SECTION I

SUBJECT AREA AND COURSE NUMBER

COMP 652

COURSE TITLE

VIRTUAL DATACENTER 2

TYPE COURSE

NON-FEE   VOCATIONAL

CATALOG COURSE DESCRIPTION

This course includes the configuration and management of a software-defined datacenter. Students will manage virtual machine inventories, datacenter storage, and virtual networking. Students will learn about virtual workload management techniques. Students will apply appropriate methodologies and techniques to configure and troubleshoot a virtual datacenter. (FT)

LECTURE/LABORATORY HOURS

60

ADVISORY

COMP 651 Virtual Datacenter 1

RECOMMENDED SKILL LEVEL

Possess a 10th grade reading level; ability to communicate effectively in the English language; knowledge of math concepts at the 8th grade level and basic computer literacy.

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
   SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
   SDCE students demonstrate effective communication skills.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

3. Critical Thinking
    SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
    SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

1. Explore the management of virtual machines and applications, templates, clones, and snapshots.
2. Gain an understanding of the content library.
3. Explore live migration techniques for virtual machines and virtual machine storage.
4. Explore monitoring, management, analytics and alerts for resource usage and pools.
5. Learn about techniques for managing high availability and fault tolerance.
6. Use replication to create virtual machines and perform data recovery.
7. Use server clusters to improve host scalability.
8. Use virtual switches to improve network scalability.
9. Understand patch management and perform basic troubleshooting of virtual machine hosts, virtual machine guests, and infrastructure management server operations.

COURSE OBJECTIVES

1. Manage virtual machines using templates, cloning, and snapshots.
2. Create and manage virtual applications.
3. Manage workloads using virtual machine migrations.
4. Troubleshoot virtual machine configurations.
5. Monitor and manage virtual machine access to host resources.
6. Select and configure high-availability server clusters to ensure resource availability.
7. Determine when and how to configure and manage server fault tolerance.
8. Manage updates, patches and profiles for hypervisor and virtual machines.

SECTION II

COURSE CONTENT AND SCOPE

1. Virtual Machine (VM) Management
    1.1. Deployment
        1.1.1. Templates
        1.1.2. Cloning
    1.2. Modification
        1.2.1. Settings
        1.2.2. Hot-pluggable devices

COURSE CONTENT AND SCOPE (CONTINUED)

       1.2.3.   Modifying virtual disk size
       1.2.4.   Boot options
       1.2.5.   VM tools
  1.3. Migration
       1.3.1.   Live migration
       1.3.2.   Storage migration
       1.3.3.   Benefits
       1.3.4.   Requirements and constraints
  1.4. Snapshots
       1.4.1.   Files
       1.4.2.   Consolidation
  1.5. Libraries
       1.5.1.   Types
       1.5.2.   Catalogs
       1.5.3.   Versioning
       1.5.4.   Deploying virtual machines
  1.6. Virtual applications

2. Resource Management and Monitoring
  2.1. Memory
       2.1.1.   Types
       2.1.2.   Over-commitment
       2.1.3.   Reclamation
  2.2. Central Processing Unit (CPU)
       2.2.1.   Sockets
       2.2.2.   Hyper-threading
       2.2.3.   Load-balancing
  2.3. Resource pools
       2.3.1.   Shares
       2.3.2.   Limit
       2.3.3.   Reservation
       2.3.4.   Expandable reservation
       2.3.5.   CPU contention
       2.3.6.   Benefits
  2.4. Resource optimization
       2.4.1.   Performance-tuning methodology
       2.4.2.   Resource monitoring tools
       2.4.3.   Charts and logs
  2.5. Monitoring usage
       2.5.1.   Events
       2.5.2.   Alarms
       2.5.3.   Triggers
       2.5.4.   Notifications

3. High Availability and Fault Tolerance
  3.1. High Availability (HA) Architecture
       3.1.1.   Database
       3.1.2.   Authentication
       3.1.3.   HA scenarios

COURSE CONTENT AND SCOPE (CONTINUED)

