Modular Content Structure

1. **Introduction to Cloud Computing**

    1.1. Cloud Computing, services, deployment models

    1.2. Introduction to Cloud Computing

    1.3. Origins and Motivation

    1.4. Types of Clouds and Services

    1.5. Cloud Infrastructure and Deployment

2. **Virtualization Techniques and Types**

    2.1. Introduction to Virtualization

    2.2. Use & demerits of Virtualization

    2.3. Types of Virtualizations

    2.4. Examples

    2.5. x86 Hardware Virtualization

    2.6. Manage the resources for the SaaS, PaaS and IaaS models

3. **Infrastructure as a Service**

    3.1. Introduction to IaaS

    3.2. IaaS examples

    3.3. Reference Model of AWS

    3.4. Amazon cloud services - Compute, Database, Storage

    3.5. Region Vs Availability zones

    3.6. Case Study - Openstack

    3.7. Managing Virtual Resources on the Cloud: Provisioning and Migration

    3.7.1. Virtual Machine Provisioning and Manageability

    3.7.2. VM Provisioning Process

    3.7.3. Virtual Machine Migration Services

    3.7.4. Migrations Techniques

    3.7.5. VM Provisioning and Migration in action

4. Containers

    4.1. Linux Containers - LXC and LXD

    4.2. Dockers - Elements, Images, Files, Containers

    4.3. Cloud orchestration technologies

5. Platform as a Service and SaaS

    5.1. Introduction to PaaS

    5.2. PaaS examples

    5.3. Windows Azure

    5.4. 5 Principles of UI Design - AWS PaaS

    5.5. Introduction to SaaS

    5.6. Pros and Cons of SaaS model and applications

6. Capacity management and Scheduling in cloud computing

    6.1. Capacity management and Scheduling

    6.2. Distributed management of virtual machines

    6.3. Reservation-based provisioning of virtualized resource

    6.4. Provisioning to meet SLA commitments

    6.5. Stages of VM life cycle within OpenNebula

    6.6. Network model for OpenNebula

7. Issues and Challenges: Availability, Multi-Tenancy, Security and SLA

    7.1. Multi-Tenancy, 4 levels of multi tenancy

    7.2. Multi-tenant models for cloud

    7.3. Introduction to cloud security

    7.4. Cloud security Issues

    7.5. Threat Model

    7.6. Top 5 cloud security threats

    7.7. Managing security

    7.8. Service License Agreements: Lifecycle and Management

    7.9. Traditional approaches to SLO management

Modular Content Structure (50 hours theory, 50 hours practical)

1. **Introduction to Cloud Computing (4 hours theory)**

    1.1. Cloud Computing, services, deployment models

    1.2. Introduction to Cloud Computing

    1.3. Origins and Motivation

    1.4. Types of Clouds and Services

    1.5. Cloud Infrastructure and Deployment

2. **Virtualization Techniques and Types (10 hours theory, 10 hours practical)**

    2.1. Introduction to Virtualization

    2.2. Use & demerits of Virtualization

    2.3. Types of Virtualizations

    2.4. Examples

    2.5. x86 Hardware Virtualization

    2.6. Manage the resources for the SaaS, PaaS and IaaS models

3. **Infrastructure as a Service (20 hours theory, 40 hours practical)**

    3.1. Introduction to IaaS

    3.2. IaaS examples

    3.3. Reference Model of AWS

    3.4. Amazon cloud services - Compute, Database, Storage

    3.5. Region Vs Availability zones

    3.6. Case Study - Openstack

    3.7. Managing Virtual Resources on the Cloud: Provisioning and Migration

        3.7.1. Virtual Machine Provisioning and Manageability

        3.7.2. VM Provisioning Process

        3.7.3. Virtual Machine Migration Services

        3.7.4. Migrations Techniques

        3.7.5. VM Provisioning and Migration in action

4.   Containers (4 hours theory)

    4.1.   Linux Containers - LXC and LXD

    4.2.   Dockers - Elements, Images, Files, Containers

    4.3.   Cloud orchestration technologies

5.   Platform as a Service and SaaS (4 hours theory)

    5.1.   Introduction to PaaS

    5.2.   PaaS examples

    5.3.   Windows Azure

    5.4.   5 Principles of UI Design - AWS PaaS

    5.5.   Introduction to SaaS

    5.6.   Pros and Cons of SaaS model and applications

6.   Capacity management and Scheduling in cloud computing (4 hours theory)

    6.1.   Capacity management and Scheduling

    6.2.   Distributed management of virtual machines

    6.3.   Reservation-based provisioning of virtualized resource

    6.4.   Provisioning to meet SLA commitments

    6.5.   Stages of VM life cycle within OpenNebula

    6.6.   Network model for OpenNebula

7.   Issues and Challenges: Availability, Multi-Tenancy, Security and SLA (4 hours theory)

    7.1.   Multi-Tenancy, 4 levels of multi tenancy

    7.2.   Multi-tenant models for cloud

    7.3.   Introduction to cloud security

    7.4.   Cloud security Issues

    7.5.   Threat Model

    7.6.   Top 5 cloud security threats

    7.7.   Managing security

    7.8.   Service License Agreements: Lifecycle and Management