

Course Outline

AWS Academy Cloud Developing

Course Version

This course outline applies to version 1.0 of *AWS Academy Cloud Developing* in English.

Description

AWS Academy Cloud Developing is designed to help students gain technical expertise in development using cloud technologies and prepare them to take the AWS Certified Developer – Associate level AWS Certification exam. The curriculum is delivered through instructor-led classes, knowledge assessments, and hands-on labs. Students will also have access to course manuals, online knowledge assessments, a free practice certification exam, and a discount voucher for the certification exam.

Curriculum Objectives

AWS Cloud Developing teaches students how to:

- Recall cloud computing services and models
- Describe developing on AWS
- Configure AWS Identity and Access Management for programmatic access
- Configure storage with Amazon S3 programmatically
- Develop with DynamoDB
- Explain caching
- Configure containers
- Develop event-driven solutions with Lambda
- Configure solutions with API Gateway
- Develop solutions with SQS and SNS
- Describe the use of Step Functions
- Identify best practice for building secure applications
- Identify best practice for deploying applications

Duration

Approximately 40 hours. *AWS Academy Cloud Developing* is designed to be delivered over a semester. Actual delivery times will vary from class to class and depending on delivery format. This course must be delivered over a period of at least four weeks.

Intended Audience

Undergraduate, graduate, or professional students seeking cloud developing expertise. This intermediate (level 200) course is intended for students attending AWS Academy member institutions.

Course Outline

AWS Academy Cloud Developing

Student Prerequisites

AWS Academy Cloud Developing requires a strong foundation in IT concepts and skills. To ensure success in this course, students should have:

- Completed *AWS Academy Cloud Foundations* course or have equivalent experience
- A working knowledge of distributed systems
- Familiarity with general networking concepts
- A working knowledge of multi-tier architectures
- Familiarity with cloud computing concepts

Delivery Methods

Learning materials are provided to support in-person or online synchronous delivery. Educators may record their lectures for asynchronous delivery.

Educator Prerequisites

Educators must hold a current AWS Certified Developer – Associate certification.

Educator Accreditation

Educators must meet the prerequisites and have completed a Technical Validation with an AWS Academy Technical Program Manager.

Learning Resources

- Video introductions
- Lecture materials
- Educator demo instructions
- Practical activities
- Lab exercises

Course Outline

AWS Academy Cloud Developing

Course Contents

		Lecture	Digital Training	Exercise & Lab	Knowledge Check
AWS Review (optional)		60 min.			
Lecture	Introduction to the AWS Cloud				
Lecture	Overview of AWS Infrastructure				
Lecture	Running Applications in the Cloud				
Lecture	Introduction to Amazon EC2, Elastic Load Balancing, and Amazon EC2 Auto Scaling				
Lecture	Introduction to Serverless Computing with AWS Lambda				
Lecture	From Monoliths to Microservices				
Lecture	Best Practices				
Module 1 – Welcome to Academy Cloud Developing (ACD)		60 min.			
Lecture	Course Prerequisites, objectives, and overview				
Lecture	AWS Training Portal				
Lecture	Lab Environment				
Lecture	AWS Free Tier (optional)				
Lecture	AWS Educate (optional)				
Activity	AWS Documentation Scavenger Hunt				
Module 2 – Introduction to Developing on AWS		120 min.			15 min.
Lecture	Systems Development Lifecycle				
Lecture	Steps to Get Started Developing on AWS				
Lecture	Working with AWS SDKs				
Lecture	Errors and Exceptions				
Lecture	Introduction to AWS X-Ray				
Lecture	Introduction to Amazon CloudWatch and AWS CloudTrail				
Educator Demo	AWS Cloud9				
Lab	Introduction to AWS Cloud9				
Knowledge Check					
Module 3 – Introduction to AWS Identity and Access Management (IAM)		120 min.			15 min.
Lecture	Shared Responsibility Model				
Lecture	Overview of IAM				
Lecture	Authentication with IAM				
Lecture	Authorization with IAM				
Educator Demo	Create an IAM User and IAM Group				
Knowledge Check					
Module 4 – Developing Storage Solutions with Amazon S3		240 min.			15 min.
Lecture	Introduction to Amazon S3				
Lecture	Creating Amazon S3 Buckets				
Lecture	Working with Amazon S3 Objects				
Lecture	Protecting Data and Managing Access to Amazon S3 Resources				
Lab	Developing with Amazon S3 using the AWS SDK				
Knowledge Check					

