

## CLOUD COMPUTING LABORATORY

<b>VII Semester: IT</b>																										
Course Code	Category	Hours / Week			Credits	Maximum Marks																				
AITB17	Core	L	T	P	C	CIA	SEE	Total																		
		-	-	3	1.5	30	70	100																		
<b>Contact Classes: Nil</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: 45</b>			<b>Total Classes: 45</b>																					
<p><b>I. COURSE OVERVIEW:</b>                      The objective of cloud computing lab is to learn the cloud architecture and its efficiency, and tools to provide virtualization on cloud. The lab enables the study and implementation of infrastructure as a service, storage as a service, and user management on cloud. Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. Cloud computing services usually provide common business applications on-line that are accessed from a web browser, while the software and data are stored on the servers. It is expected that Cloud Computing will help in pooling of computing resources of Government Departments into large clouds thereby increasing utilization of computing resources effectively. Besides, the self-service nature of cloud computing allows organizations to create elastic environments that expand and contract; based on the workload and target performance parameters.</p> <p><b>II. OBJECTIVES:</b>  <b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>I. Learn to run virtual machines of different configuration. .</li> <li>II. Develop Big Data application using Hadoop.</li> <li>III. Exposed to tool kits for cloud environment.</li> <li>IV. Developing web services/Applications in cloud framework.</li> </ol> <p><b>III. COURSE OUTCOMES:</b>  <b>After successful completion of the course, students should be able to:</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">CO 1</td> <td style="width: 70%;">Define and implement Virtualization using different types of Hypervisors. .</td> <td style="width: 20%;">Apply</td> </tr> <tr> <td>CO 2</td> <td>Describe steps to perform on demand Application delivery using Ulteo.</td> <td>Apply</td> </tr> <tr> <td>CO 3</td> <td>Examine the installation and configuration of Open stack cloud.</td> <td>Apply</td> </tr> <tr> <td>CO 4</td> <td>Analyze and understand the functioning of different components involved in Amazon Web services cloud platform.</td> <td>Apply</td> </tr> <tr> <td>CO 5</td> <td>Describe the functioning of Platform as a Service.</td> <td>Apply</td> </tr> <tr> <td>CO 6</td> <td>Design Synthesize Storage as a service using own Cloud.</td> <td>Analyze</td> </tr> </table>									CO 1	Define and implement Virtualization using different types of Hypervisors. .	Apply	CO 2	Describe steps to perform on demand Application delivery using Ulteo.	Apply	CO 3	Examine the installation and configuration of Open stack cloud.	Apply	CO 4	Analyze and understand the functioning of different components involved in Amazon Web services cloud platform.	Apply	CO 5	Describe the functioning of Platform as a Service.	Apply	CO 6	Design Synthesize Storage as a service using own Cloud.	Analyze
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<b>LIST OF EXPERIMENTS</b>																										
<b>Week-1</b>	<b>VIRTUALIZATION</b>																									
Install Oracle Virtual box and create two VMs on your laptop.																										
<b>Week-2</b>	<b>VIRTUALIZATION</b>																									
Install Turbo C in guest OS and execute C program.																										

<b>Week-3</b>	<b>VIRTUALIZATION</b>
Test ping command to test the communication between the guest OS and Host OS.	
<b>Week-4</b>	<b>HADOOP</b>
Install Hadoop single node setup.	
<b>Week-5</b>	<b>HADOOP</b>
Develop a simple Hadoop application called Word Count. It counts the number of occurrences of each word in a given input set.	
<b>Week-6</b>	<b>HADOOP</b>
Develop Hadoop application to count no of characters, no of words and each character frequency.	
<b>Week-7</b>	<b>HADOOP</b>
Develop Hadoop application to process given data and produce results such as finding the year of maximum usage, year of minimum usage.	
<b>Week-8</b>	<b>HADOOP</b>
<p>Develop Hadoop application to process given data and produce results such as how many female and male students in both schools the results should be in following format.</p> <p>GP-F #number  GP-M #numbers  MS-F #number  MS-M #number</p>	
<b>Week-9</b>	<b>CLOUD PROGRAMMING</b>
Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.	
<b>Week-10</b>	<b>CLOUD PROGRAMMING</b>
Design a protocol and use Simple Queue Service (SQS) to implement the barrier synchronization after the first phase.	
<b>Week-11</b>	<b>CLOUD PROGRAMMING</b>
Use the Zookeeper to implement the coordination model in Problem 10.	
<b>Week-12</b>	<b>CLOUD PROGRAMMING</b>
Develop a Hello World application using Google App Engine.	

<b>Week-13</b>	<b>CLOUD PROGRAMMING</b>
Develop a Guestbook Application using Google App Engine.	
<b>Week-14</b>	<b>WINDOWS AZURE</b>
Develop a Windows Azure Hello World application using.	
<b>Week-15</b>	<b>PIPES</b>
Create a Mashup using Yahoo! Pipes.	
<b>Reference Books:</b>	
<ol style="list-style-type: none"> <li>1. Dan Marinescu, “Cloud Computing: Theory and Practice”, MK Publishers, 1<sup>st</sup> Edition, 2013.</li> <li>2. Kai Hwang, Jack Dongarra, Geoffrey Fox, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, MK Publishers, 1<sup>st</sup> Edition, 2013.</li> <li>3. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, McGraw Hill, 1<sup>st</sup> Edition, 2009.</li> <li>4. Arshdeep Bahga, Vijay Madiseti, “Cloud computing A Hands on Approach”, Universities Publications, 1<sup>st</sup> Edition, 2013.</li> </ol>	
<b>Web References:</b>	
<ol style="list-style-type: none"> <li>1. <a href="http://www.howtogeek.com/196060/beginner-geek-how-to-create-and-use-virtual-machines/">http://www.howtogeek.com/196060/beginner-geek-how-to-create-and-use-virtual-machines/</a></li> <li>2. <a href="http://www.tutorialspoint.com/hadoop/">http://www.tutorialspoint.com/hadoop/</a></li> <li>3. <a href="https://aws.amazon.com/">https://aws.amazon.com/</a></li> <li>4. <a href="http://www.tutorialspoint.com/zookeeper/">http://www.tutorialspoint.com/zookeeper/</a></li> <li>5. <a href="https://cloud.google.com/appengine/docs/java/gettingstarted/creating-guestbook">https://cloud.google.com/appengine/docs/java/gettingstarted/creating-guestbook</a></li> <li>6. <a href="https://www.zdnet.com/article/yahoo-pipes-tutorial-build-an-rss-mashup/">https://www.zdnet.com/article/yahoo-pipes-tutorial-build-an-rss-mashup/</a></li> </ol>	
<b>SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 36 STUDENTS:</b>	
<b>HARDWARE:</b> Intel Desktop Systems: 36 nos	
<b>SOFTWARE:</b> Globus Toolkit or equivalent Eucalyptus or Open Nebula.	