IT 0170 - AWS CLOUD FOUNDATIONS

Catalog Description

Hours: 72 (54 lecture, 18 laboratory)
Description: Intended for students who seek an overall understanding of cloud computing concepts, independent of specific technical roles. This course provides a detailed overview of cloud concepts, Amazon Web Services (AWS) core services, security, architecture, pricing, and support. Can be used to prepare for the AWS Cloud Practitioner exam. (CSU)

Course Student Learning Outcomes

- CSLO #1: Research, analyze and evaluate information to solve business problems using cloud computing technologies.
- CSLO #2: Design and produce computer cloud computing solutions incorporating current trends, security, and best practices.
- CSLO #3: Effectively employ cloud computing technology concepts and terminology in professional communication.
- CSLO #4: Demonstrate marketable cloud computing technology career skills.

Effective Term

Fall 2024

Course Type

Credit - Degree-applicable

Contact Hours

72

Outside of Class Hours

108

Total Student Learning Hours

180

Course Objectives

Upon completion of this course, students will be able to:

Lecture Objectives:

1. Explain the AWS Cloud Adoption Framework (AWS CAF)
2. Define each of the core perspectives
   a. Focus on Business – Business, People and Governance
   b. Focus on Technology – Platform, Security and Operations
3. Describe the six advantages of cloud computing
4. Describe three cloud deployment models
5. Identify the main AWS categories and core services
6. Interpret the AWS pricing philosophy
7. Outline fundamental pricing characteristics
8. Classify the elements of Total Cost of Ownership
9. Identify how to set up an organizational structure that simplifies billing and account visibility to review cost data.
10. Describe how to use AWS Bills, AWS Cost Explorer, AWS Budgets and AWS Cost and Usage Reports
11. Identify the various AWS technical support plans and features
12. Describe the AWS Global Infrastructure
13. Explain the difference between AWS Regions, Availability Zones, and Edge Locations
14. Identify AWS service and service categories
15. Explain the AWS shared responsibility model
16. Describe AWS Identity and Access Management
17. Define how to secure a new AWS account
18. Describe the ways to ensure compliance
19. Explain Networking Basics concepts
20. Define Amazon Virtual Private Cloud
21. Explain Amazon Route 53 and Amazon CloudFront
22. Explain the different AWS compute services
23. Describe how to optimize EC2 costs
24. Explain AWS Lambda, which is serverless computing
25. Describe AWS Elastic Beanstalk
26. Discuss storage services including Amazon Elastic Block Store (EBS), Amazon Simple Storage Service (S3), Amazon Elastic File System (EFS), and Amazon Glacier
27. Describe use cases for storage options, along with a demonstration of Amazon Glacier
28. Compare storage pricing
29. Provide an overview of different database services in the cloud
30. Define the differences between Relational Database Service (RDS), DynamoDB, Redshift and Aurora
31. Highlight the differences between unmanaged and managed database solutions
32. Differentiate between Structured Query Language (SQL) and NoSQL databases
33. Describe the availability differences of alternative database solutions
34. Define the well-architected pillars and design principles
35. Explain high availability and reliability
36. Explain the AWS Trusted Advisor checks
37. Discover the ability of Auto Scaling to launch servers in response to workload changes
38. Define Elastic Load Balancing, Amazon CloudWatch and EC2 Auto Scaling
39. Describe different types of security credentials
40. Discuss security compliance
41. Interpret best practices on day 1 with a new AWS account
42. Describe the business impact of design decisions

Lab Objectives:

1. Create virtual firewalls with security groups

2. Secure delivery of data, videos, applications, and Application Programming Interface (APIs) with Amazon CloudFront

3. Distribute traffic across Amazon Elastic Computer Cloud (EC2) instances using Elastic Load Balancing

4. Use CloudWatch to monitor AWS resources and applications in real time

5. Examine Identity and Access Management (IAM) users, groups, and roles

6. Configure IAM using the Management Console

7. Build a VPC and launch a web server

8. Compare the advantages and disadvantages of running a database deployment on EC2 versus RDS

9. Implement Lambda configuration options

10. Set up an Elastic Beanstalk instance

11. Create an EBS volume and attach it to an EC2 instance then create a snapshot and use it to create another new volume

14. Set up an Amazon RDS database solution

15. Review an architecture diagram and evaluate it against the AWS Well-Architected Framework design principles.

16. Use Elastic Load Balancing, Amazon CloudWatch and EC2 Auto Scaling together to create a dynamically scalable architecture.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Classroom Discussions
  - Example: Online Discussion After completing the AWS Module 3 information post a short few paragraphs explaining in your own words the difference between AWS Regions, Availability Zones and edge locations and include a bit of information about why or when each may be used. When you have finished your post read what others had to say and reply to at least 3 other student posts.
- Objective Examinations
  - Example: Students will be given a knowledge check quiz at the end of each section/module containing multiple choice questions. They will also take a practice certification test. Grading will be based on percentage of correct answers and used to measure the level of understanding of the topics covered. Example Question: True or false? Unlimited services are available via the free tier to new AWS customers for 12 months following their AWS sign-up date. Answer: False
- Skill Demonstrations
  - Example: Students will complete hands-on lab activities using instructions provided through an online lab environment and will be graded based on accuracy and completion of assigned tasks. Example: In Lab 1: Introduction to Amazon Elastic Computer Cloud (EC2), students will use the AWS Console to launch a web server with termination protection enabled, monitor their EC2 instance, modify the security group that their web server is using to allow Hypertext-Transfer-Protocol (HTTP) access, resize their EC2 instance to scale, explore EC2 limits, test the termination protection, and terminate their EC2 instance.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Students will use an online lab environment to get hands-on experience in the Amazon Console using the step-by-step instructions for the Introduction to Amazon EC2 Lab. In this lab, students will launch and configure their first Microsoft Windows virtual machine running on Amazon Elastic Computer Cloud (EC2). The instructor will help as needed, clarify concepts, and verify completion of the task.

Lecture:

1. Instructor will utilize the lecture materials provided by Amazon to give a lecture describing the six advantages of cloud computing and how it helps organizations make the decision to get out of the low-value parts of IT and focus on what drives business success. Students will listen and engage in discussion with their peers regarding the advantages.

Distance Learning

1. The instructor will provide online lecture replacement materials such as reading or Amazon's slides with audio. Students will listen/read and learn about the best practices for Day 1 with an Amazon account. They will take notes and practice these actions in a lab.

Typical Out of Class Assignments Reading Assignments

Examples: 1. Review the assigned AWS whitepaper on AWS VPC Connectivity Options and be prepared to discuss in class. 2. Watch/Read the slides with audio provided by Amazon for Module 1 Section 3 - AWS Global Infrastructure Overview and be prepared to take the Knowledge Check Quiz.

Writing, Problem Solving or Performance

1. Using the AWS Console and instructions provided through QuikLabs, students will scale and load balance their architecture. Afterwards they will be prepared to discuss and help fellow classmates. 2. Using the AWS Console and instructions provided through QuikLabs, students will get hands-on experience with Identity and Access Management. Afterwards they will be prepared to discuss security and user access best practices.

Other (Term projects, research papers, portfolios, etc.)

Computer based projects to demonstrate students' ability to apply skill sets from written instructions.

Required Materials

- Cloud Foundations
  - Author: AWS
  - Publisher: AWS Academey
  - Publication Date:
  - Text Edition: Online
  - Classic Textbook?:
  - OER Link:
  - OER: Yes

Other materials and-or supplies required of students that contribute to the cost of the course.