Course Outline

AWS Academy Cloud Developing

Module 5 – Developing NoSQL Solutions with Amazon DynamoDB		400 min.			15 min.
Lecture	Introduction to Amazon DynamoDB				
Lecture	Amazon DynamoDB Key Concepts				
Lecture	Partitions and Data Distribution				
Lecture	Secondary Indexes				
Lecture	Read/Write Throughput				
Lecture	Streams and Global Tables				
Lecture	Backup and Restore				
Lecture	Basic Operations for Amazon DynamoDB Tables				
Activity	Calculate Read Capacity Units (RCUs)				
Activity	Calculate Write Capacity Units (WCUs)				
Lab	Developing with Amazon DynamoDB				
Knowledge Check					
Module 6 - Caching Information for Scalability		160 min.			15 min.
Lecture	Caching Overview				
Lecture	Caching with Amazon CloudFront				
Lecture	Caching with Amazon ElastiCache				
Lecture	Caching Strategies				
Knowledge Check					
Module 7 - Introduction to Containers		220 min.			15 min.
Lecture	Introduction to Containers				
Lecture	Containers vs. Hardware Virtualization				
Lecture	Microservices – Use Case for Containers				
Lecture	Amazon Container Services				
Lab	Working with Docker Containers				
Knowledge Check					
Module 8 - Developing Solutions with Amazon SQS and Amazon SNS		200 min.			15 min.
Lecture	Introduction to Message Queues				
Lecture	Introduction to Amazon SQS				
Lecture	Amazon SQS Developer Concepts				
Lecture	Introduction to Amazon SNS				
Lecture	Amazon SNS Developer Concepts				
Lecture	Introduction to Amazon MQ				
Knowledge Check					
Module 9 - Developing Event-Driven Solutions with AWS Lambda		120 min.			15 min.
Lecture	Introduction to Serverless Computing with AWS Lambda				
Lecture	Overview of AWS Lambda				
Lecture	Execution Models for Invoking Lambda Functions				
Lecture	AWS Lambda Permissions				
Lecture	Overview of Authoring and Configuring Lambda Functions				
Lecture	Overview of Deploying Lambda Functions				
Knowledge Check					
Module 10 - Developing Solutions with Amazon API Gateway		300 min.			15 min.

Course Outline

AWS Academy Cloud Developing

Lecture	Application Programming Interfaces				
Lecture	Amazon API Gateway				
Lecture	Creating a RESTful API				
Lecture	Controlling Access to a RESTful API				
Lecture	Testing a RESTful API				
Lecture	Deploying a RESTful API				
Lecture	Invoking a RESTful API				
Lecture	Monitoring a RESTful API				
Lab	Developing with AWS Lambda and Amazon API Gateway using the AWS SDK				
Knowledge Check					
Module 11 - Developing Solutions with AWS Step Functions		120 min.			15 min.
Lecture	Workflow Coordination in Distributed Applications				
Lecture	Introduction to AWS Step Functions				
Lecture	State Types				
Lecture	AWS Step Functions Use Case				
Lecture	AWS Step Functions API				
Knowledge Check					
Module 12 - Developing Secure Applications on AWS		120 min.			15 min.
Lecture	Secure Network Connections				
Lecture	Manage Application Secrets				
Lecture	Authenticate with AWS Security Token Service				
Lecture	Authenticate with Amazon Cognito				
Knowledge Check					
Module 13 - Deploying Applications on AWS		160 min.			
Lecture	Introducing DevOps				
Lecture	Using AWS Code Services for CI/CD				
Lecture	Introducing Deployment and Testing Strategies				
Lecture	Deploying Applications with AWS Elastic Beanstalk				
Lecture	Deploying Applications with AWS CloudFormation				
Lecture	Deploying Serverless Applications with AWS SAM				
Recommended & Optional					
Lab	Sandbox				

