SEMESTER	VIII					
YEAR	IV					
COURSE CODE	21CS4806					
TITLE OF THE COURSE	CLOUD INFRASTRUCTURE MANAGEMENT					
SCHEME OF INSTRUCTION	Lecture Hours	Tutorial Hours	Practical Hours	Seminar/Projects Hours	Total Hours	Credits
	3	-	-		39	3

Perquisite Courses (if any):

#	Sem/Year	Course Code	Title of the Course
*	***	*	***

COURSE OBJECTIVES:

- **Understand** Cloud Computing architecture for various Cloud based enterprises, challenges, workflow and architectural style of cloud computing.
- **Comprehend** Cloud Enabling Technologies that includes: virtualization technologies and their role in cloud computing, Differentiate between full and para virtualization, and Cloud resource management and scheduling
- **Analyze** Cloud storage Mechanisms and evaluate various infrastructure components in a cloud environment
- **Identify** common security challenges in cloud computing, Discuss security and privacy concern for cloud users, virtual machines and shared images.
- **Evaluate** the key technologies used in Xen VMM and various cloud applications

COURSE OUTCOMES:

Course Outcome	Description	Bloom's Taxonomy Level
At the end of the course the student will be able to:		
1	Examine the cloud computing infrastructure at Amazon, Google, and Microsoft and analyse the challenges of cloud.	L4
2	Identify the different layers of virtualization and make use of the proper scheduling algorithm to manage the resources.	L3
3	Compare the different types of file system used in cloud environment and analyze the transaction process using NoSQL databases.	L4, L5
4	Analyze the core issues of cloud computing, such as security, privacy, and interoperability.	L4

5	Evaluate the effectiveness of different cloud computing solutions for various applications.	L5

COURSE CONTENT:

MODULE 1: Cloud Infrastructure and Application Paradigms	9Hrs

Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Open source software platforms for private clouds, Cloud storage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User experience and software licensing. *(Textbook-1: Chapter 3: 67-95).*

Challenges of cloud computing, Architectural styles of cloud computing, Workflows: Coordination of multiple activities, Coordination based on a state machine model: The Zookeeper, The Map Reduce programming model. *(Textbook-1: Chapter 4: 99-115).*

MODULE 2: Virtualization and Resource Management & Scheduling	9Hrs

Virtualization, Layering and virtualization, Virtual machine monitors, Virtual Machines, Performance and Security Isolation, Full virtualization and para virtualization, Hardware support for virtualization. *(Textbook-1: Chapter 5: 132-142).*

Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, Stability of a two level resource allocation architecture, Scheduling algorithms for computing clouds, Fair queuing, Start-time fair queuing, Borrowed virtual time, Cloud scheduling subject to deadlines, Scheduling MapReduce applications subject to deadlines, Resource management and dynamic scaling. *(Textbook-1: Chapter 6: 164, 182-201).*

MODULE 3: Cloud Storage Structure	7Hrs

The Evolution of Storage Technology, Storage Models, File Systems, and Databases, Distributed File Systems: The Precursors, General Parallel File System, Google File System, Apache Hadoop, Locks and Chubby: A Locking Service, Transaction Processing and NoSQL Databases, BigTable, Megastore. *(Textbook-1: Chapter 8: 242-278).*

MODULE 4: Cloud Security and Mechanisms	7Hrs

Cloud Security, Cloud Application Development: Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Security risks posed by shared images, Security risks posed by a management OS, A trusted virtual machine monitor. *(Textbook-1: Chapter 9: 274-298).*

MODULE 5: Case Study	7Hrs

The Grep The Web application, Cloud for science and engineering, High performance computing on a cloud, Cloud computing for Social computing, digital content and cloud computing *(Textbook-1: Chapter 4: 118-128).*
Xen a VMM based para virtualization, Optimization of network virtualization, vBlades, Performance comparison of virtual machines, The dark side of virtualization
(Textbook-1: Chapter 5: 144-156).

TEXT BOOKS:

1. Cloud Computing: Theory and Practice, Dan C Marinescu Elsevier (MK), 2013.

REFERENCE BOOKS:

1. Computing Principles and Paradigms, RajkumarBuyya , James Broberg, Andrzej Goscinsk,i Willey, 2014.

2. Cloud Computing Implementation, Management and Security John W Rittinghouse, James F Ransome, CRC Press, 2013.