Name of Department:- Computer Science and Engineering

1. Subject Code: TCS 451 Course Title: **Virtualization and Cloud Computing**
2. Contact Hours: L: 3 T: - P: 2
3. Semester: IV
4. Pre-requisite: TCS 101, TCS351
5. Course Outcomes: After completion of the course students will be able to

    1. Understand the concepts applied in Cloud Computing
    2. Describe the different paradigms of cloud computing
    3. Implement the Virtualization
    4. Compare parallel and distributed computing
    5. Describe the architectures of cloud computing.
    6. Use the cloud services

6. Detailed Syllabus

Sl. No.	Contents	Contact Hours
Unit -1	**Understand the Concepts in Cloud Computing and its Use** Why Cloud Computing (CC)? Different Perspectives on CC, Different Stakeholders in CC, Total cost of ownership (TCO), Characteristics of cloud computing, Characteristics of cloud computing as per NIST, Cloud Definitions	08
Unit -2	**Unit- 2 Introduction to Cloud Computing** Cloud Computing at a Glance, The Vision of Cloud Computing, Cloud Computing Reference Model, Challenges Ahead, Historical Developments, Distributed Systems, Virtualization, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing, Building Cloud Computing Environments, Application Development, Infrastructure and System Development, Computing Platforms and Technologies, Amazon Web Services (AWS), Google AppEngine, Microsoft Azure, Hadoop, Force.com and Salesforce.com	08
Unit -3	**Virtualization** Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Execution Virtualization, Other Types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples,	10

	Xen: Para virtualization, VMware: Full Virtualization, Microsoft Hyper-V	
Unit-4	**Principles of Parallel and Distributed Computing** Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing, What is Parallel Processing?, Hardware Architectures for Parallel Processing, Approaches to Parallel Programming, Levels of Parallelism, Laws of Caution, Elements of Distributed Computing, General Concepts and Definitions, Components of a Distributed System, Architectural Styles for Distributed Computing, Models for Inter-Process Communication, Technologies for Distributed Computing, Remote Procedure Call, Distributed Object Frameworks, Service Oriented Computing	10
Unit-5	**Cloud Computing Architecture** Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds, Public Clouds, Private Clouds Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges, Cloud Interoperability and Standards, Scalability and Fault Tolerance, Security, Trust, and Privacy, Organizational Aspects	08
	Total	44

Text Books:

1. Raj Kumar Buyya," Mastering the Cloud Computing",MacGraw Hill Education (India), 2013
2. Tim Mather, SubraKumaraswamy, ShahedLatif:" Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance"
3. J.R. ("Vic") Winkler: "Securing the Cloud"
4. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs", Emereo Pty Limited, July 2008.

Reference Books:

5. Michael Miller," Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
6. David Chisnall, "The Definitive Guide to Xen Hypervisor", Prentice Hall; Reprint edition (9 November 2007)