

# DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE (AUTONOMOUS)



(Approved by AICTE & Affiliated to Anna University, Chennai)  
Accredited with 'A' Grade by NAAC, Accredited by TCS  
Accredited by NBA with BME, ECE & EEE  
**PERAMBALUR - 621 212. Tamil Nadu.**  
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## LABORATORY COURSE PLAN

<b>LAB COURSE TITLE</b>	<b>CLOUD COMPUTING LABORATORY</b>			
<b>LAB COURSE CODE</b>	<b>U23CSP71</b>			
<b>LAB COURSE STRUCTURE</b>	<b>LECTURE</b>	<b>TUTORIAL</b>	<b>PRACTICAL</b>	<b>CREDIT</b>
	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
<b>REGULATION</b>	<b>BRANCH</b>	<b>YEAR</b>	<b>SEMESTER</b>	<b>ACADEMIC YEAR</b>
<b>2023</b>	<b>IT</b>	<b>III</b>	<b>V</b>	<b>2025-2026</b>
<b>COURSE INCHARGE</b>	<b>Mrs.PREETHI.S</b>			

## SYLLABUS

### COURSE OBJECTIVE:

- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- To learn to implement and use parallel programming using Hadoop.

### The student should be made to:

- Configure various virtualization tools such as Virtual Box, VMware workstation.
- Design and deploy a web application in a PaaS environment.
- Learn how to simulate a cloud environment to implement new schedulers.
- Install and use a generic cloud environment that can be used as a private cloud.
- Manipulate large data sets in a parallel environment.

### LIST OF EXPERIMENTS

1. Install Virtual box/VMware Workstation with different flavors of Linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count.

**TOTAL: 60 PERIODS**

### BIBLIOGRAPHY

#### TEXT/REFERENCE BOOKS:

- Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
- Rittinghouse, John W., and James F. Ransome, —Cloud Computing: Implementation, Management and Security, CRC Press, 2017.
- Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, —Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
- Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach, Tata Mcgraw Hill, 2009.
- George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)", O'Reilly, 2009

#### Hardware:

- Standalone desktops

#### web link for resource & Virtual lab reference link

<a href="https://www.oreilly.com/library/view/cloud-computing-concepts/9780133387568/ch05.xhtml">https://www.oreilly.com/library/view/cloud-computing-concepts/9780133387568/ch05.xhtml</a>
<a href="https://www.tutorialspoint.com/cloud_computing/cloud_computing_architecture.htm">https://www.tutorialspoint.com/cloud_computing/cloud_computing_architecture.htm</a>
<a href="https://www.w3schools.in/cloud-computing/cloud-computing-architecture/">https://www.w3schools.in/cloud-computing/cloud-computing-architecture/</a>
<a href="https://www.ijemr.net/DOC/CloudComputingInResourceManagement.pdf">https://www.ijemr.net/DOC/CloudComputingInResourceManagement.pdf</a>
<a href="https://www.techrepublic.com/article/the-most-important-cloud-advances-of-the-decade/">https://www.techrepublic.com/article/the-most-important-cloud-advances-of-the-decade/</a>
<a href="https://www.crn.com/news/cloud/10-emerging-cloud-computing-trends-to-watch-in-2020">https://www.crn.com/news/cloud/10-emerging-cloud-computing-trends-to-watch-in-2020</a>

<b>EXP. NO.</b>	<b>NAME OF THE EXPERIMENTS</b>	<b>NO. OF PERIODS</b>	<b>CUMULATIVE PERIODS</b>
<b>CYCLE I</b>			
1.	Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.	8	8
2.	Install a C compiler in the virtual machine created using virtual box and execute Simple Programs	8	16
3.	Install Google App Engine. Create hello world app and other simple web applications using python/java	8	24
4.	Use GAE launcher to launch the web applications	4	28
<b>CYCLE II</b>			
5.	Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim	8	36
6.	Find a procedure to transfer the files from one virtual machine to another virtual machine	8	44
7.	Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)	8	52
8.	Install Hadoop single node cluster and run simple applications like wordcount	8	60

### **COURSE OUTCOME**

Upon Completion of the course, the students will be able to:

CO 1 Configure various virtualization tools such as Virtual Box, VMware workstation.

CO 2 Design and deploy a web application in a PaaS environment.

CO 3 Learn how to simulate a cloud environment to implement new schedulers.

CO 4 Install and use a generic cloud environment that can be used as a private cloud.

CO 5 Manipulate large data sets in a parallel environment.

