CHT A281: CLOUD INFRASTRUCTURE & SERVICES

Item	Value
Curriculum Committee Approval Date	11/02/2021
Top Code	070800 - Computer Infrastructure and Support
Units	3 Total Units
Hours	72 Total Hours (Lecture Hours 45; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

This course educates students about cloud deployment and service models, cloud infrastructure, and the key considerations in migrating to cloud computing. The course covers technologies required to build classic, virtualized, and cloud data center environments. These technologies include compute, storage, networking, desktop and application virtualization. Additional areas of focus are backup/recovery, business continuity, security, and management. Students will learn about the key considerations and steps involved in transitioning from the current state of a data center to a cloud computing environment. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate in project format the use of the differing technologies, protocols and tools to design and build a cloud computing environment.
2. Demonstrate in project format the ability to control, deploy and manage virtual resources.

Course Objectives

• 1. Explain the importance and benefits of Cloud computing and the need for its rapid adoption.
• 2. Explain roadmap for transformation from Classic to Cloud environment.
• 3. Identify and differentiate various infrastructure components of classic and virtualized data center.
• 4. Explain virtualization requirements and available tools at each layer of IT infrastructure.
• 5. Explain business continuity options in a virtualized environment.
• 6. Discuss effective cloud computing deployment models for businesses and IT organizations.
• 7. Perform detailed exploration of cloud products and services.
• 8. Describe infrastructure framework and service management activities in Cloud computing.
• 9. Understand and address security concerns commonly found in Cloud computing environments.
• 10. Formulate high-level cloud migration strategy and best practices.

Lecture Content

1. Journey to the Clouda. Business driversb. Definition of Cloud Computingc. Essential characteristicsd. Phases in the journey to the cloud environment 2. Classic Data Center (CDC)a. Key elements of CDCb. Computec. Storaged. Networkinge. Business Continuityf. Data Center Management 3. Virtualized Data Center (VDC) – Computational Aspectsa. Processor Virtualization and Techniquesb. Details of virtual machine (VM) componentsc. Management of computational resourcesd. Converting physical machines to virtual machines 4. Virtualized Data Center (VDC) – Storagea. Understanding key underlying technologiesb. Implementation methods for providing virtual storage to computer systems in a VDC environment 5. Virtualized Data Center (VDC) – Networkinga. Network virtualization in the VDCb. Network infrastructure and componentsc. Virtual LANsd. Virtual SANse. Key network traffic management techniques. 6. Virtualized Data Center (VDC) – Desktop and Applicationa. Details of desktop virtualization technologiesb. Application implementation on a virtual desktop 7. Business Continuity in VDCa. Understanding the mechanisms to protect single point of failure in a VDCb. Technology options for backup, replication, and migration of Virtual Machines (VM) and their data in a VDC environmentc. Options for recovering from total site failure due to a disaster 8. Cloud Computing Primera. Essential characteristics of cloud computingb. Cloud services and deployment modelsc. The economics of cloud 9. Cloud Infrastructure and Managementa. Creati ng cloud servicesb. Cloud service management processesc. Alignment of the delivery of cloud services with business objectives and expectations of cloud service consumers 10. Cloud Securitya. Key security concerns and threatsb. Infrastructure security mechanisms in VDC and cloud environmentsc. Access controld. Identity managemente. Governancef. Cloud security best practices 11. Cloud Migration Considerationsa. Examine details of 'cloud models suitable for different categories of usersb. Considerations for choosing candidate applications and various other considerations for migration to cloudc. Cloud adoption phases

Lab Content

Understanding RAID   Block level storage   File level storag   vSphere Datastore Implementation   Backup and Recovery Concepts   Benefits of Storage vMotion   Storage Replication   Storage De-duplication

Method(s) of Instruction

• Lecture (02)
• DE Live Online Lecture (02S)
• DE Online Lecture (02X)
• Lab (04)
• DE Live Online Lab (04S)
• DE Online Lab (04X)

Instructional Techniques

Lecture and application of ideas Students will be presented material from several different sources, including, but not limited to study guides, "Web-based" curriculum, in-class demonstrations of systems integration and personal experiences of industry professionals.Individual and paired exercises During the lab portion of the class, students will be

required to perform many of the tasks of a network administrator. In order to complete several projects, students will need to work together in teams to build working local area networks.Interactive computer-based assignments Using computer and "Web-based" training tools, students will be working on simulated networks in order to solve problems.

Reading Assignments

Minimum of 3 hours per week reading from textbook material.

Writing Assignments

Program and configure a set of routers to create a simulated Wide Area Network (WAN) infrastructure.   Given a minimum set of requirements, the student will design a recommended solution accommodating routing technologies using some combination of hardware and software. After the solution is designed, the student will create a presentation describing the results.

Out-of-class Assignments

45 hours (3hrs/wk). Student performance on quizzes, tests, including short essays, and laboratory assignments will be used to determine proficiency

Demonstration of Critical Thinking

Reading and writing assignments Web-based research Term or other paper(s) Laboratory reportsProblem solving demonstrations Exams Homework problemsSkill demonstrations Performance exams Case study presentationsObjective examinations, including Multiple-choice True/false

Required Writing, Problem Solving, Skills Demonstration

Program and configure a set of routers to create a simulated Wide Area Network (WAN) infrastructure.   Given a minimum set of requirements, the student will design a recommended solution accommodating routing technologies using some combination of hardware and software. After the solution is designed, the student will create a presentation describing the results.

Eligible Disciplines

Computer information systems (computer network installation, microcomputer ...: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience. Computer service technology: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Other Resources

1. PDF "Textbook" provided for free: EMC Academic Alliance. Cloud Infrastructure and Services Student Guide, Current ed. Boston: EMC Academic Alliance, Current edition (updated approximately yearly).