Credit Hours: 3

Contact Hours: This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

Faculty Information: Faculty contact information and office hours can be found on the faculty profile page.

COURSE DESCRIPTION AND OUTCOMES

COURSE DESCRIPTION:

This course provides students with an overview of Cloud technology fundamentals with a view to prepare students for CompTIA Cloud + certification. Cloud computing is the new paradigm of 21st century computing, with a natural transition from the legacy model of enterprise IT to a world where computing can be sold and purchased from a Cloud computing vendor. This course prepares a student with the knowledge and skills required to understand standard Cloud terminologies and methodologies to implement, maintain, and support Cloud technologies and infrastructure.

COURSE OVERVIEW:

This course presents an overview of techniques and domain knowledge of Cloud computing. Furthermore, this course overviews the associated components for approaching business from a Cloud computing perspective, through a management and practitioner lens.

Within this course, students will gain fundamental knowledge about Cloud characteristics, various Cloud models of computing, and Cloud security fundamentals. At the end of this course, students will attain the subject matter knowledge required for CompTIA Cloud + certification preparation.

COURSE LEARNING OUTCOMES:

1. Explain the characteristics associated with the cloud computing paradigm.
2. Identify the technical basics of Cloud and scalable computing.
3. Summarize the concepts associated with cloud computing management.
4. Explain terms related to Cloud Delivery and Hosting Models.
5. Use the Cloud computing standards and security guidelines.
6. Analyze the concepts associated with "The CompTIA Cloud+ Certification Exam."

PARTICIPATION & ATTENDANCE

Prompt and consistent attendance in your online courses is essential for your success at CSU-Global Campus. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

COURSE MATERIALS

Required:

Salam, A., Gilani, Z., & Ul Haq, S. (2015). *Deploying and managing a Cloud infrastructure: Real world skills for the CompTIA Cloud+ certification and beyond: CV0-001.* Indianapolis, IN: Sybex. ISBN13: 978-1-118-87510-0

NOTE: All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.

COURSE SCHEDULE

Due Dates

The Academic Week at CSU-Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday 11:59 p.m. MT. Late posts may not be awarded points.
- **Opening Exercises:** Take the Opening Exercise before reading each week's content to see which areas you will need to focus on. You may take these exercises as many times as you need. The Opening Exercises will not affect your final grade.
- **Mastery Exercises:** Students may access and retake Mastery Exercises through the last day of class until they achieve the scores they desire.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.

WEEKLY READING AND ASSIGNMENT DETAILS

MODULE 1

Readings

- Chapter 1 in *Deploying and Managing a Cloud Infrastructure* (pp. 1-27)
- Chinnaiah, M. R., & Niranjan, N. (2018). Fault tolerant software systems using software configurations for cloud computing. *Journal of Cloud Computing, 7*(1), 1-17.
- Hentschel, R., Leyh, C., & Petznick, A. (2018). Current cloud challenges in Germany: The perspective of cloud service providers. *Journal of Cloud Computing, 7*(1), 1-12.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

MODULE 2

Readings

- Chapter 2 in *Deploying and Managing a Cloud Infrastructure* (pp. 28-51)
- Khan, S., Gani, A., Wahab., A. W. A., Bagiwa, M. A., Shiraz, M., Khan, S., … & Zomaya, A. Y. (2016). Cloud log forensics: Foundations, state of the art, and future directions. *ACM Computing Surveys (CSUR), 49*(1), 1-42.
- Phaphoom, N., Wang, X., & Abrahamsson, P. (2013). Foundations and technological landscape of Cloud computing. *ISRN Software Engineering, 2013*, 1-31.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

MODULE 3

Readings

- Chapter 3 in *Deploying and Managing a Cloud Infrastructure* (pp. 54-86)
- Dong, X., Yu, J., Zhu, Y., Chen, Y., Luo, Y., & Li., M. (2015). SECO: Secure and scalable data collaboration services in cloud computing. *Computers & Security, 50*, 91-105.
- Kalloniatis, C., Mouratidis, H., & Islam, S. (2013). Evaluating cloud deployment scenarios based on security and privacy requirements. *Requirements Engineering, 18*(4), 299-319.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking (75 points)

Option 1: Questions about Cloud

Respond to any two of the three questions that are listed below.

1. Discuss the advantages of Cloud infrastructure over a traditional enterprise computing.
2. Describe the different types of virtualization techniques and the role hypervisors play in a visualized platform.
3. Explain the security issues around Cloud and what can be done to mitigate the major Cloud security issues?

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Your well-written paper must adhere to the following parameters:

- Be 3-4 pages in length, not including the title and reference pages.

- Cite three scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.

