Program : **Diploma in Computer Engineering / Computer Hardware Engineering**	
Course Code : **5133A**	Course Title: **Virtualization Technology and Cloud Computing**
Semester : **5**	Credits: **4**
Course Category: **Program Elective**	
Periods per week: **4 (L:4 T:0 P:0)**	Periods per semester: **60**

Course Objectives:

- Provide an exposure to the basics of Virtualization Technology and Cloud Computing.
- Provide knowledge to apply Web Development, Network & System Administration skills in Cloud Computing Platforms.

Course Prerequisites:

Topic	Course code	Course name	Semester
Basics of Computer Networks		Computer Communication and Networks	4

Course Outcomes

On completion of the course, the students will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Illustrate the basic concepts of Virtualization and Hypervisors	15	Understanding
CO2	Summarize Virtual Machines and Network, Desktop and Application Virtualization	14	Understanding
CO3	Explain Cloud Computing and its Architecture	15	Understanding
CO4	Summarize Models of Cloud Computing and Cloud Datacentres	14	Understanding
	Series Test	2	

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2						
CO2	2						
CO3	2						
CO4	2						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Illustrate the basic concepts of Virtualization and Hypervisors**		
M1.01	Illustrate Virtualization and its importance	3	Understanding
M1.02	Outline Virtualization and Cloud Computing	2	Understanding
M1.03	Summarize Virtualization Software Operation and Types of Virtualization	2	Understanding
M1.04	Illustrate Hypervisors and its types	3	Understanding
M1.05	Outline Role of a Hypervisor	2	Understanding
M1.06	Compare Hypervisors	3	Understanding
Contents: **Understanding Virtualization** – Describing Virtualization – Importance of Virtualization – Virtualization and Cloud Computing – Virtualization Software Operation – Types of Virtualization **Understanding Hypervisors** – Describing Hypervisor – Type 1 and Type 2 Hypervisors – Role of a Hypervisor – Comparison of Hypervisors			
CO2	**Summarize Virtual Machines and Network, Desktop and Application Virtualization**		
M2.01	Summarize Virtual Machines	2	Understanding
M2.02	Outline how to examine CPUs, Memory, Network and Storage in a VM.	1	Understanding
M2.03	Explain VM Clones, Templates and Snapshots	1	Understanding
M2.04	Outline Open Virtualization Format	1	Understanding
M2.05	Summarize the benefits and components of Network Virtualization	1	Understanding

M2.06	Outline Virtual Switch, Virtual LAN and VM Migration Services	2	Understanding
M2.07	Explain Advantages and Limitations of Desktop Virtualization	2	Understanding
M2.08	Outline Techniques used for Desktop Virtualization (RDS and VDI)	1	Understanding
M2.09	Summarize Components for Desktop Virtualization	1	Understanding
M2.10	Explain Advantages and Limitations of Application Virtualization and Tools used.	2	Understanding
	Series Test – I	1	

Contents:

Understanding Virtual Machines (VM) – Describing VM – CPUs, Memory, Network and Storage in a VM – Working of VM – VM Clones, Templates, Snapshots – Open Virtualization Format

Network Virtualization – Benefits – Components – Virtual Switch – Virtual LAN – VM Migration Services

Desktop and Application Virtualization – Advantages and Limitations of Desktop Virtualization – Techniques used for Desktop Virtualization (RDS and VDI) – Components for Desktop Virtualization – Advantages and Limitations of Application Virtualization – Tools used for Application Virtualization

CO3	**Explain Cloud Computing and its Architecture**		
M3.01	Summarize the Needs, History, Benefits and Limitations of Cloud Computing	3	Understanding
M3.02	Outline Cloud Infrastructure and Vendors of Cloud Computing	2	Understanding
M3.03	Explain Cloud Data Centre Requirements	2	Understanding
M3.04	Summarize Architectural, Technological and Operational influences on Cloud Computing	3	Understanding
M3.05	Outline Cloud Computing Architecture based on different criteria	3	Understanding
M3.06	Describe Characteristics of Cloud Computing	2	Understanding

Contents:

Overview of Cloud Computing – Essentials of Cloud Computing – Needs – History – Benefits – Limitations – Cloud Infrastructure – Vendors of Cloud Computing

Factors that Affect Cloud Computing – Cloud Data Centre Requirements – Architectural, Technological and Operational influences on Cloud Computing

Cloud Computing Architecture – Cloud Computing Architecture based on Load Balancing, Disk Provisioning, Storage Management, Hypervisor Installed, Migration, Service Relocation, Cloud Balancing and Virtual Switch Load Balancing – Characteristics of Cloud Computing

CO4	Summarize Models of Cloud Computing and Cloud Datacentres		
M4.01	Explain Cloud Service Models	2	Understanding
M4.02	Outline Cloud Deployment Models	2	Understanding
M4.03	Explain Cloud Storage	2	Understanding
M4.04	Describe Cloud Data Centre Core Elements	2	Understanding
M4.05	Outline Storage Network Technologies	2	Understanding
M4.06	Explain Cloud Backup, Disaster Recovery and Replication Technologies	2	Understanding
M4.07	Outline Computing on Demand	2	Understanding
	Series Test – II	1	

Contents:

Models of Cloud Computing – Cloud Service Models – SaaS – PaaS – IaaS – Cloud Deployment Models – Public, Private, Community and Hybrid Clouds – Cloud Storage

Cloud Data Centre – Cloud Data Centre Core Elements (Application, DBMS, Compute, Storage and Network) – Storage Network Technologies – Cloud Backup – Cloud and Disaster Recovery – Replication Technologies – Computing on Demand.

Text / Reference:

T/R	Book Title / Author
T1	Matthew Portnoy, *Virtualization Essentials*, 2nd Edition, Sybex (Wiley) Publication, 2016
T2	Shailendra Singh, *Cloud Computing*, Oxford University Press, 2018
R1	Todd Montgomery and Stephen Olson, *CCNA Cloud Complete Study Guide*, Sybex (Wiley) Publication, 2018

Online Resources:

Sl. No.	Website Link
1	https://www.tutorialspoint.com/virtualization2.0/index.htm
2	https://www.tutorialspoint.com/cloud-computing/index.htm
3	https://www.javatpoint.com/cloud-computing-tutorial