СОФИЙСКИ УНИВЕРСИТЕТ "СВ. КЛИМЕНТ ОХРИДСКИ"
ФАКУЛТЕТ ПО МАТЕМАТИКА И ИНФОРМАТИКА

учебна година: 2010/2011   **семестър:** летен

наименование на дисциплината: Виртуализация и Cloud Computing (Virtualization & Cloud Computing)	
хорариум: 2 + 0 + 2 Общо: 60 часа (30 + 0 + 30) ***вид на дисциплината:*** избираема	
специалност: ***курс***: I ***поток:*** Разрелени системи и мобилни технологии	
специалност: ***курс***: II ÷ IV ***поток:*** Информатика Информационни системи Компютърни науки Софтуерно инженерство Приложна математика	
лектор: гл. ас. Георги Георгиев	

1. **Кратка анотация на дисциплината**

   Курсът е избираем за студентите от I курс в магистърската програма "Разпределени системи и мобилни технологии" на направление „Информатика".

   Курсът е отворен като избираем и за студентите от II до IV курс от бакалавърските програми "Информатика", „Информационни системи", „Компютърни науки", „Софтуерно инженерство" и „Приложна математика".

   Курсът запознава студентите с Cloud Computing и продуктите за виртуализация, които са в технологичната основа на Cloud Computing, и им дава специализирани знания и умения за инсталиране, поддръжка и управление на такива продукти за виртуализация. Курсът е насочен към студенти с интереси в администрирането на сървъри и услуги.

2. **Предварителни изисквания към студентите (отнася се само за избираемите дисциплини)**

   Студентите следва да имат основни познания по компютърни мрежи. Изисква се студентите успешно да са преминали обучение в поне един от следните курсове: „Практикум Компютърни мрежи (CCNA)" и/или „Основи на TCP/IP (в.4 и в.6)".

   Студентите следва да имат и начални познания по Windows операционна система. Изисква се студентите успешно да са преминали обучение и в поне един от следните курсове: „Директорийни услуги" и/или „Администриране на Майкрософт сървъри".

3. **Форма на проверка на знанията и уменията и начин на формиране на оценката по дисциплината**

Междинни тестове по време на занятията:	33 % от крайната оценка
Финален тест:	67 % от крайната оценка

4. **Тематичен план (конспект) на дисциплината**

Module 1: Evaluating and Planning for Virtualization
- Overview of Microsoft Virtualization
- Overview of Virtualization Management
- Evaluating the Current Environment for Virtualization
- Planning the Hyper-V Server Role

Lab: Evaluating the Network Environment for Virtualization
- Planning for the Hyper-V Server Role
- Assessing the Computing Environment by Using the MAP Toolkit

Module 2: Installing and Configuring the Hyper-V Server Role
- Installing the Hyper-V Server Role
- Configuring Hyper-V Settings and Virtual Networks

Lab: Installing and Configuring the Hyper-V Server Role
- Installing the Hyper-V Role
- Determining Virtual Network Configuration Settings Based On Organizational Requirements
- Configuring Virtual Network Settings Using Virtual Network Manager
- Installing Remote Management Tools

Module 3: Creating and Configuring Virtual Hard Disks and Virtual Machines
- Creating and Configuring Virtual Hard Disks
- Creating and Configuring Virtual Machines
- Managing Virtual Machine Snapshots
- Working with the Virtual Machine Connection Application

Lab: Creating Virtual Hard Disks and Virtual Machines
- Creating Appropriate Virtual Hard Disks, Based On Organizational Requirements
- Creating New Virtual Machines Using the Virtual Machine Wizard
- Modifying Virtual Machine Settings
- Creating and Modifying Virtual Machine Snapshots

Module 4: Integrating System Center Virtual Machine Manager with Microsoft Hyper-V Server 2008 R2
- Planning for Integration of System Center Virtual Machine Manager
- Installing the VMM Server and Administrator Console
- Managing Hosts and Host Groups

Lab: Planning and Deploying VMM 2008 R2
- Planning for the Implementation of SCVMM 2008 R2, Based Upon Organizational Requirements
- Installing and Configuring SCVMM Server and Administration Console Components

Module 5: Creating and Deploying Virtual Machines Using System Center Virtual Machine Manager 2008 R2

- Creating a New Virtual Machine Using VMM 2008 R2
- Converting a Physical Server to a Virtual Machine
- Converting and Migrating Virtual Machines

Lab: Creating and Deploying Virtual Machines

- Creating a New Virtual Machine
- Deploying a New Virtual Machine from the VMM Library
- Converting a VMware-Based Virtual Machine to a Hyper-V Based Virtual Machine

