Foundation of AWS Cloud Computing

Nature of Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 40 Hours

Course Objectives

Recall Cloud Computing Services & Models

- **Infrastructure as a Service (IaaS):** Virtualized computing resources delivered over the internet.

- **Platform as a Service (PaaS):** Platform and tools to develop, test, and deploy applications.

- **Software as a Service (SaaS):** Software delivered over the internet without local installation.

- **Public, Private, Hybrid, and Multi-Cloud Deployments:** Different deployment models catering to various business needs.

Describe Developing on AWS

- **Introduction to AWS Services:** Overview of key AWS services for development.

- **Cloud Development Best Practices:** Guidelines for scalable, reliable, and cost-effective development.

- **AWS Global Infrastructure:** Understanding the distributed nature of AWS data centers.

Write Code that Interacts with Amazon S3 by Using AWS SDKs

- **Amazon S3 Basics:** Storage service for scalable and secure object storage.

- **AWS SDKs:** Using AWS Software Development Kits to interact with S3 programmatically.

- **Object Storage Concepts:** Understanding buckets, objects, and permissions in S3.

Explain the Role of AWS IAM

- **Identity and Access Management:** Controlling access to AWS services and resources.

- **IAM Policies:** Defining permissions for users, groups, and roles.

- **Security Best Practices:** Ensuring secure access to AWS resources.

Write Code that Interacts with Amazon DynamoDB by Using AWS SDKs

- **Amazon DynamoDB:** NoSQL database service for high-performance applications.

- **AWS SDKs for DynamoDB:** Writing code to interact with DynamoDB programmatically.

- **Data Modeling in DynamoDB:** Designing and implementing NoSQL data models.

Create a REST API by Using Amazon API Gateway

- **Amazon API Gateway Basics:** Building and deploying scalable APIs.

- **RESTful API Concepts:** Understanding REST principles.

- **Integration with AWS Services:** Connecting API Gateway to other AWS services.

Create Functions with AWS Lambda by Using AWS SDKs

- **AWS Lambda Basics:** Serverless computing for running code without provisioning servers.

- **Serverless Architecture Patterns:** Building event-driven and scalable solutions.

- **AWS SDKs for Lambda:** Writing code to deploy and manage Lambda functions.

Configure Containers

- **Containerization Concepts:** Understanding containers and Docker.

- **Amazon ECS and Amazon EKS:** Services for deploying and managing containers on AWS.

- **Orchestration:** Configuring container orchestration for scalability.

Explain Caching with Amazon CloudFront and Amazon ElastiCache

- **Amazon CloudFront:** Content Delivery Network (CDN) for low-latency content delivery.

- **Amazon ElastiCache:** In-memory caching for improved application performance.

- **Caching Strategies:** Implementing effective caching for scalability.

Develop Solutions with Amazon SQS and Amazon SNS

- **Amazon SQS (Simple Queue Service):** Managed message queue service for decoupling components.

- **Amazon SNS (Simple Notification Service):** Publish/subscribe messaging for event-driven architectures.

- **Messaging Patterns:** Implementing scalable and reliable messaging solutions.

Describe the Use of AWS Step Functions

- **AWS Step Functions:** Serverless orchestration service for coordinating multiple AWS services.

- **Workflow Design:** Creating workflows to automate and coordinate functions.

- **Event-Driven Workflows:** Building workflows based on events and triggers.

Explain How to Build Secure Applications

- **Security in Application Development:** Incorporating security from the design phase.

- **Data Encryption:** Securing data in transit and at rest.

- **Secure Coding Practices:** Writing code with security in mind.

Identify Best Practices for Deploying Applications

- **Continuous Integration/Continuous Deployment (CI/CD):** Automating the deployment pipeline.

- **Infrastructure as Code (IaC):** Managing infrastructure through code for consistency.

- **Monitoring and Logging:** Implementing tools for tracking and troubleshooting.

Module I
Introduction to Developing on AWS

- Overview of AWS services and global infrastructure

- Basic cloud computing concepts

Module II
Developing Storage Solutions

- Amazon S3 (Simple Storage Service) and Amazon EBS (Elastic Block Store)

- Designing and implementing scalable storage solutions

Module III
Securing Access to Cloud Resources

- AWS Identity and Access Management (IAM)

- Best practices for securing AWS environments

Module IV
Developing Flexible NoSQL Solutions

- NoSQL databases on AWS, with a focus on Amazon DynamoDB

- Designing and implementing NoSQL data models

Module V
Developing REST APIs

- Designing, building, and deploying RESTful APIs

- Using Amazon API Gateway for API management

Module VI
Developing Event-Driven Serverless Solutions

- Serverless computing with AWS Lambda

- Building event-driven, scalable, and cost-effective solutions

Module VII
Introducing Containers and Container Services

- Containerization using Amazon ECS and Amazon EKS

- Deployment and management of containerized applications

Module VIII
Caching Information for Scalability

- Caching strategies for performance improvement

- Implementing caching solutions with Amazon ElastiCache

Module IX
Developing with Messaging Services

- Messaging services on AWS, including Amazon SQS and Amazon SNS

- Building scalable and decoupled applications with messaging

Module X
Defining Workflows to Orchestrate Functions

- Orchestration of functions and services using AWS Step Functions

- Designing and implementing workflows for application coordination

Module XI
Developing Secure Applications on AWS

- Encryption and secure coding practices

- Implementing security measures in different layers of an application

Module XII
Automating Deployment Using CI/CD Pipelines

- Continuous Integration and Continuous Deployment (CI/CD) practices

- Automation of deployment processes using AWS CodePipeline and AWS CodeBuild