- Review the grading rubric, which can be found in the Module 3 folder.
- Ensure that your assignment is formatted according to the *CSU-Global Guide to Writing and APA.*

Option 2: OPEX and CAPEX

Please read the scenario below and then respond to the question asked, through using references to support your rationale.

Today, many companies maintain an on-premise infrastructure that is managed by internal resources or contract personnel. There is an argument that Cloud migration significantly reduces OPEX; however, there may be initial CAPEX costs to deal with. What are your thoughts on OPEX vs. CAPEX considerations for Cloud migration? In your response, please provide justification using research and real-world examples.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Your well-written paper must adhere to the following parameters:

- Be 3-4 pages in length, not including the title and reference pages.

- Cite three scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.

- Review the grading rubric, which can be found in the Module 3 folder.
- Ensure that your assignment is formatted according to the *CSU-Global Guide to Writing and APA.*

MODULE 4

Readings

- Chapter 4 in *Deploying and Managing a Cloud Infrastructure* (pp. 87-120)
- Durao, F., Carvalho, J., Fonseka, F., & Garcia, S. (2014). A systematic review on cloud computing. *The Journal of Supercomputing, 68*(3), 1321-1346.
- Talia, D., Marozzo, F., & Trunfio, P. (2016). *Data analysis in the Cloud: Models, techniques and applications*. Amsterdam, Netherlands: Elsevier.
  - (Please read Chapter 4: pp. 77-121)

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Milestone (30 points)

Submit a 1-2-page outline of the information you plan to provide in your final Portfolio Project. Your outline should include all elements listed in the Portfolio description, which is located in Week 8. Please contact your instructor if you have any questions or concerns regarding this Portfolio Project.

This deliverable is a required component of the final Portfolio Project, and you will lose points on your final project grade if you fail to submit your outline by Sunday at 11:59 PM MT at the end of Week 4.

Critical Thinking (75 points)

Option 1: Security of Data

Please read the scenario below and then respond to the question asked, through using references to support your rationale.

Data security is a major issue in any Cloud computing platform. What are some of the measures that can be taken to ensure that data in a Cloud environment is secure? Include techniques for data-at-rest vs. data-in-transit encryption.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Your well-written paper must adhere to the following parameters:

- Be 3-4 pages in length, not including the title and reference pages.

- Cite three scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.

- Review the grading rubric, which can be found in the Module 4 folder.
- Ensure that your assignment is formatted according to the *CSU-Global Guide to Writing and APA.*

Option 2: Security Merits of Cloud Models

Please read the scenario below and then respond to the question asked, through using references to support your rationale.

You are a Cloud Architect for a Fortune 100 retail company that collects a lot of customer data as part of doing business. The organization is actively contemplating the idea of migrating an enterprise environment into a Cloud based environment. Your CIO asked you to come up with a paper about the security merits of each of the Cloud models and to make a recommendation on which Cloud model to adopt. Your report should include a final recommendation and the technical reason behind why you decided to make that recommendation.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Your well-written paper must adhere to the following parameters:

- Be 3-4 pages in length, not including the title and reference pages.

- Cite three scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.

- Review the grading rubric, which can be found in the Module 4 folder.

- Ensure that your assignment is formatted according to the CSU-Global Guide to Writing & APA.

MODULE 5

Readings

- Chapter 6 in *Deploying and Managing a Cloud Infrastructure* (pp. 157-177)
- Kushida, K. E., Murray, J., & Zysman, J. (2015). Cloud computing: From scarcity to abundance. *Journal of Industry, Competition and Trade, 15*(1), pages 5-19.
- Roueff, E., Ruaud, M., Le Petit, F., Godard, B., & Le Bourlot, J. (2013). *Diffuse Cloud models: Successes and challenges*. International Astronomical Union. Proceedings of the International Astronomical Union, 9*(S297), pages 311-320.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Lab (75 points)

Cloud Academy: Create Your First Amazon EC2 Instance (Linux)

Amazon EC2 is the most famous AWS service and allows you to launch different types of cloud instances and pay for them with a pay-per-use approach. EC2 provides you with complete control of your computing resources and lets you run on Amazon's computing environment. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes. This allows you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 allows you to build and configure your instances as you like, from your operating system to your applications.

By completing this hands-on lab, you will be able to launch and configure your first Amazon EC2 instance using the AWS Management Console.

