Course No.:	Name: Virtualization & Cloud Computing	Credits: 2-0-2-6	Prerequisites: NIL

COURSE OBJECTIVES:

1. To understand the fundamental concepts of cloud computing and virtualization.
2. To learn how to design, deploy, and manage cloud computing infrastructure.
3. To explore various virtualization technologies and understand their advantages and limitations.
4. To gain an understanding of network virtualization and its benefits.
5. To learn about cloud computing services and their associated security challenges.

COURSE OUTCOMES:

1. Students will be able to design, deploy, and manage cloud computing infrastructure.
2. Students will be able to evaluate and select appropriate virtualization technologies for specific use cases.
3. Students will be able to design and implement secure cloud computing services.
4. Students will be able to design and implement network virtualization.
5. Students will be able to analyze and evaluate cloud computing infrastructure and make recommendations for improvement.

SYLLABUS:

MODULE 1 - INTRODUCTION TO CLOUD COMPUTING (9 hours)

- Getting to know the Cloud
- Cloud Types and Models: Private Cloud, Community Cloud, Public Cloud, Hybrid Clouds.
- Benefits and Challenges of Cloud Computing
- Cloud Computing Deployment Models
- Cloud Computing Service Models
- Cloud Computing Architecture

MODULE 2 - VIRTUALIZATION TECHNOLOGIES (9 hours)

- Overview of Virtualization
- Server Virtualization
- Network Virtualization
- Application Virtualization
- Storage Virtualization
- Desktop Virtualization

MODULE 3 - CLOUD COMPUTING SERVICES (9 hours)

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)
- Storage as a Service (STaaS)
- Database as a Service (DBaaS)
- Security as a Service (SECaaS)

MODULE 4 - CLOUD COMPUTING SECURITY (9 hours)

- Cloud Computing Security Challenges
- Cloud Computing Security Issues
- Security Management in Cloud Computing
- Security and Privacy in Cloud Computing
- Security in Public Clouds
- Security in Private Clouds

MODULE 5 - CLOUD COMPUTING MANAGEMENT AND MONITORING (6 hours)

- Cloud Computing Management
- Cloud Computing Monitoring
- Cloud Computing Maintenance
- Cloud Computing Performance Management

LIST OF EXPERIMENTS:

1. Setting up a cloud environment using a cloud computing platform like Amazon Web Services (AWS) or Microsoft Azure and deploying a virtual machine.
2. Deploying and configuring a virtual network infrastructure using a virtualization platform like VMware vSphere or Microsoft Hyper-V.
3. Implementing storage virtualization by setting up a Storage Area Network (SAN) using a virtualization platform and testing the performance of different storage virtualization techniques such as hardware-based and software-based.
4. Performing desktop virtualization by deploying a virtual desktop infrastructure (VDI) using a virtualization platform like Citrix XenDesktop or VMware Horizon and testing the performance and user experience.
5. Exploring the security aspects of cloud computing by setting up a secure virtual environment and testing different security techniques like network segmentation, access control, and encryption.

TEXTBOOKS:

1. "Cloud Computing: Principles, Systems and Applications" by Nick Antonopoulos and Lee Gillam, Springer
2. "Virtualization: A Manager's Guide" by Dan Kusnetzky, Prentice Hall
3. "Mastering Cloud Computing: Foundations and Applications Programming" by Rajkumar Buyya, Christian Vecchiola, and S. Thamarai Selvi, Morgan Kaufmann
4. "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance" by Tim Mather, Subra Kumaraswamy, and Shahed Latif, O'Reilly Media