Program : **Diploma in Computer Hardware Engineering**	
Course Code :	Course Title: **Virtualization Technology and Cloud Computing Lab**
Semester : **5**	Credits: **1.5**
Course Category: **Program Elective**	
Periods per week: **3 (L:0 T:0 P:3)**	Periods per semester: **45**

Course Objectives:

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

Course Prerequisites:

Topic	Course Code	Course Title	Semester
Basics of Computer Network		Computer Networks I	3

Course Outcomes

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

COn	Description	Duration (Hours)	Cognitive Level
CO1	Experiment with Hypervisors and Virtual Machines	10	Applying
CO2	Experiment with the installation of Guest OSs on VMs and its configuration	10	Applying
CO3	Experiment with Management of computer resources for a VM and configure network between VMs	10	Applying
CO4	Experiment with Cloud IaaS and PaaS	12	Applying
	Lab Exam	3	

CO – PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3			
CO2	3			3			
CO3	3			3			
CO4	3						

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

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	Experiment with Hypervisors and Virtual Machines		
M1.01	Install VMWare Workstation Player	2	Applying
M1.02	Familiarize VMWare Workstation Player	1	Applying
M1.03	Install VirtualBox	2	Applying
M1.04	Familiarize VirtualBox	1	Applying
M1.05	Create Virtual Machine on VMWare	2	Applying
M1.06	Create Virtual Machine on Virtual Box	2	Applying
CO2	Experiment with the installation of Guest OSs on VMs and its configuration		
M2.01	Install Windows on a Virtual Machine (VMWare)	2	Applying
M2.02	Install VMWare Tools for above installation	1	Applying
M2.03	Configure USB Port	1	Applying
M2.04	Configure Shared Folder	1	Applying
M2.05	Install Linux on a Virtual Machine (VirtualBox)	2	Applying
M2.06	Install VirtualBox Guest Additions for above installation	1	Applying
M2.07	Configure USB Port	1	Applying
M2.08	Configure Shared Folder	1	Applying
	Lab Exam – I	1½	
CO3	Experiment with Management of computer resources for a VM and configure network between VMs		
M 3.01	Manage CPUs for a VM	1	Applying

M 3.02	Manage Memory for a VM	1	Applying
M 3.03	Manage Storage for a VM	1	Applying
M 3.04	Manage Network for a VM	1	Applying
M 3.05	Copy a VM	2	Applying
M 3.06	Configure Network between two VMs (VMWare)	2	Applying
M 3.07	Configure Network between two VMs (VirtualBox)	2	Applying
CO4	Familiarize Cloud IaaS and PaaS		
M4.01	Create account and familiarize control panel of Google Cloud / AWS / Microsoft Azure or any other cloud service provider	2	Applying
M4.02	Create VMs on Cloud	2	Applying
M4.03	Install LAMP Stack on one VM and test from other VM and also from host machine.	2	Applying
M4.04	**Open-ended experiment.	6	Applying
	Lab Exam – I	1½	

**** Suggested Open-ended Experiments:**

(Not for End Semester Examination but compulsory to be included in Continuous Internal Evaluation. Students can do open-ended experiments as a group of 2-3. There is no duplication in experiments between groups. Open ended experiments should include the concepts of arrays, functions and structures)

1. Host a simple website in the Cloud

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