

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING AND TECHNOLOGY									
Programme	Bachelor of Technology				Branch/ Spec.	Computer Science & Engineering (CBA)			
Semester	V				Version	1.0.0.3			
Effective from Academic Year			2022-23		Effective for the batch Admitted in			June 2020	
Subject code	2CSE50E20		Subject Name		VIRTUALIZATION				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites:									
Operating System Concepts, Data Structures and Algorithms, Basics of Communication, Microprocessor fundamentals									
Learning Outcome:									
After successful completion of this course, students will be able to:									
<ul style="list-style-type: none"> ● Understand various Virtual IT infrastructure concepts & Algorithms ● Apply various virtualization approaches to create and manage virtualized IT resources ● Design and implement private clouds using virtualization ● Demonstrate the design of data centers. 									
Theory syllabus									
Unit	Content								Hrs
1	Virtualized IT Infrastructure: Concepts & Trends Physical Vs Virtual IT Infrastructure, machines, Data Centers, Types of Virtualization, Desktop, Application, Server, Hardware, Storage, Memory and I/O virtualization, Need of Network and Storage Virtualization, Recent Trends & technologies in virtualized environments								6
2	Virtual Machine Management Introduction to Hypervisors, Role of VMM. VM lifecycle, VM configurations, MVM migrations, Migration types and process, VM provisioning, Scaling, VM scheduling, Load balancing: Significance, Types and Algorithms, Comparing workstation products, QoS parameters – Performance, Functionality, Windows Vs Linux Hosting, Software Migration, Migrating workloads from Physical to Virtual Machines								8
3	Hardware Abstractions Abstracting hardware – Need & Solutions, partitioning physical shared resources, CPU Virtualization Approaches & Algorithms, Memory virtualization Approaches & Algorithms, Storage virtualization Approaches, Storage Aggregation								12
4	Network Virtualization How to build guest OS, planning for automatic installations, Virtual Interfaces, VNIC profiles, Virtual Switches and Routers, TUN/TAP drivers and data flow between VMs, NAT, host-only approaches, Designing virtual networks, Bridged, NAT and host-only networking, Virtual Data Centers introduction, Data Center Virtualization with ESXi, Networking with Switches and port groups, Optimizing resource utilization								8
5	Server Virtualization Server Partitioning, choosing virtual server hosts, Security implications, Server VMs, Interactive mode, deploying virtual servers, managing virtual servers remotely, Server								6

	health monitoring using vSphere Monitoring and Performance services, VM Cluster, Distributing workloads via Network Load Balancing (NLB)											
6	Virtualization performance Performance issues, Virtual machine sprawling, Hypervisor vulnerabilities, Hypervisor attacks, VM attacks, VM migration attacks	5										
Self-Study:												
Private cloud implementation using Eucalyptus ,Hyper-V and VMWare												
Practical content:												
Practicals will be based on Virtual Lab and environment setup using Red Hat Enterprise Virtualization 4.X version, Configuration and Customization of VMM for reports, Data warehousing & other management activities, Installation, configuration and Customization of hypervisors, Creating and maintaining virtual data center & Clusters with customized policies, health monitoring of virtualized environments, creating private cloud using Virtualization tools												
MooC Course:												
https://www.coursera.org/lecture/cloud-applications-part1/2-1-1-virtualization-d645V												
Text Books:												
1.	Chris Wolf and Erick M. Halter, "Virtualization" A press											
2.	LatifaBoursas (Editor), Mark Carlson (Editor), Wolfgang Hommel (Editor), Michelle Sibilla (Editor), KesWold (Editor), "Systems and Virtualization Management: Standards and New Technologies"											
Reference Books:												
1.	Massimo Cafaro (Editor), Giovanni Aloisio (Editor), "Grids, Clouds and Virtualization" Springer											
2.	Edward L. Haletky, "VMware ESX Server in the enterprise". Prentice Hall											
3.	Gaurav Somani, "Scheduling and Isolation in Virtualization", VDM VerlagDr.Müller [ISBN: 978-3639295139], Muller Publishers, Germany											
4.	Edward Haletky, "VMware ESX and ESXi in the Enterprise - Planning Deployment of Virtualization Servers" [ISBN: 978-0137058976], Prentice Hall											
Course Outcomes:												
COs	Description											
CO1	Understand various Virtual IT infrastructure concepts & Algorithms											
CO2	Apply various virtualization approaches to create and manage virtualized IT resources											
CO3	Design and implement private clouds using virtualization											
CO4	Demonstrate the design of data centers.											
Mapping of CO and PO:												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	3	3	2	2	2	3	3	3
CO2	2	2	3	3	3	2	1	1	2	3	3	3
CO3	3	3	3	2	3	3	1	1	3	3	2	2
CO4	2	2	3	2	3	3	3	2	3	3	2	3