Clemson University - Center for Corporate Learning
1 North Main Street, 7th Floor,
Greenville, SC 29601
http://www.clemson.edu/online/
Contact: Juanita Durham│ 864.656.3984│jdrhm@clemson.edu

Amazon Web Services with Certified Solutions Architect

Format: Self-Pace Online / eLearning
Program Duration: 6 Months
Course Contact Hours: 375

The Amazon Web Services (AWS) Certified Solutions Architect Program
This comprehensive program starts with foundational instruction on Amazon Web Services with coverage on cloud computing and available AWS services, as well as a guided hands-on look at using services such as EC2 (Elastic Compute Cloud), S3 (Simple Storage Service), and more. The Amazon Web Services (AWS) course is designed to provide a solid foundational understanding of the Amazon Web Services (AWS) infrastructure-as-a-service products. The course covers concepts necessary to understand cloud computing platforms, working with virtual machines, storage in the cloud, security, high availability, and more.

This program continues on with the knowledge necessary to pass the AWS Solutions Architect (Associate) certification exam, including an in-depth review of AWS architecture principles and best practices, and technical details pertaining to the implementation of services in accordance with the Well Architected Framework as published by Amazon Web Services.

The AWS Certified Solutions Architect (Associate) course was developed specifically for the latest edition of the exam released in February of 2018. The AWS Solutions Architect Associate certification is ideal for anyone in a solutions architect or similar technical role, and this course is designed to help you pass the AWS Certified Solutions Architect Associate exam.

Throughout this program, we will cover all the key areas addressed in the exam and review a number of use cases designed to help you ingrain the principles and practices on which this certification is based so that you have an intellectual framework with which to formulate the correct answers. We will use a combination of demonstrations, architectural diagram walkthroughs, and case studies to help you understand the tools available to you for passing the exam. Throughout this course you will gain a deeper understanding of AWS architecture following the five pillars of the Well-architected framework. Demonstrations of Amazon Web Services and third-party cloud solutions are included to provide a clear guide to understanding the services offered by Amazon Web Services and the needs those services meet.

Education and National Certifications
- Students should have or be pursuing a high school diploma or GED.

- Students who complete this program will be eligible to sit for the **Amazon Web Services Solutions Architect Exam**

Program Objectives

At the conclusion of this program, students will be able to:

➢ Employ proper security and networking methods in Amazon Web Services (AWS)
➢ Understand computing in AWS
➢ Understand storage in AWS
➢ Use databases and employing analytics in AWS
➢ Use AWS developer and management tools
➢ Use AWS mobile and application services
➢ Understand high availability & fault tolerance
➢ Identify key, useful resources and materials that require studying in order to pass the AWS Certified Solutions Architect (Associate) exam
➢ Understand high availability principles, calculate services availability and how to plan for applications to be truly highly available
➢ Understand how network topology contributes to a more resilient infrastructure
➢ Understand how to achieve reliable infrastructure and applications in AWS, which requires consideration of capacity, and application and database resilience
➢ Identify the principles and service details that can help in the design of performant networks in AWS
➢ Explain compute performance and how the use of any particular instance type or leveraging containers can help improve application performance
➢ Identify the various database solutions for both relational and non-relational data
➢ Explain how DynamoDB and other data models affect performance and how it can be improved for write- or read-heavy applications
➢ Explain the use of fully managed and powerful services such as kinesis, lambda, elastic container service and API gateway
➢ Explain how event-driven and serverless infrastructures can improve the performance of our applications
➢ Understand how securing account credentials and ensuring proper access to resources is a vital first step in securing infrastructure, applications and data
➢ Discuss options that can be leveraged to create a more secure environment
➢ Monitor every aspect of the infrastructure and create an environment in which nothing goes unnoticed or unrecorded using various features, options and practices
➢ Identify and employ principles and techniques that can guide securing infrastructure most effectively
➢ Secure data using access controls, as well as encryption in transit and at rest
➢ Understand the various AWS cost models including often overlooked cost contributors for various services
➢ Implement AWS in a way that maximizes agility and flexibility to achieve operation excellence for organizations

