**Velammal College of Engineering and Technology, Madurai – 625 009**

**Department of Computer Science and Engineering**

**Syllabus**

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| **Course Code-Title** | **CS6703 /GRID AND CLOUD COMPUTING** |
| **Course Component** | Core |
| **Contact Hours** | Lecture | Tutorial | Practical | Total Hours | Credit |
| 3 | 0 | 0 | 45 | 3 |
| **Course Assessment methods**  | **Continuous** | **Semester-end assessment** |
| **Cycle Tests****Model Exam****Assignments** | **Student Course exit survey** |
| **Prerequisite Courses** | * Knowledge in Computer Networks,Distributed Systems
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| **Course Objective**  | The student should be made to:* Understand how Grid computing helps in solving large scale scientific problems.
* Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
* Learn how to program the grid and the cloud.
* Understand the security issues in the grid and the cloud environment.
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| **TOPICS TO BE COVERED****UNIT I INTRODUCTION 9**Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture**.****UNIT II GRID SERVICES 9**Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services. **UNIT III VIRTUALIZATION 9**Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation. **UNIT IV PROGRAMMING MODEL 9** Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write. **UNIT V SECURITY 9** Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud. **Total : 45** |
| **Course Outcomes** | **Upon completion of the course the student will****CO1:** Describe the evolution of distributed computing[K2]**CO2:** Explain the architecture, standards, elements and services of grid computing [K2]**CO3:** Distinguish the various deployment model and categories of cloud [K2]**CO4:** Implement the virtualization techniques using VMware [K3]**CO5:** Demonstrate the concepts of grid middleware packages using Globus Toolkit [K3]**CO6:** Illustrate the concepts of map reduce and Hadoop file system [K2]**CO7:** Interpret the security models in the grid and the cloud environment [K2] |
| **TEXT BOOK(S)**T1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, “Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet”, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012 |
| **REFERENCES**R1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, A Press, 2009R2. Tom White, “Hadoop The Definitive Guide”, First Edition. O‟Reilly, 2009. R3. Bart Jacob (Editor), “Introduction to Grid Computing”, IBM Red Books, Vervante, 2005 R4. Ian Foster, Carl Kesselman, “The Grid: Blueprint for a New Computing Infrastructure”, 2nd Edition, Morgan Kaufmann. R5. Frederic Magoules and Jie Pan, “Introduction to Grid Computing” CRC Press, 2009. R6. Daniel Minoli, “A Networking Approach to Grid Computing”, John Wiley Publication, 2005. R7. Barry Wilkinson, “Grid Computing: Techniques and Applications”, Chapman and Hall, CRC, Taylor and Francis Group, 2010. |
| **WEB MATERIALS**W1.<http://toolkit.globus.org/alliance/publications/papers/IFIP-2005.pdf>W2. <https://www.cs.umd.edu/class/spring2004/cmsc818s/Lectures/Chapter17-Grid2.pdf>W3. <http://flylib.com/books/en/1.414.1.53/1/>W4. <http://www.tutorialspoint.com/hadoop/hadoop_introduction.htm>W5. <https://opensource.com/life/14/8/intro-apache-hadoop-big-data> |