CO 6 Demonstrate task as an individual and /or a team member to manage the task in time

**CO-PO mapping:**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	-	3	-	-	-	-	-	-	-
CO2	2	1	-	-	3	-	-	-	-	-	-	-
CO3	2	1	-	-	3	-	-	-	-	-	-	-
CO4	3	2	1	1	3	-	-	-	-	-	-	-
CO5	2	1	-	-	2	-	-	-	-	-	-	-
CO6	2	1	-	-	2	-	-	-	-	-	-	-
<b>AVG</b>	2.17	1.17	1.00	1.00	2.67	-	-	-	-	-	-	-

Substantial/ High      3  
 Moderate/ Medium    2  
 Slight/ Low            1  
 No correlation         0

**ADDITIONAL EXPERIMENTS**

EXP. NO.	NAME OF THE EXPERIMENTS	Identified Resource link
1	Creating a Web Service for Calculator	<a href="https://cwiki.apache.org/confluence/display/GMOxDO C21/Developing+a+simple+Calculator+Web+Service">https://cwiki.apache.org/confluence/display/GMOxDO C21/Developing+a+simple+Calculator+Web+Service</a>
2	Develop new OGSA-compliant Web Service	<a href="https://link.springer.com/chapter/10.1007/11403937_20">https://link.springer.com/chapter/10.1007/11403937_20</a>
3	Using Apache Axis develop a Grid Service	<a href="https://www.youtube.com/watch?v=iscqDDNFzys">https://www.youtube.com/watch?v=iscqDDNFzys</a>
4	Develop applications using Java or C/C++ Grid APIs	<a href="https://cs6712.wordpress.com/2016/07/26/exercise-4-develop-applications-using-java-or-cc-grid-apis/">https://cs6712.wordpress.com/2016/07/26/exercise-4-develop-applications-using-java-or-cc-grid-apis/</a>
5	Develop secured applications using basic security mechanisms available in Globus Toolkit.	<a href="https://cs6712.wordpress.com/2016/07/26/exercise-5-develop-secured-applications-using-basic-security-mechanisms-available-in-globus-toolkit/">https://cs6712.wordpress.com/2016/07/26/exercise-5-develop-secured-applications-using-basic-security-mechanisms-available-in-globus-toolkit/</a>

**MODEL LAB DETAILS**

BATCH	REGISTER NO.	MODE OF LAB CONDUCT	DATE	TIMING

## VIVA QUESTIONS

1. What is Type-1 and Type-2 hypervisor?
2. What is the use of virsh command?
3. Explain how you can transfer volume from one owner to another in Open Stack?
4. Write notes on KVM Features?
5. What is Virtual block? 6.
- What is Virtualization? 7.
- What are virtual clusters?
8. How virtualization happens in data center?
9. List some of the open source grid middleware packages.
10. What is a programming model?
11. What is Hadoop?
12. What are map and reduce functions? 13. How to run a job in hadoop?
14. What is HDFS?
15. What are the open source grid middleware packages?
16. What is peer to peer computing?
17. What are node clusters?
18. How virtual migration happens in data center?
19. List some middleware packages.
20. What is a deployment model?
21. What is the difference between Xen & KVM ?
22. What are different hypervisors available in Linux ?
23. Which command is used to list all virtual machine running on the KVM hypervisor ?
24. What are the different states of a VM in Xen hypervisor ?
25. How to forcefully shutdown the KVM based virtual machine from the command line ?
26. What is virtual Machine?
27. What is Compiler?

28. What is Directory?
29. List the C Compilers available?
30. What is virtualization?
31. List out VM operations
32. What are different hypervisors available in windows?
33. How to implement applications on the cloud to install C compiler?
34. What are grid and cloud tools available?
35. What is hypervisor?
36. What are the types of virtualization?
37. Is it possible to create n number of VM ?
38. What is Memory virtualization?
39. What is CPU virtualization?
40. What is VMware?
41. What are the basic requirements of VM live migration in KVM?
42. Which command is used in KVM for VMs live migration?
43. How to get hardware information of KVM guest machine?
44. What is VM migration?
45. Which type of virtualization is also characteristic of cloud computing ?
46. Which virtualization standard does the WebSphere Application Server Hypervisor Edition use?
47. What are the advantages of using cloud computing?
48. Mention platforms which are used for large scale cloud computing?
49. Explain, different models for deployment in cloud computing.
50. What are the different data centers deployed for cloud computing?

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