![FingerLakes Community College]

Syllabus

CSC 253 Cloud Operations

General Information

Date May 24th, 2021

Author Carrie Krueger

Department Computing Sciences

Course Prefix CSC

Course Number 253

Course Title Cloud Operations

Course Information

Catalog Description This course is designed to prepare students to pursue entry-level DevOps, support, and cloud operations roles. The course includes Amazon Web Service (AWS) Academy Cloud Operations, which is developed and maintained by Amazon. It will also help prepare students to take the AWS SysOps Administrator – Associate exam. Emphasizing best practices in the AWS Cloud and recommended design patterns, this course will teach students how to solve problems and troubleshoot various scenarios. The course will show students how to create automatable and repeatable deployments of networks and systems on AWS and covers specific AWS features and tools related to configuration and deployment. With case studies and demonstrations, students will learn how some AWS customers design their infrastructures and implement various strategies and services. Students will also have the opportunity to build a variety of infrastructures via guided, hands-on activities.

Credit Hours 3

Lecture Contact Hours 3

Lab Contact Hours 1

Other Contact Hours 0

Grading Scheme Letter

Prerequisites

CSC 153 Introduction to Cloud Computing

Co-requisites

None

First Year Experience/Capstone Designation

This course DOES NOT satisfy the outcomes applicable for status as a FYE or Capstone.

SUNY General Education

This course is designated as satisfying a requirement in the following SUNY Gen Ed categories
None

FLCC Values

Institutional Learning Outcomes Addressed by the Course
Vitality, Inquiry, Perseverance, and Interconnectedness

Course Learning Outcomes

Course Learning Outcomes

1. Explain AWS infrastructure as it relates to system operations, such as global infrastructure, core services, and account security.

2. Use the AWS Command Line Interface (AWS CLI) and explore additional administration and development tools.

3. Manage, secure, and scale compute instances, configurations, and databases on AWS.

4. Monitor the health of the cloud infrastructure and manage resource consumption using AWS services.

Outline of Topics Covered

Module 0: Welcome and Overview

- **Explain the course scope and expectations.**
- **Create an AWS Training Portal account.**
- **Create your free AWS Educate account.**
- **Access course materials and resources.**
- **Navigate the AWS documentation website.**

Module 1: Understanding Systems Operations on AWS

- **Describe system operations in the cloud related to automated and repeatable**

deployments.

- **Explain Amazon Web Services (AWS) regions and edge locations, and criteria for selecting them.**
- **Describe core services related to system operations, including services for network, compute, and access.**
- **Explain how AWS Identity and Access Management (IAM) provides security over AWS account resources.**
- **Describe AWS Command Line Interface (AWS CLI) features.**

Module 2: Tooling and Automation

- **Describe the purpose and function of AWS Systems Manager and its related features.**
- **Describe the purpose and function of AWS Tools for PowerShell.**
- **Identify additional development tools used for tooling and automation, such as software development kits (SDKs), AWS CloudFormation, and AWS OpsWorks.**
- **Explain how Amazon Simple Storage Service (Amazon S3) can be used to host a static website.**

Module 3: Computing Servers

- **Describe Amazon Elastic Compute Cloud (Amazon EC2) virtualization.**
- **Differentiate between the instance types and storage options available for EC2 instances.**
- **Understand the networking components that must be specified when you launch an EC2 instance.**
- **Explain Amazon EC2 user data and metadata.**
- **Differentiate the lifecycle states for an EC2 instance.**
- **Explain the shared responsibility model.**
- **Create Amazon EC2 instances.**

Module 4: Computing (Scaling and Name Resolution)

- **Describe Elastic Load Balancing features.**
- **Differentiate the types of ELB load balancers.**
- **Describe Amazon EC2 Auto Scaling and launch configurations.**
- **Use EC2 Auto Scaling.**
- **Describe Amazon Route 53 features and routing options.**
- **Configure failover routing.**

Module 5: Computing (Containers and Serverless)

- **Explain the purpose and function of AWS Lambda.**
- **Describe the purpose and function of application programming interfaces (APIs), including RESTful APIs.**
- **Explain the benefits and function of Amazon API Gateway.**
- **Explain the purpose and function of containers and the AWS services that support container usage.**

- **Explain the purpose and function of AWS Step Functions.**

Module 6: Computing (Database Services)

- **Differentiate the types of managed database services offered by Amazon Web Services (AWS) and identify their recommended use.**
- **Identify some of the factors for consideration when selecting a database (engine and workloads).**
- **Explain the purpose and function of Amazon Relational Database Service (Amazon RDS), Amazon Aurora, and Amazon DynamoDB and related benefits of each.**
- **Describe the main features and benefits of Amazon Relational Database Service (Amazon RDS), Amazon Aurora, and Amazon DynamoDB.**
- **Explain the benefits of the AWS Database Migration Service (AWS DMS) and the capabilities of the AWS Schema Conversion Tool (AWS SCT).**

Module 7: Networking

- **Explain the foundational role of an Amazon virtual private cloud (VPC) in AWS Cloud networking.**
- **Identify the networking components inside of a VPC and their purpose.**
- **Differentiate the options for VPC connectivity.**
- **Describe the layered network defense model inside a VPC, such as network Access Control Lists (network ACLs), security groups, and bastion hosts.**
- **List the steps to troubleshoot common VPC network issues.**
- **Configure a VPC.**

Module 8: Storage and Archiving

- **Differentiate the AWS data storage options and explain their purpose and benefits.**
- **Create and manage Amazon EBS snapshots.**
- **Store, retrieve, and archive Amazon S3 objects.**
- **Identify AWS data migration services.**

Module 9: Monitoring and Security

- **Explain the benefits of Amazon CloudWatch.**
- **Describe Amazon CloudWatch monitoring features, including metrics and alarm details.**
- **Describe Amazon CloudWatch log features and benefits.**
- **Explain the purpose and function of AWS CloudTrail.**
- **Describe AWS Config features and benefits.**
- **Use Amazon CloudWatch to monitor applications and infrastructure.**

Module 10: Managing Resource Consumption

- **Explain the purpose and function of tagging in AWS.**
- **Describe the cost management strategies associated with tagging.**
- **Describe how to enforce tagging using Identity and Access Management (IAM)**

policies.
- **Identify some of the cost benefits of the cloud.**
- **Explain the purpose and function of the AWS Trusted Advisor service.**
- **Manage Resources with tagging.**

Module 11: Creating Automated and Repeatable Deployments

- **Identify some of the AWS services for configuration management.**
- **Describe the challenges associated with cloud deployments and potential solutions for remedy.**
- **Describe infrastructure as code and the value it creates.**
- **Describe the purpose of AWS CloudFormation.**
- **Describe some of the types of errors with AWS CloudFormation and their remedy.**
- **Describe best practices using AWS CloudFormation.**

Program Affiliation

This course is not required as a core course in any programs.