AWS Certified Solutions Architect Program Detailed Student Objectives:

AWS OVERVIEW
- Understand "Cloud Computing"

- Understand the AWS Global Infrastructure in terms of Regions
- Understand the AWS Global Infrastructure in terms of Availability Zones
- Understand the AWS Global Infrastructure in terms of Edge Locations
- Determine the Scope of Services available via AWS
- Provide an overall service overview for AWS

SECURITY IN AWS
- Understand Amazon Web Services (AWS) Identity and Access Management
- Create a User and Group
- Create Access Keys
- Dictate Permissions and Policies
- Understand Roles
- Create Roles
- Understand and Employ Federated Users
- Manage an MFA Device
- Understand Resource Policy
- Use Roles for Cross Account Access
- Employ Best Practices in AWS

NETWORKING IN AWS
- Understand Amazon Virtual Private Cloud (VPC)
- Create a VPC
- Add Subnets
- Understand Routinga and Route to the Internet
- Understand Public, Private, and Hybrid Subnets
- Understand Network Access Control Lists (NACL)
- Understand Security Groups
- Create and apply an NACL
- Create a Security Group
- Understand VPC Peering and Related Scenarios
- Peer Two VPCs
- Understand and Employ VPN Access
- Understand AWS Direct Connect

COMPUTING IN AWS
- Understand and use Amaazon Elastic Compute Cloud (EC2)
- Employ Amazon Machine Image (AMI)
- Launch a Linux Instance
- Understand and employ Key Pairs
- Utilize the Instance Metadata Service
- Employ bootstrapping with Userdata
- Launch a Windows Instance
- Stop and Terminate an Instance
- Understand Billing Options
- Emply Highly-Available Web Applications
- Understand and Employ AWS Lamda and Hello World in AWS Lamda
- Use Image Processing with AWS Lamda

STORAGE IN AWS

- Understand Available AWS Storage Optionse
- Understand Amazon Simple Storage Service (S3)
- Create Buckets and Objects
- Understand and Employ Bucket Secuity with Resource Policies
- Create a Bucket Policy for Public Read
- Understand Amazon Glacier
- Add Lifecycle Rules
- Understand Instance Store Volumes
- Understand Amazon Elastic Block Store (EBS), Volume Types and Performance
- Create an EBS Volume
- Create an EBS Volume on Linux and on Windows
- Understand Amazon EBS Snapshots
- Create a Snapshot
- Employ Video Transcoding and Archival

DATABASES IN AWS

- Understand Available AWS Database Options
- Understand and Employ Amazon Relational Database Service (RDS)
- Understand Data Durability with Amazon RDS
- Launch an Amazon RDS Instsance
- Understand Amazon DynamoDB adn Data Models in Amazon DynamoDB
- Create an Amazon DynamoDB Table
- Scan and Query Operations
- Understand Amazon ElastiCache
- Understand Amazon Redshift
- Employ Database Objectives for E-Commerce

ANALYTICS IN AWS

- Understand Real-Time Stream Processing with Amazon Kinesis
- Employ Big Data Principles with Amazon Elastic MapReduce
- Employ AWS Data Pipeline
- Employ Video Subscription Service Business Intelligence

DEVELOPER AND MANAGEMENT TOOLS

- Monitoring Using Amazon Cloudwatch
- Log Collection with Amazon Cloudwatch Logs
- Develop Infrastructure as Code with AWS Cloudformation
- Create Resources with AWS Cloudformation
- Apply Management Services
- Launch an Application on AWS Elastic Beanstalk

MOBILE AND APPLICATION SERVICES

- Understand and Employ Amazon Simple Queue Service (SQS)
- Understand and Employ Amazon Simple Notification Service (SNS)
- Understand and Employ Amazon Simple Email Service (SES)
- Understand and Employ Amazon Cognito
- Understand and Employ Amazon Mobile Analytics