Course Outline

AWS Academy Cloud Developing

Learning Objectives

Module	Learning Objectives
Module 2 – Introduction to Developing on AWS	<ul style="list-style-type: none">Recognize the systems development life cycleDescribe how to start developing on AWSIndicate how to work with AWS SDKsIdentify why AWS X-Ray is a critical developer toolIdentify AWS management toolsDevelop and run a simple program in AWS Cloud9
Module 3: Introduction to AWS Identity and Access Management (IAM)	<ul style="list-style-type: none">Recognize the shared responsibility modelExplain how IAM helps secure access to AWS resourcesDescribe IAM user authenticationIdentify how to authorize an IAM user, group, or role
Module 4: Developing Storage Solutions with Amazon S3	<ul style="list-style-type: none">Describe how Amazon S3 can be used as a storage solutionIdentify Amazon S3 features and componentsDescribe two ways to protect data with Amazon S3Describe the function of the S3 object operations (PUT, GET, SELECT, DELETE)Explain how to manage access to Amazon S3 resourcesDevelop with Amazon S3 using the AWS SDKs
Module 5: Developing Flexible NoSQL Solutions with Amazon DynamoDB	<ul style="list-style-type: none">Identify Amazon DynamoDB featuresDescribe Amazon DynamoDB componentsExplain how Amazon DynamoDB uses partitionsIndicate how indexes are used with Amazon DynamoDBDescribe how Amazon DynamoDB keeps data consistentRecognize when streaming and global tables are usedExplain the backup and restore processDevelop flexible NoSQL solutions with Amazon DynamoDB
Module 6: Introduction to Caching with Amazon CloudFront and Amazon ElastiCache	<ul style="list-style-type: none">Explain when caching is usedDescribe caching with Amazon CloudFrontDescribe caching with Amazon ElastiCacheApply caching strategies
Module 7: Introduction to Containers	<ul style="list-style-type: none">Describe the history, technology, and terminology behind containersDifferentiate containers from bare-metal servers and virtual machinesIdentify the characteristics of a microservices architectureRecognize the drivers for using container-based workloadsHost a basic website by using Docker containers
Module 8: Developing Solutions with Amazon SQS and Amazon SNS	<ul style="list-style-type: none">Recall how message queues workDescribe Amazon SQSSend messages to an SQS queueDescribe Amazon SNSExplain Amazon SNS conceptsDescribe Amazon MQ

Course Outline

AWS Academy Cloud Developing

Module 9: Developing Event-Driven Solutions with AWS Lambda	<ul style="list-style-type: none">Explain serverless computingDescribe how AWS Lambda worksRecognize AWS Lambda execution modelsIdentify how to use AWS IAM to grant Lambda permissionsIndicate the steps to author and configure a Lambda functionExplain how to deploy serverless applicationsDevelop event-driven solutions with AWS Lambda
Module 10: Developing Solutions with AWS Step Functions	<ul style="list-style-type: none">Recognize application programming interfacesDescribe Amazon API GatewayIndicate the steps for developing RESTful APIs with Amazon API Gateway
Module 11: Developing Solutions with Amazon API Gateway	<ul style="list-style-type: none">Recognize the dynamics of workflow coordination in distributed applicationsDescribe AWS Step FunctionsIdentify state typesIndicate common use cases for AWS Step FunctionsRecall AWS Step Functions APIs
Module 12: Developing Secure Applications on AWS	<ul style="list-style-type: none">Identify how to secure applicationsDescribe how to manage your application's secretsRecall how to authenticate with AWS Security Token ServiceDescribe how Amazon Cognito is used to build secure applications
Module 13: Deploying Applications on AWS	<ul style="list-style-type: none">Describe DevOpsRecognize AWS code services for CI/CDSummarize deployment strategiesDescribe how AWS Elastic Beanstalk is used to deploy applicationsDescribe how AWS CloudFormation is used to deploy applicationsDescribe how AWS SAM is used to deploy serverless applications