Module 6: Managing Virtual Machines Using Virtual Machine Manager 2008

- Overview of VMM Management Tasks
- Creating and Managing Checkpoints

Lab: Managing Virtual Machines Using VMM 2008 R2

- Modifying Virtual Machine Properties
- Managing Virtual Machine Checkpoints

Module 7: Configuring and Managing the VMM Library

- Overview of the VMM Library
- Managing Profiles and Templates
- Designing Fault Tolerance for the VMM Library

Lab: Configuring and Managing the VMM Library

- Adding a Library Server and Library Resources
- Creating a Hardware Profile
- Creating a Guest Operating-System Profile
- Creating a Virtual Machine Template
- Configuring highly available file servers for Virtual Machine Library Using DFS

Module 8: Configuring User Roles and the Virtual Machine Manager Self-Service Portal

- Configuring User Roles
- Installing and Configuring the VMM Self-Service Portal

Lab: Configuring the VMM Self-Service Portal

- Preparing the Host Group and User Role Requirements
- Implementing the Self-Service Portal

Module 9: Implementing High Availability for Server Virtualization

- Overview of Failover Clustering
- Implementing Failover Clustering with Hyper-V
- Implementing High Availability with VMM 2008 R2

Lab: Implementing High Availability for Server Virtualization

- Installing and Configuring the Failover Clustering Feature
- Configuring Live Migration
- Integrating Failover Clustering with VMM 2008 R2

Module 10: Maintaining Software Updates Using the Offline Virtual Machine Servicing Tool

- Overview of the Offline Virtual Machine Servicing Tool
- Configuring WSUS and the Offline Virtual Machine Servicing Tool

Lab: Maintaining Software Updates Using the Offline Virtual Machine Servicing Tool

- Configuring Infrastructure Prerequisites to Support the Offline Virtual Machine Servicing Tool
- Installing and Configuring the Offline Virtual Machine Servicing Tool

Module 11: Monitoring and Reporting Virtualization

- Monitoring Jobs in VMM 2008 R2
- Integrating System Center Operations Manager with VMM 2008 R2
- Configuring Performance and Resource Optimization

Lab: Integrating System Center Operations Manager with VMM 2008

- Configuring System Center Operations Manager for VMM 2008 Integration
- Configuring PRO

Module 12: Backup and Restore Strategies for Virtual Machines

- Overview of Backup and Restore Options for Virtual Machines and the VMM Database
- Implementing Data Protection Manager for Backing Up the VMM Infrastructure

Lab: Using Data Protection Manager to Back Up the VMM 2008 Infrastructure

Module 13: Desktop Virtualization Using Remote Desktop Services

- Overview of Remote Desktop Services
- Implementing the Remote Desktop Session Host
- Implementing Remote Desktop Connection Broker
- Implementing the Remote Desktop Connection Virtualization Host

Lab: Implementing Remote Desktop Services

- Installing the Remote Desktop Session Host
- Installing and configuring the Remote Desktop Session Host
- Installing the Remote Desktop Connection Broker
- Configuring the Remote Desktop Connection Broker
- Installing and Configuring the Remote Desktop Virtualization Host
- Deploying an Application Using RemoteApp

Module 14: Extending Remote Desktop Services Outside the Organization

- Configuring the Remote Desktop Gateway
- Configuring Remote Desktop Web Access

Lab: Integrating Remote Desktop Web Access into the Desktop Virtualization Infrastructure

- Installing Remote Desktop Gateway
- Installing Remote Desktop Web Access
- Configuring Remote Desktop Web Access
- Integrating RemoteApp and Desktop Connection with Remote Desktop Web Access

Module 15: New features for virtualization with Windows Server 2008 R2 SP1

- Dynamic Memory Overview
- Configure Dynamic Memory

Lab: Evaluate Dynamic Memory

- Identify the memory consumption of a virtual machine
- Configure Dynamic Memory
- Evaluate Memory Consumption

- Adjust Dynamic Memory Settings to Tune Performance

Module 16: Cloud Computing
- What Is Cloud Computing?
- Examining the Benefits of Cloud Computing
- Examining Cloud-Computing Usage Scenarios
- Understanding the Cloud-Computing Platform
- Availability of the Cloud-Computing Platform

5. **Литература**

1. MOC # 10215: Implementing and Managing Microsoft Server Virtualization. *Student book*
2. MOC #6422A: Implementing and Managing Windows Server 2008 Hyper-V. *Student book*
3. Tulloch M., Understanding Microsoft Virtualization Solutions, Second Edition. Microsoft Press, Redmond, Washington, 2010.
4. *e-Learning:* Collection 6319: Configuring Hyper-V in Windows Server 2008.
5. *e-Learning:* Collection 6896: Configuring Microsoft System Center Virtual Machine Manager 2008.