



College of Information Technology
Department of Information Technology
COURSE SYLLABUS/ SPECIFICATION

Course Code & Title: ITCS 442 - Virtualization

Weight: (2 - 2 - 3)

Prerequisite: ITCS 335

NQF Level Allocated: 8

NQF Notional Hours / Credits: 120 notional hours/ 12 NQF credit

Description: This course is designed primarily for IT professionals who have some experience with NOS. It is designed for professionals who will be responsible for managing storage servers and computing elements by using NOS, and who need to understand the scenarios, requirements, and storage and compute options that are available and applicable to NOS.

Objectives:

1. Prepare and install Nano Server, a Server Core installation, and plan a server upgrade and migration strategy.
2. Describe the various storage options, including partition table formats, basic and dynamic disks, file systems, virtual hard disks, and drive hardware, and explain how to manage disks and volumes.
3. Describe enterprise storage solutions, and select the appropriate solution for a given situation.
4. Implement and manage Storage Spaces and Data Deduplication.
5. Install and configure host virtualization, and configure virtual machines and host virtualization containers.
6. Describe the high availability and disaster recovery technologies in NOS.
7. Plan, create, and manage a failover cluster and implement failover clustering for Hyper-V virtual machines.
8. Configure a Network Load Balancing (NLB) cluster, and plan for an NLB implementation.
9. Create and manage deployment images.
10. Manage, monitor, and maintain virtual machine installations.

Semester:

Instructor (s):

Office Telephone:

Email (s):

Intended Learning Outcomes (ILOs):

| A. Knowledge and Understanding | | NQF Descriptor/ Level |
|--------------------------------|---|---|
| A1 | Concepts and Theories: Demonstrate critical knowledge and understanding of various virtualization requirements, storage and compute technologies for local and enterprise. | Knowledge: Theoretical Understanding [Level 8] |
| A2 | Contemporary Trends, Problems and Research: | N/A |
| A3 | Professional Responsibility: | N/A |

| B. Subject-specific Skills | | NQF Descriptor/ Level |
|-----------------------------|--|---|
| B1 | Problem Solving: Demonstrate ability to use specialist skills to prepare, install and configure nano server, server core, host virtualization, containers and virtual machines. | Knowledge: Practical Application [Level 8] Skills: Communication, ICT & Numeracy [Level 8] |
| B2 | Modeling and Design: Demonstrate creativity in Designing a well thought out plans for configuring storage technology and implementing disaster recovery. | Knowledge: Practical Application [Level 8] |
| B3 | Application of Methods and Tools: Apply specialized tools while installing, managing and configuring nano and core servers, host virtualization, containers and virtual machines. | Knowledge: Practical Application [Level 8] Skills: Communication, ICT & Numeracy [Level 8] |
| C. Critical-Thinking Skills | | NQF Descriptor/ Level |
| C1 | Analytic skills: <i>Critically evaluate</i> the various tools of configuring and managing servers, failover clusters, virtual hosts and machines as well as | Generic Problem Solving & |

| | | |
|-----------|---|--------------------------------|
| | choose the appropriate tools for a given situation. | Analytical skills [Level 8] |
| C2 | Synthetic: | N/A |
| C3 | Creative Thinking and innovation: | N/A |

| D. General and Transferable Skills (other skills relevant to employability and personal development) | | NQF Descriptor/ Level |
|---|--|--|
| D1 | Communication: Use Specialist skills to express and communicate critical ideas related to virtualization and storage technologies in oral and written form. | Communication, ICT & Numeracy Skills [Level 8] |
| D2 | Teamwork and Leadership: | N/A |
| D3 | Organizational and Developmental Skills: Demonstrate ability to organize ideas and effectively allocate time in a given assignment. | Competence: Autonomy, Responsibility and Context [Level 8] |
| D4 | Ethics and Social Responsibility: | N/A |

Course Structure (Outline)

| Week | Hours | | ILOs | Topics | Teaching Method | Assessment Method |
|-------|-------|-----|----------------|---|---|-------------------------------|
| | Lec. | Lab | | | | |
| 1 | 2 | 2 | A1 | Introduction and Syllabus Distribution | Lecture | |
| 2 | 2 | 2 | A1, B3 | Installing, upgrading, and migrating servers and workloads | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 3 | 2 | 2 | A1, B3 | Configuring local storage | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 4 | 2 | 2 | A1, B2, B3, C1 | Implementing enterprise storage solutions | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise/ Quiz1 |
| 5 | 2 | 2 | B3, C1, D1, D3 | Implementing Storage Spaces and Data Deduplication | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise/ Assignment 1 |
| 6 | 2 | 2 | B3 | Installing and configuring Hyper-V and virtual machines | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 7 | 2 | 2 | B3 | Deploying and managing Windows and Hyper-V containers | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 8 | 2 | 2 | A1, B2, B3, C1 | Overview of high availability and disaster recovery | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 9-10 | 4 | 4 | A1, B3, C1 | Implementing failover clustering | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise / Major Test |
| 11 | 2 | 2 | A1, B3, C1 | Implementing failover clustering with Windows Server 2016 Hyper-V | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise / Quiz2 |
| 12 | 2 | 2 | A1, B3, C1 | Implementing Network Load Balancing | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 13 | 2 | 2 | A1, B3 | Creating and managing deployment images | Lecture/ Class Discussion/ In-Lab Supervised Work | In-Lab Exercise |
| 14-15 | 4 | 4 | A1, B3, C1 | Managing, | Lecture/ Class | In-Lab Exercise/ |

| | | | | | | |
|----|---|---|------------|---|------------------------------------|-------------|
| | | | D1, D3 | monitoring, and maintaining virtual machine installations | Discussion/ In-Lab Supervised Work | Assignment2 |
| 16 | 2 | - | A1, B1, C1 | All Topic | | Final Exam |

Teaching Materials:

| | |
|----------------------|--|
| Textbook(s): | Craig Zacker (2017), <i>Exam Ref 70-740 Installation, Storage and Compute with Windows Server 2016</i> , Microsoft Press, ISBN: 978-0735698826 |
| Handout(s): | Available on Moodle i.e. http://www.ahlia.edu.bh/moodle |
| Reference(s): | Microsoft Course 20740C Website https://www.microsoft.com/en-ca/learning/course.aspx?cid=20740 |

Assessments:

| Method of Assessment | Description | Learning Outcomes | Weighting |
|-------------------------|--|------------------------|--------------|
| Assignments | Students will be given two assignments each worth 10 marks and their total will be considered at the end. | B1, B2, B3, C1, D1, D3 | 20% |
| Quizzes | The purpose of the quiz is to assess the students' knowledge and understanding of the topics covered in the course like managing and configuring nano and core server, virtual host and machines. Students will be given two quizzes, each one is 30 minutes, and the best one will be considered. | A1, C1 | 10% |
| Major Test | The test will be an in-class 60 minutes exam that will consist of multiple choice questions, fill in the blank, short-answer and few essay questions. It will cover the topics studied in the first 9 weeks. | A1, C1 | 30% |
| Final Exam | The final exam is comprehensive and will be of two hours duration. It will consist of multiple choice questions, fill in the blank, short-answer and few essay questions. | A1, B1, C1 | 40% |
| In-Lab Exercises | Each of the In-Lab exercises consists of a set of practical tasks to be carried by the students during lab time and that will help in evaluating hands-on capability of the students. | B1, B3, C1 | Formative |
| Overall: | | | 100 % |

| Admissions | |
|-----------------------------------|----|
| Minimum number of students | 5 |
| Maximum number of students | 20 |

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