South Central College

# COMP 2453 Virtualization Technologies

## Course Outcome Summary

### 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: COMP 1200 Hardware and Software Essentials)

**Total Credits** 4

**Total Hours** 64

### Types of Instruction

| Instruction Type | Credits/Hours |
|---|---|
| Lecture / Active learning | 4/64 |

### Pre/Corequisites

COMP 1200 Hardware and Software Essentials

### Institutional Core Competencies

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

### 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.
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

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

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