

Spokane Community College

COURSE LEARNING OUTCOMES (CLO) AND OUTLINE

Course Title: AWS Cloud Architecting

Prefix and Course Number: CIS 247

Version Date: 1/14/22

Course Learning Outcomes:

By the end of this course, a student should be able to:

1. Make architectural decisions based on AWS architectural principles and best practices
2. Use AWS services to make your infrastructure scalable, reliable, and highly available
3. Use AWS managed services to enable greater flexibility and resiliency in an infrastructure
4. Indicate how to increase the performance efficiency and reduce costs of infrastructures built on AWS
5. Use the AWS Well-Architected Framework to improve architectures that use AWS solutions

Course Outline

- I. Introducing Cloud Architecting
 - a. Define cloud architecture
 - b. Describe how to design and evaluate architectures using the AWS Well-Architected Framework
 - c. Explain best practices for building solutions on AWS
 - d. Describe how to make informed decisions on where to place AWS resources
- II. Adding a Storage Layer
 - a. Recognize the problems that Amazon Simple Storage Service (Amazon S3) can solve
 - b. Describe how to store content efficiently using Amazon S3
 - c. Recognize the various Amazon S3 storage classes and cost considerations
 - d. Describe how to move data to and from Amazon S3
 - e. Describe how to choose a Region
 - f. Create a static website
- III. Adding a Compute Layer
 - a. Identify how Amazon Elastic Compute Cloud (Amazon EC2) can be used in an architecture
 - b. Explain the value of using Amazon Machine Images (AMIs) to accelerate the creation and repeatability of infrastructure
 - c. Differentiate between the EC2 instance types
 - d. Recognize how to configure Amazon EC2 instances with user data
 - e. Recognize storage solutions for Amazon EC2
 - f. Describe EC2 pricing options
 - g. Determine the placement group given an architectural consideration
 - h. Launch an Amazon EC2 instance
- IV. Adding a Database Layer
 - a. Compare database types
 - b. Differentiate between managed versus unmanaged services
 - c. Explain when to use Amazon Relational Database Service (Amazon RDS)
 - d. Explain when to use Amazon DynamoDB
 - e. Describe available database security controls
 - f. Describe how to migrate data into Amazon Web Services (AWS) databases
 - g. Deploy a database server

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- V. Creating a Networking Environment
 - a. Explain the foundational role of a virtual private cloud (VPC) in Amazon Web Services (AWS) Cloud networking
 - b. Identify how to connect your AWS networking environment to the internet
 - c. Describe how to isolate resources within your AWS networking environment
 - d. Create a VPC with subnets, an internet gateway, route tables, and a security group
- VI. Connecting Networks
 - a. Describe how to connect an on-premises network to the Amazon Web Services (AWS) Cloud
 - b. Describe how to connect virtual private clouds (VPCs) in the AWS Cloud
 - c. Connect VPCs in the AWS Cloud by using VPC peering
 - d. Describe how to scale VPCs in the AWS Cloud
 - e. Describe how to connect VPCs to supported AWS services
- VII. Securing User and Application Access
 - a. Explain the purpose of AWS Identity and Access Management (IAM) users, groups, and roles.
 - b. Describe how to allow user federation within an architecture to increase security.
 - c. Recognize how AWS Organizations service control policies (SCPs) increase security within an architecture.
 - d. Describe how to manage multiple AWS accounts.
 - e. Configure IAM users.
- VIII. Implementing Elasticity, High Availability, and Monitoring
 - a. Use Amazon EC2 Auto Scaling within an architecture to promote elasticity
 - b. Explain how to scale your database resources
 - c. Deploy an Application Load Balancer to create a highly available environment
 - d. Use Amazon Route 53 for Domain Name System (DNS) failover
 - e. Create a highly available environment
 - f. Design architectures that use Amazon CloudWatch to monitor resources and react accordingly
- IX. Automating Your Architecture
 - a. Recognize when to automate and why
 - b. Identify how to model, create, and manage a collection of AWS resources using AWS CloudFormation
 - c. Use the Quick Start AWS CloudFormation templates to set up an architecture
 - d. Indicate how to use AWS System Manager and AWS OpsWorks for infrastructure and deployment automation
 - e. Indicate how to use AWS Elastic Beanstalk to deploy simple applications
- X. Caching Content
 - a. Identify how caching content can improve application performance and reduce latency
 - b. Identify how to design architectures that use edge locations for distribution and distributed denial of service (DDoS) protection
 - c. Create architectures that use Amazon CloudFront to cache content
 - d. Recognize how session management relates to caching
 - e. Describe how to design architectures that use Amazon ElastiCache

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- XI. Building Decoupled Architectures
 - a. Differentiate between tightly and loosely coupled architectures
 - b. Identify how Amazon Simple Queue Service (Amazon SQS) works and when to use it
 - c. Identify how Amazon Simple Notification Service (Amazon SNS) works and when to use it
 - d. Describe Amazon MQ
- XII. Building Microservices and Serverless Architectures
 - a. Indicate the characteristics of microservices
 - b. Refactor a monolithic application into microservices and use Amazon ECS to deploy the containerized microservices
 - c. Explain serverless architecture
 - d. Implement a serverless architecture with AWS Lambda
 - e. Describe a common architecture for Amazon API Gateway
 - f. Describe the types of workflows that AWS Step Functions supports
- XIII. Planning for Disaster
 - a. Identify strategies for disaster planning
 - b. Define recovery point objective (RPO) and recovery time objective (RTO)
 - c. Describe four common patterns for backup and disaster recovery and how to implement them
 - d. Use AWS Storage Gateway for on-premises-to-cloud backup solutions