Lab Code	Course Name	Credits
CSL803	**Cloud Computing Lab**	**2**

Lab Objectives: The course will help the learners to get familiar with

1. Key concepts of virtualization.
2. Various deployment models such as private, public, hybrid and community.
3. Various service models such as IaaS and PaaS.
4. Security and Privacy issues in cloud.

Lab Outcomes: On completion of the course learners will be able to

1. Adapt different types of virtualization and increase resource utilization.
2. Build a private cloud using open source technologies.
3. Analyze security issues on cloud.
4. Develop real world web applications and deploy on commercial cloud.
5. Demonstrate various service models.

Module	Detailed Contents	Hours
01	**Title:** Study of NIST model of cloud computing. **Objective:** Understand deployment models, service models, advantages of cloud computing.	2
02	**Title:** Virtualization. **Objective**: Understand different types of virtualizations, Host and bare metal hypervisors and implement horizontal scalability. **Technology:** XEN/ Vmwares EXSi	2
03	**Title:** Infrastructure as a Service. **Objective:** Implement IaaS using your resources. **Technology:** Open Stack / Eucalyptus	2
04	**Title:** Identity Management in Cloud **Concept:** Simulate identity management in your private cloud. **Technology:** Open Stack	2
05	**Title:** Storage as a Service **Objective:** Explore Storage as a Service for remote file access using web interface. **Technology:** ownCloud	2
06	**Title:** Cloud Security **Objective:** Understand security of web server and data directory. **Technology:** ownCloud	2
07	**Title:** Platform as a Service **Objective:** Deploy web applications on commercial cloud. **Technology:** Google appEngine/ Windows Azure	2
08	**Title:** Amazon Web Service **Objective:** To create and access VM instances and demonstrate various	2

	components such as EC2, S3, Simple DB, DynamoDB. **Technology:** AWS	
09	**Title:** Software as a Service **Objective:** Understand on demand application delivery and Virtual desktop infrastructure. **Technology:** Ulteo	2
10	**Title: Case Study on Fog Computing** **Objective**: To have a basic understanding of implementation/applications of fog computing.	2
11	**Title:** Mini Project **Objective:** Using the concepts studied throughout the semester students shall be able to 1. Create their private cloud for the institute using the available resources. 2. Apply security concepts to secure a private cloud. 3. Implement efficient load balancing. 4. Compare various virtualization technologies with given resource. 5. Create cloud applications such as messenger, photo editing website, your own social media etc. **Note:** Evaluators must check if students have used appropriate cloud computing tools for their projects.	6

Digital Material

www.openstack.org

Text Books:

1. Enterprise Cloud Computing by Gautam Shroff, Cambridge,2010
2. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley - India, 2010 ,
3. Getting Started with OwnCloud by Aditya Patawar , Packt Publishing Ltd, 2013

Term Work:

- Term work should consist of at least 6 experiments and a mini project.
- Journal must include at least 2 assignments.
- The final certification and acceptance of term work indicates that performance in laboratory work is satisfactory and minimum passing marks may be given in term work.
- The distribution of marks for term work shall be as follows:
- Laboratory work (experiments): …….. (15) Marks.
- Mini project..... …… (15) Marks.
- Mini Project Presentation & Report..... (10) Marks
  Assignments..... (05) Marks
- Attendance ……..(05) Marks
- **TOTAL: ……(50) Marks.**

Practical and Oral examination will be based on Laboratory work, mini project and above syllabus.