South Central College

COMP 2453 Virtualization Technologies

Common Course Outline

Course Information

Description: The Virtualization Technologies course is designed to get students up to speed on one of the most important aspects of today's IT environment. This course covers the fundamental concepts, components, infrastructure, as well as security and privacy considerations for virtualization systems. Through lectures, discussions, demonstrations, and labs, students learn the skills and knowledge necessary to install, configure and manage virtual environments. Students will learn how to effectively plan, implement and manage Cloud Computing in virtual data centers and complete introductory coursework in Virtualization software. Topics will include creating virtualized switches and storage, creating and managing virtual machines, establishing access controls, and performing resource monitoring. With additional effort, students can use this knowledge to pass the VCP Certification Exam.

(Prerequisite: None)

Career Cluster: Arts, Communications, & Information Systems

Instructional Level: Certificate

Total Credits: 4.00

Total Hours: 64.00

Types of Instruction

<table>
<thead>
<tr>
<th>Instruction Type</th>
<th>Credits/Hours</th>
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<tbody>
<tr>
<td>Lecture / Active learning</td>
<td>4/64</td>
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Pre/Corequisites

Prerequisite: COMP 1200 Hardware and Software Essentials

Institutional Core Competencies

1. Analysis and inquiry: Students will demonstrate an ability to analyze information from multiple sources and to raise pertinent questions regarding that information.

2. Critical and creative thinking: Students will develop the disposition and skills to strategize, gather, organize, create, refine, analyze, and evaluate the credibility of relevant information and ideas.

3. Teamwork and problem-solving: Students will demonstrate the ability to work together cohesively with
diverse groups of persons, including working as a group to resolve any issues that arise.

4. Written and oral communication: Students will communicate effectively in a range of social, academic, and professional contexts using a variety of means, including written, oral, numeric/quantitative, graphic, and visual modes of communication.

**Course Competencies**

1. **Explore virtualization concepts.**

   **Learning Objectives**
   - Describe the benefits of using virtual machines.
   - Define a virtual machine.
   - Identify the files that comprise a virtual machine.
   - Explain the concepts of server, network, and storage virtualization.
   - Compare and contrast physical and virtual architectures.
   - Describe the history of computer Virtualization Technology.
   - Discuss the practical aspects of virtualization.

2. **Differentiate between types of virtualization and the environments that support them.**

   **Learning Objectives**
   - Define the different types of Virtualization Technology.
   - Describe in brief the main hypervisors available.
   - Define and identify the different types of Virtualization Technology.
   - Explain the difference between a guest OS and a host OS.
   - Explain the principles emulation.
   - Describe Kernel level and shared level virtualization.

3. **Analyze the uses of server and desktop based virtualization.**

   **Learning Objectives**
   - Demonstrate the configuration processes of server and desktop virtualization.
   - Describe how to deploy virtual appliances.
   - Describe tuning and adjustment of virtual devices.
   - Explain the security features of Virtual Servers.
   - Describe how to backup systems.
   - Discuss migration strategies.
   - Describe the conversion of physical servers to virtual servers.

4. **Demonstrate the configuration processes of server virtualization.**

   **Learning Objectives**
   - Create a virtual machine.
   - Install a guest operating system in a virtual machine.
   - Identify a virtual machine’s disk format and usage statistics.
   - Install VMware Tools on a virtual machine installed with a Windows operating system.
   - Enable time synchronization between a virtual machine and an ESXi host.

5. **Secure Virtual infrastructure.**

   **Learning Objectives**
   - Identify common Hypervisor Server privileges and roles.
   - Add, Modify, Remove permissions for users and groups on Server inventory objects.
   - Describe how permissions are applied and inherited.
   - Configure and administer Single Sign-On.
   - Configure network security policies.
   - Configure and administer the Hypervisor firewall.

6. **Plan and configure virtual storage.**

   **Learning Objectives**
   - Configure Shared Storage.
   - Identify storage adapters and devices.
Compare and contrast array thin provisioning and virtual disk thin provisioning.
Describe zoning and LUN masking practices.
Create an NFS share for use by Hypervisor.

7 Perform Basic Storage Troubleshooting.

Learning Objectives
Verify storage configuration.
Troubleshoot storage contention issues.
Troubleshoot storage over-commitment issues.
Troubleshoot iSCSI software initiator configuration issues.
Troubleshoot Storage Reports and Storage Maps.
Identify the root cause of a storage issue based on troubleshooting information.

8 Manage user access to the Virtual infrastructure.

Learning Objectives
Control user access through roles and permissions.
Integrate Hypervisor with Active Directory.

9 Configure and manage virtual networking.

Learning Objectives
Configure Standard virtual Switches.
Create and configure port groups on a Standard virtual Switch.
Configure vkernel ports for network services.
Identify Distributed Switch (vDS) capabilities.
Create Distributed Switches.
Configure Distributed Switch general and vPort group settings.

10 Perform Basic Network Troubleshooting.

Learning Objectives
Verify network configuration.
Verify a given virtual machine is configured with the correct network resources.
Troubleshoot virtual switch and port group configuration issues.
Troubleshoot physical network adapter configuration issues.
Identify the root cause of a network issue based on troubleshooting information.

11 Plan and Implement VMware Fault Tolerance.

Learning Objectives
Identify Fault Tolerance requirements.
Configure Fault Tolerance networking.
Determine use case for enabling Fault Tolerance on a virtual machine.
Configure Fault Tolerances on a virtual machine.
Test a Fault Tolerance configuration.

12 Monitor system resource usage and utilization.

Learning Objectives
Identify critical performance metrics.
Compare and contrast Overview and Advanced Charts.
Configure Server logging options.
Determine host performance using guest Performance Monitor.
Configure resource maps.
Given performance data, identify the affected server resource.

13 Investigate and implement the VMware Server platform.

Learning Objectives
Describe the functions of the VMware console.
Create and customize virtual machines with the VMware console.
Describe file and folder security.
Identify file names and roles.
Explain how VMware can be used in real world applications.

14 Explain and implement the Citrix XenServer platform.

   Learning Objectives
   Identify the features of the XenServer Hypervisor.
   Identify the features of the XenServer Console.
   Create Virtual Machines on the XenServer Platform.
   Customize Virtual Machines on the XenServer Platform.
   Identify the features of a resource pool and create virtual machine templates.
   Explain the real world application scenarios with XenServer.

15 Investigate the features of the Hyper-V Platform.

   Learning Objectives
   Explain the features of the Hyper-V platform.
   Define how to create and customize virtual machines with Hyper-V.
   Describe how to use file and folder security with Hyper-V.
   Use file name roles with Hyper-V.

SCC Accessibility Statement

If you have a disability and need accommodations to participate in the course activities, please contact your instructor as soon as possible. This information will be made available in an alternative format, such as Braille, large print, or cassette tape, upon request. If you wish to contact the college ADA Coordinator, call that office at 507-389-7222.

Disabilities page [http://southcentral.edu/academic-policies/disability-rights.html](http://southcentral.edu/academic-policies/disability-rights.html)