HIGH AVAILABILITY AND FAULT TOLERANCE

- Understand Elastic Load Balancing (ELB)
- Understand and Employ Listeners and SSL Certificates
- Employ Load Balancing Algorithms
- Create and ELB
- Understand and Employ Auto Scaling
- Understand and Employ Demand-Based Scaling
- Create an Auto Scaling Group

AWS SUMMARY
- Understand The Ideal
- Understand Best Practices
- Understand The Exam

AWS SOLUTIONS ARCHITECT CERTIFICATION EXAM
- Understand the AWS Certified Solutions Architect (Associate) exam requirements
- Gather and access exam preparation resources
- Gather tips for taking the exam
- Gather documentation and study material

RESILIENT ARCHITECTURES – HIGH AVAILABILITY
- Understand how to calculate availability
- Determine plans for failure
- Understand how to design for availability

RESILIENT ARCHITECTURES – NETWORK TOPOLOGY
- Understand Fault Isolation
- Understand and employ Resilient Configuration
- Employ VPN Resiliency methods
- Apply Direct Connect Resiliency

RESILIENT ARCHITECTURES – APPLICATION DESIGN
- Understand and employ tools for Application Resiliency
- Describe and deploy menthods for Database Resiliency
- Understand Capacity Planning
- Monitor for Availability
- Devise Multi-Region Architectures

PERFORMANT ARCHITECTURES – NETWORK PERFORMANCE
- Understand and employ strategies to maximize networking performance
- Understand and employ strategies to maximize NAT Gateway Performance

PERFORMANT ARCHITECTURES – COMPUTE PERFORMANCE
- Understand Compute Options
- Employ Instance-Based Applications
- Improve performance with Containers

PERFORMANT ARCHITECTURES – STORAGE PERFORMANCE
- Understand the various Storage Options available
- Understand and monitor Block Store Performance
- Understand and monitor Amazon S3 Performance
- Search for Data in Amazon S3

- Understand and employ AWS Assurance Programs
- Improve the End User Experience

PERFORMANT ARCHITECTURES – DATABASE PERFORMANCE
- Understand and employ DynamoDB Performance
- Understand and employ DynamoDB Primary Keys
- Understand and employ DynamoDB Secondary Indexes
- Improve Read-Heavy Applications
- Improve Write-Heavy Applications

PERFORMANT ARCHITECTURES – LEVERAGING MANAGED SERVICES
- Understand Event-Driven Architectures
- Understand Severless Architectures

SECURE APPLICATIONS AND ARCHITECTURES – IDENTITY & ACCESS MANAGEMENT
- Understand and Employ Design Principles
- Secure Identities and Credentials
- Secure Acess to Resources
- Utilize Temporary Credentials
- Understand Roles for EC2
- Understand and determine Cross-Account Access
- Understand and create Federated Users
- Utilize IAM Best Practices

SECURE APPLICATIONS AND ARCHITECTURES – DETECTION
- Understand and employ Design Principles
- Effectively monitor infrastructure
- Capture logs
- Analyze logs

SECURE APPLICATIONS AND ARCHITECTURES – SECURING INFRASTRUCTURE
- Understand and Employ Design Principles
- Route as Security
- Understand and Employ Network Access Control Lists (NACLs)
- Understand and Employ Security Groups
- Secure the Operating System

SECURE APPLICATIONS AND ARCHITECTURES – SECURING DATA
- Understand and Employ Design Principles
- Understand Resource Policies
- Understand Amazon S3 Object Ownership
- Define Publicly Accessible Data
- Authorize Acess to Private Content
- Encrypt Data at Rest and Transit
- Encrypt Database Connections

COST-OPTIMIZED ARCHITECTURES – COST OPTIMIZATION
- Understand and Employ Design Principles
- Understand and Employ Right Sizing
- Understand the Costs of Amazon S3
- Understand the Costs of Amazon VPC

- Utilize Amazon EC2 Pricing Models to Optimize Costs
- Analyze Cost Savings with Temporary Environments
- Create and set Billing Alarms

OPERATIONALLY EXCELLENT ARCHITECTURES – OPERATIONAL EXCELLENCE
- Understand and Employ Design Principles
- Understand and Employ Infrastructure as Code