Course Information

Division: Business
Course Number: CMP 255
Title: Server Systems I
Credits: 3
Developed by: James McBride
Lecture/Lab Ratio: 2 Lecture/2 Lab
Transfer Status: ASU, NAU, UA

Elective Credit
ISM Departmental Elective
BASV Dept Elective, Credit given in Bachelor of Applied Sci only

Activity Course: No
CIP Code: 11.0100
Assessment Mode: Pre/Post Test (80 Questions/100 Points)
Semester Taught: Spring
GE Category: None
Separate Lab: No
Awareness Course: No
Intensive Writing Course: No

Prerequisites
None

Educational Value
This course serves as a program elective and personal interest course. It exposes the student to the principles and practices of hardware and OS virtualization. This course also explores the reasoning and rational for virtualization as applied to PCs, mobile devices, and servers.

Description
In this course, the fundamentals of virtualization and virtualization techniques are explored. Students will have the opportunity to install, configure, manage, and deploy virtual servers and workstations. It is recommended the student take a course discussing basic network technologies such as CMP 151, Computer Systems I, prior to attempting this course. Core elements of virtualization are explored as well as the fundamental concepts and skills. Concepts of how virtualization software operates, different hypervisor products, and how to manage hardware resources, such as CPU, memory, storage, networking, and the like within virtual environments will be covered.
Supplies
None

Competencies and Performance Standards
1. Discuss the history and basics of virtualization beginning with mainframes and continuing through current virtualization technologies.

Learning Objectives
What you will learn as you master the competency:
   a. Describe the historical development of virtualization.
   b. Survey the significance of virtualization.
   c. Apply knowledge of the basics of virtualization software operation.

Performance Standards
Competence will be demonstrated:
   o by participating in the lecture and classroom discussions
   o by successful completion of required assignments, readings, and projects
   o by successful completion of chapter quizzes
   o by successful completion of the final exam
Criteria – Performance will be satisfactory when:
   o learner describes the historical development of virtualization in oral discussion
   o learner surveys the significance of virtualization in completion of course work
   o learner applies knowledge of virtualization software operation in course work, in the unit quiz and final exam

2. Demonstrate an understanding of hypervisor technologies and concepts, the software that provides virtualization.

Learning Objectives
What you will learn as you master the competency:
   a. Compare the various components of a hypervisor.
   b. Discuss the role of a hypervisor.
   c. Compare today’s hypervisors.

Performance Standards
Competence will be demonstrated:
   o by participating in the lecture and classroom discussions
   o by successful completion of required assignments, readings, and projects
   o by successful completion of chapter quizzes
   o by successful completion of the final exam
Criteria – Performance will be satisfactory when:
   o learner compares the components of hypervisors
   o learner discusses the role of a hypervisor
   o learner compares the features of today’s hypervisors
3. **Demonstrate an understanding of the components of a virtual machine and how they interact with the hypervisor.**

**Learning Objectives**

What you will learn as you master the competency:

a. Describe a virtual machine.
b. Discuss how a virtual machine works.
c. Work with virtual machines.

**Performance Standards**

Competence will be demonstrated:

- by participating in the lecture and classroom discussions
- by successful completion of required assignments, readings, and projects
- by successful completion of chapter quizzes
- by successful completion of the final exam

Criteria – Performance will be satisfactory when:

- learner describes the components of a virtual machine
- learner discusses how a virtual machine works
- learner works with virtual machines

4. **Verify understanding and knowledge of managing applications in a virtual machine.**

**Learning Objectives**

What you will learn as you master the competency:

b. Demonstrate how to install and use applications in a virtual environment.
c. Install and configure virtual appliances and vApps.

**Performance Standards**

Competence will be demonstrated:

- by participating in the lecture and classroom discussions
- by successful completion of required assignments, readings, and projects
- by successful completion of chapter quizzes
- by successful completion of the final exam

Criteria – Performance will be satisfactory when:

- learner drafts diagrams of the components of a virtual infrastructure
- learner demonstrates how to install and use applications in a virtual environment
- learner installs and configures the virtual environments and vApps
5. **Create virtual machines to tie hardware to virtual hardware.**

   **Learning Objectives**
   
   What you will learn as you master the competency:
   
   a. Perform physical to virtual conversions.
   b. Demonstrate how to move and load virtual environments.
   c. Build a new virtual machine.

   **Performance Standards**
   
   Competence will be demonstrated:
   
   o by participating in the lecture and classroom discussions
   o by successful completion of required assignments, readings, and projects
   o by successful completion of chapter quizzes
   o by successful completion of the final exam

   **Criteria** – Performance will be satisfactory when:
   
   o learner performs a physical to virtual conversion
   o learner demonstrates how to move and load virtual environments
   o learner builds a new virtual machine

6. **Install operating systems on a virtual machine.**

   **Learning Objectives**
   
   What you will learn as you master the competency:
   
   a. Demonstrate how to load Windows into a virtual machine.
   b. Discuss Windows configuration options.
   c. Optimize a new Windows virtual machine.
   d. Demonstrate how to load Linux into a virtual machine.
   e. Discuss Linux configuration options.
   f. Optimize a new Linux virtual machine.

   **Performance Standards**
   
   Competence will be demonstrated:
   
   o by participating in the lecture and classroom discussions
   o by successful completion of required assignments, readings, and projects
   o by successful completion of chapter quizzes
   o by successful completion of the final exam

   **Criteria** – Performance will be satisfactory when:
   
   o learner demonstrates how to load Linux and Windows into a virtual machine
   o learner compares the differences between Linux and Windows virtual machine configuration options
   o learner optimizes Linux and Windows virtual machines
7. **Manage virtual machines including: copying, backing up, cloning, templates, and snapshots.**

**Learning Objectives**
What you will learn as you master the competency:

a. Demonstrate how to copy and clone a virtual machine.
b. Use virtual machine templates.
c. Indicate how virtual machine states are saved and restored.
d. Define the uses of virtual machine tools.

**Performance Standards**
Competence will be demonstrated:

- by participating in the lecture and classroom discussions
- by successful completion of required assignments, readings, and projects
- by successful completion of chapter quizzes
- by successful completion of the final exam

Criteria – Performance will be satisfactory when:

- learner demonstrates how to copy and clone a virtual machine
- learner uses virtual machine templates
- learner indicates how virtual machine states are saved and restored
- learner defines the uses of virtual machine tools

8. **Verify understanding of availability in the virtual environment and the technologies that provide for it.**

**Learning Objectives**
What you will learn as you master the competency:

a. Describe availability and how virtualization can benefit it.
b. Protect a virtual machine.
c. Protect multiple virtual machines.
d. Describe the processes for protecting data centers.

**Performance Standards**
Competence will be demonstrated:

- by participating in the lecture and classroom discussions
- by successful completion of required assignments, readings, and projects
- by successful completion of chapter quizzes
- by successful completion of the final exam

Criteria – Performance will be satisfactory when:

- learner describes availability and how virtualization can benefit it
- learner protects a virtual machine
- learner protects multiple virtual machines
- learner describes the processes for protecting data centers
**Types of Instruction**
Classroom Presentation
In class Discussion
Lab Exercises

**Grading Information**

**Grading Rationale**
The Final Exam and other tests will represent 25% of the course grade.
Course learning activities shall represent 75% of the course grade.

**Grading Scale**
A  90-100%
B  80-89%
C  70-79%
D  60-69%
F  < 60%