To complete this lab, navigate to the following URL: https://cloudacademy.com/amazon-web-services/labs/create-your-first-amazon-ec2-instance-1/
Select the 'Start Lab' button. Within the lab environment, you will complete the following steps:
1. Log in to the Amazon Web Service Console - Your first step to start the laboratory experience
2. Create an EC2 instance -- Launch a new EC2 instance using the management console wizard.
3. Convert a PEM key to a PPK key -- Learn how to generate a PPK (PuTTY key) using the AWS PEM key
4. Connect to a remote shell using an SSH connection -- How to use a remote Linux shell from Windows, Linux or Mac
5. Get the EC2 instance metadata - How to get the EC2 instance ID and other useful metadata
6. Terminate an EC2 instance - How to destroy an EC2 instance

This lab will be graded by your instructor based on your successful completion.

MODULE 6

Readings

- Chapter 11 in *Deploying and Managing a Cloud Infrastructure* (pp. 323-346)
- Aljawarneh, S. A., Alawneh, A., & Jaradat, R. (2017). Cloud security engineering: Early stages of SDLC. *Future Generation Computer Systems, 74*, 385-392.
- Singh, A., & Chatterjee, K. (2017). Cloud security issues and challenges: A survey. *Journal of Network and Computer Applications, 79*, 88-115.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking (75 points)

Option 1: Cloud Vendor Recommendations - Global

Please read the scenario below and then respond to the question asked, through using references to support your rationale.

You are a Cloud Architect for a Fortune 500 company with offices in multiple countries, but headquartered in the U.S. Your CIO asked you to evaluate three Cloud vendors and provide a report on strengths and weaknesses of each vendor in the area of data security. Your report should include any three Cloud vendors that are popular in the U.S., who also have a global foot print. Based on your findings, recommend a preferred vendor and support your recommendation.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- o Your well-written paper must adhere to the following parameters:
- o Be 5-6 pages in length, not including the title and reference pages.
- o Cite three scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.
- o Review the grading rubric, which can be found in the Module 6 folder.
- o Ensure that your assignment is formatted according to the CSU-Global Guide to Writing & APA.

Option 2: Cloud Vendor Recommendations - National

Please read the scenario below and then respond to the question asked, through using references to support your rationale.

You are a Cloud architect for a Fortune 500 company with multiple offices in the U.S. Your company is not a multinational corporation. Your headquarters are located in New York City. Your CIO asked you to evaluate three Cloud vendors and provide a report on strengths and weaknesses of each vendor in the area of data security. Your report should include any three Cloud vendors that are popular in the U.S./North America. Based on your findings, recommend one of the three preferred vendors and support your recommendation for this vendor.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Your well-written paper must adhere to the following parameters:
- Be 5-6 pages in length, not including the title and reference pages.
- Cite three scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.
- Review the grading rubric, which can be found in the Module 6 folder.
- Ensure that your assignment is formatted according to the CSU-Global Guide to Writing & APA.

MODULE 7

Readings

- Chapter 12 in Deploying and Managing a Cloud Infrastructure (pp. 359-395)
- Habjan. K. B., & Pucihar, A. (2017). The importance of business model factors for Cloud computing adoption: Role of previous experiences. *Organizacija, 50*(3), 255-272.
- PR Newswire (2018, February 8). New CloudTIA Cloud+ certification reflects growing importance of advanced Cloud skills: Credential validates IT pros' abilities to maintain and optimize cloud infrastructure services.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Lab (70 points)

Cloud Academy: Create your First Cloud Storage Bucket Using Amazon Simple Storage Service (Amazon S3)

Amazon S3 provides secure, durable, and highly-scalable object storage. Amazon S3 allows you to store and retrieve any amount of data from anywhere on the web. You'll pay only for the storage you actually use, with no minimum fee and no setup cost. Amazon S3 can be used alone, or together with other AWS services, such as Amazon Elastic Compute Cloud (Amazon EC2), Amazon Elastic Block Store (Amazon EBS), and Amazon Glacier. You can also use Amazon S3 with third-party storage repositories and gateways.

This Lab guides you through the bucket creation process and its first usage. The Cloud Academy Labs Engine constantly checks the Lab environment, giving you instant feedback on your work.

To complete the lab, navigate to the following URL: https://cloudacademy.com/amazon-web-services/labs/create-your-first-amazon-s3-bucket-2/

Select the 'Start Lab' button. Within the lab environment, you will complete the following steps:
1. Log in to the Amazon Web Service Console -- *Your first step to start the laboratory experience.*
2. Create an S3 bucket -- *How to create an S3 bucket.*
3. Create a folder inside an S3 bucket -- *How to create a folder for organizing the bucket objects*
4. Upload a file inside an S3 bucket -- *How to upload a file in a S# bucket*
5. Set an S3 file to be publicly accessible -- *How to make public an S3 object*
6. Change metadata of an S3 object -- *How to change object metadata using Amazon Management Console*
7. Destroy an S3 bucket -- *How to destroy an S3 bucket*

This lab will be graded by your instructor based on your successful completion.