      3.1.4.   Agent communication
      3.1.5.   Master and Slave hosts
      3.1.6.   Heartbeats
      3.1.7.   Redundancy
      3.1.8.   Failure scenarios
  3.2. Clustering
      3.2.1.   Configuration
      3.2.2.   Management
      3.2.3.   VM Monitoring
  3.3. Fault Tolerance (FT)
      3.3.1.   Enablement
      3.3.2.   Failover
      3.3.3.   VM migration
      3.3.4.   Checkpoints
      3.3.5.   Shared files
  3.4. Replication
      3.4.1.   Appliance
      3.4.2.   File types
      3.4.3.   Expandable reservation
      3.4.4.   Recovering VMs
      3.4.5.   Architecture
  3.5. Data protection
      3.5.1.   Backup
      3.5.2.   Restoration
4. Host Scalability
  4.1. Distributed clusters
  4.2. Requirements
  4.3. Automation levels
  4.4. Functions
  4.5. Benefits
  4.6. Configuration
  4.7. Management
  4.8. Affinity and anti-affinity rules
  4.9. Business continuity
5. Patch Management
  5.1. Update manager
      5.1.1.   Components
      5.1.2.   Installation
      5.1.3.   Plug-in
  5.2. Baselines
      5.2.1.   Groups
      5.2.2.   Patch, extension, upgrade
  5.3. Hosts
      5.3.1.   Scanning
      5.3.2.   Compliance
      5.3.3.   Remediation

COURSE CONTENT AND SCOPE (CONTINUED)

    5.4. Host profiles
        5.4.1. Workflow
        5.4.2. Attaching to Host or cluster
        5.4.3. Compliance
        5.4.4. Remediation
6. Virtual Data Center Components
    6.1. Hypervisors
        6.1.1. Hardware requirements
        6.1.2. Installation requirements and options
        6.1.3. Installation methods: Scripted, automatic, remote
        6.1.4. Boot from Storage Area Network (SAN)
    6.2. Management server
        6.2.1. Platform services controller
        6.2.2. Functions and services
        6.2.3. Configuration types: appliance, server, distributed
        6.2.4. Installation method
        6.2.5. User account
        6.2.6. Supported operating systems
        6.2.7. Supported databases

APPROPRIATE READINGS

Appropriate readings may include, but are not limited to, periodicals, magazines, instructor-written materials, manuals, instructor selected URLs, and publications related to the implementation of virtualization technologies, including software-defined datacenters, networking, and virtual machine management.

WRITING ASSIGNMENTS

Appropriate writing assignments may include, but are not limited to, preparing text for an assigned project, documenting all laboratories and project work, and completing all written assigned reports, such as describing the different techniques used in a software defined datacenter to ensure high availability and fault tolerance.

OUTSIDE ASSIGNMENTS

Outside assignments may include, but are not limited to, reading texts and reference resources; research as needed to complete projects, such as current security threats and the appropriate mitigation; and organizing and preparing written answers to assigned questions.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Assignments which demonstrate critical thinking may include, but are not limited to, analysis and evaluation of assigned text and reference resources, and utilize this analysis in classroom discussions, writing assignments, and in performing laboratory activities, such as the appropriate methodology to troubleshoot loss of management capabilities of the hypervisors.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING
(CONTINUED)

Students must select appropriate methods and resources needed to complete laboratory
assignments.

EVALUATION

A student's grade will be based on multiple measures of performance and will include
evaluation of student's ability to:

1. Perform in a variety of activities and assignments related to the course objectives.
2. Complete written and practical examinations.
3. Contribute to class and group discussions.
4. Maintain attendance and punctuality per current policy.
5. Demonstrate ability to work independently and as a team member.
6. Demonstrate troubleshooting skills.

Upon successful completion of each course in the program, a Certificate of Course Completion
will be issued. Upon successful completion of all courses included in the program, a
Certificate of Program Completion will be issued.

METHOD OF INSTRUCTION

Methods of instruction may include, but are not limited to, lectures, self-paced lab,
demonstrations, individualized study, use of audio-visual aids, group/team work, tutorials,
outside assignments, guest lectures, field trips, and guided student job assignments. This
course, or sections of this course, may be offered through distance education.

TEXTS AND SUPPLIES

VMware vSphere: Install, Configure, Manage, VMware Educational services, current edition
Mastering VMware vSphere 6, Nick Marshall, Grant Orchard, Josh Atwell, Scott Lowe,
     Wiley Publishing, current edition
Web Resources: https://mylearn.vmware.com
Supplies: Journal (composition book), USB Drive or other storage media

PREPARED BY: ___Richard Gholson_____   DATE: _____12/7/2016_____

REVISED BY: _____   DATE: _____

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities
and Administrative Due Process), and the Attendance Policy set forth in the Continuing
Education Catalog.

REFERENCES:
San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog