

COURSE CODE	COURSE TITLE	L	T	P	C
1152CS122	VIRTUALIZATION TECHNOLOGIES	3	0	0	3

**Course Category: Program Elective**

**A. Preamble:**

Many times, in computer storage not utilized properly. Basically, for some application needs more space but the available space may be less or vice versa. For proper and better utilization of need to go for the concept called virtualization. This course goes in deep concept behind virtualization.

**B. Prerequisite Courses:**

SI No	Course Code	Course Name
1	1151CS111	Computer Networks

**C. Related Courses:**

SI No	Course Code	Course Name
1	1156CS601	Minor Project
2	1156CS701	Major Project

**D. Course Educational Objectives:**

Students undergoing this course are exposed to

- Computing Virtualization tools, applications and techniques
- Network Virtualization
- Virtualization and Cloud Computing

**E. Course Outcomes:**

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Illustrate the basics functions and operations of Virtualization.	K2
CO2	Explain the concepts of hardware and server virtualization.	K2
CO3	Outline the different network virtualization and layer architecture.	K2
CO4	Classify the different virtualization storage architecture.	K2
CO5	Analysis the various types of virtual machines products.	K3

**F. Correlation of COs with POs:**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PSO 3
CO1	M		M	L	L		M					M			L
CO2	M	L	M	M	L		M	L				M			L
CO3	H	L	H	M	L		M	L				M	L		L
CO4	H	L	M	L	L		M	L				M	L		L
CO5	H	L	L	L	L		M	L				M	L	L	L

## **G. Course Content:**

### **UNIT I OVERVIEW OF VIRTUALIZATION**

**10**

Basics of Virtualization - Virtualization Types – Desktop Virtualization – Network Virtualization – Server and Machine Virtualization – Storage Virtualization – System-level or Operating Virtualization – Application Virtualization-Virtualization Advantages – Virtual Machine Basics – Taxonomy of Virtual machines - Process Virtual Machines – System Virtual Machines – Hypervisor - Key Concepts

### **UNIT II SERVER CONSOLIDATION**

**8**

Hardware Virtualization – Virtual Hardware Overview - Server Virtualization – Physical and Logical Partitioning - Types of Server Virtualization – Business cases for Server Virtualization – Uses of Virtual server Consolidation – Planning for Development – Selecting server Virtualization Platform.

### **UNIT III NETWORK VIRTUALIZATION**

**10**

Design of Scalable Enterprise Networks - Virtualizing the Campus WAN Design – WAN Architecture - WAN Virtualization - Virtual Enterprise Transport Virtualization–VLANs and Scalability - Theory Network Device Virtualization Layer 2 - VLANs Layer 3 VRF Instances Layer 2 - VFI's Virtual Firewall Contexts Network Device Virtualization - Data- Path Virtualization Layer 2: 802.1q - Trunking Generic Routing Encapsulation – Ipv6 L2TPv3 Label Switched Paths - Control-Plane Virtualization–Routing Protocols- VRF - Aware Routing Multi-Topology Routing.

### **UNIT IV VIRTUALIZING STORAGE**

**8**

SCSI- Speaking SCSI- Using SCSI buses – Fiber Channel – Fiber Channel Cables – Fiber Channel Hardware Devices – iSCSI Architecture – Securing iSCSI – SAN backup and recovery techniques – RAID – SNIA Shared Storage Model – Classical Storage Model – SNIA Shared Storage Model – Host based Architecture – Storage based architecture – Network based Architecture – Fault tolerance to SAN – Performing Backups – Virtual tape libraries.

### **UNIT V VIRTUAL MACHINES PRODUCTS**

**9**

Xen Virtual machine monitors - Xen API – VMware – VMware products – VMware Features – Microsoft Virtual Server – Features of Microsoft Virtual Server.

**TOTAL:45Hours**

## **H. Learning Resources**

### **i. Text Books:**

1. William von Hagen, Professional Xen Virtualization, WorxPublications, January, 2008.
2. Chris Wolf, Erick M. Halter, Virtualization: From the Desktop to the Enterprise, A Press 2005.

### **ii. Reference:**

1. James E. Smith, Ravi Nair, Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann, 2005.
2. David Marshall, Wade A. Reynolds, Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications, 2006.

### **iii. Online resources**

1. [www.cs.sunysb.edu/~chiueh/cse674/list.pdf](http://www.cs.sunysb.edu/~chiueh/cse674/list.pdf)
2. [www.stanford.edu/class/ee282/handouts/lect.10.vm.pdf](http://www.stanford.edu/class/ee282/handouts/lect.10.vm.pdf)
3. [grids.ucs.indiana.edu/ptliupages/publications/10-fg-hypervisor.pdf](http://grids.ucs.indiana.edu/ptliupages/publications/10-fg-hypervisor.pdf)

<http://www.slideshare.net/sigindia/emc-lecture-session-virtualization-technology-and-directions-9731982>