MODULE 8

Readings

- Chapter 10 in *Deploying and Managing a Cloud Infrastructure* (pp. 287-300)
- Kalloniatis, C., Mouratidis, H., & Islam, S. (2013). Evaluating cloud deployment scenarios based on security and privacy requirements. *Requirements Engineering, 18*(4), 299-319.
- Narayanan, V. (2012). Harnessing the cloud: International law implications of cloud-computing. *Chicago Journal of International Law, 12*(2), 783-809.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Project (320 points)

Option 1: ABC Company Recommendations

You are the Chief Information Technology Officer at a small retail organization, ABC Company, that sells services and products online. ABC Company employs five architects, ten programmers, three project managers, and two technicians. There are 25 store locations but 80% of revenue comes from online sales. Each location is equipped with a local area network. In addition, five computers are used by the administrative assistants for managing vendor and customer information. All of these computers are connected using a local area network. The senior management at the ABC Company decided to migrate all their applications into Amazon Cloud within six months.

As the Chief Information Technology Officer, you are charged with the task of evaluating the data security of the chosen Cloud vendor (Amazon Cloud Services) of all the patients, customers, vendors, status of the facility network and developing a report to recommend the directions that should be followed in the near future.

Your well-written paper must include the following information:

- Existing and potential vulnerabilities and threats on the Cloud.
- Suggestions and discussions of methods or tools that can be used to overcome the existing and potential security threats.
- Discussion of encryption techniques that can be used for the wireless network and the selection and justification of a proper technique for this facility.
- Discussion of the prevention of cyber-attacks and the proper maintenance needed to achieve this goal.
- Discussion about cloud specific security mitigation strategies.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Be 10-12 pages in length, not including the title and reference pages.
- Contain illustrative diagrams for the considered systems.
- Cite seven scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.
- Review the grading rubric, which can be found in the Module 8 folder.
- Ensure that your assignment is formatted according to the CSU-Global Guide to Writing & APA.

Option 2: Regional Bank Recommendations
You are the Chief Information Technology Officer at a small regional bank in the U.S. Your regional bank has no brick and mortar locations; in fact, all banking is done online. Customers open their accounts online and manage their accounts online. Your regional bank currently has over 100,000 customers in the southeast region of the United States. All customers and account data are highly confidential. The bank's Board of Executives is currently contemplating migrating entirely into Cloud hosting provider.

As the Chief Information Technology Officer, you are charged with the task of evaluating the data security of the Cloud vendors (Amazon, Azure, and Softlayer) and to develop a report to recommend a vendor based on your research and findings:

Your well-written paper must include the following information:

- Existing and potential vulnerabilities and threats on the Cloud.
- Suggestions and discussions of methods or tools that can be used to overcome the existing and potential security threats particularly related to data hosted in a Cloud environment.
- Discussion of encryption techniques that can be used for the wireless network and the selection and justification of a proper technique for this facility.
- Discussion of the prevention of cyber-attacks and the proper maintenance needed to achieve this goal.
- Discussion about cloud specific security mitigation strategies.

Keep in mind this is academic writing and should be written in the third person and should not include unsubstantiated opinions, but rather facts and theories.

- Be 10-12 pages in length, not including the title and reference pages.
- Contain illustrative diagrams for the considered systems.
- Cite seven scholarly references. Remember, you must support your thinking and/or opinions and prior knowledge with references; all facts must be supported; in-text references used throughout the assignment must be included in an APA-formatted reference list.
- Review the grading rubric, which can be found in the Module 8 folder.
- Ensure that your assignment is formatted according to the CSU-Global Guide to Writing & APA.

COURSE POLICIES

Course Grading

20% Discussion Participation
0% Opening Exercises
8% Mastery Exercises
37% Critical Thinking Assignments
35% Final Portfolio Project

Grading Scale	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

IN-CLASSROOM POLICIES

For information on late work and incomplete grade policies, please refer to our **In-Classroom Student Policies and Guidelines** or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

Academic Integrity
Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /repurposing your own work (see *CSU-Global Guide to Writing and APA Requirements* for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and Internet resources.

Citing Sources with APA Style
All students are expected to follow the *CSU-Global Guide to Writing and APA Requirements* when citing in APA (based on the APA Style Manual, 6th edition) for all assignments. For details on CSU-Global APA style, please review the APA resources within the CSU-Global Library under the "APA Guide & Resources" link. A link to this document should also be provided within most assignment descriptions in your course.

Disability Services Statement
CSU-Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

Netiquette
Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults, or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.