation

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