COURSE CONTENT

CLOUD COMPUTING								
II Semester: M. Tech (CSE)								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
BCSE22	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**0**	**0**	**3**	**40**	**60**	**100**
Contact Classes: 48	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 48**		
Prerequisites: Computer Networks								

I. COURSE OVERVIEW:

This course provides a comprehensive introduction to Cloud Computing, covering its evolution, service and deployment models, and underlying virtualization technologies. Students will learn about cloud architectures, networking, and applications, along with security challenges and solutions. The course emphasizes practical understanding through examples of major cloud providers and explores the design and management of scalable, on-demand cloud services.

II. COURSE OBJECTIVES:

The students will try to learn

I. The fundamentals of cloud computing, its service and deployment models.
II. The concepts of virtualization, cloud architecture, networking, and cloud-based applications.
III. The cloud security challenges, solutions, and real-world case studies.

III. COURSE OUTCOMES:

At the end of the course, students should be able to:

CO1 Describe the evolution of cloud computing, service models (IaaS, PaaS, SaaS), and deployment models
CO2 Explain virtualization concepts, hypervisors, VM migration, and resource management in cloud environments
CO3 Analyze cloud architectures, networking, and data center designs to support scalable and efficient cloud services.
CO4 Demonstrate the development and deployment of cloud-based applications using popular platforms and tools.
CO5 Evaluate cloud security challenges, implement appropriate solutions, and assess real-world cloud case studies
CO6 Apply cloud service management principles to optimize performance, cost, and scalability in real-world scenarios.

IV. COURSE CONTENT:

MODULE–I: INTRODUCTION TO CLOUD COMPUTING (9)

Evolution of Cloud Computing –System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture -IaaS – On-demand Provisioning – Elasticity in Cloud – E.g.of IaaS Providers - PaaS – E.g. of PaaS Providers - SaaS – E.g. of SaaS Providers – Public ,Private and Hybrid Clouds.

MODULE–II: VIRTUALIZATION TECHNOLOGY (10)

Definition, Understanding and Benefits of Virtualization. Implementation Level of Virtualization, Virtualization Structure/Tools and Mechanisms, Hypervisor, VMware, KVM, Xen. Virtualization of CPU, Memory, I/O Devices, Virtual Cluster and Resources Management, SLA & Power consumption management, Virtualization of Server.VM Migration

MODULE-III: NETWORKING SUPPORT FOR CLOUD COMPUTING (10)

Ubiquitous Cloud and the Internet of Things. Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Services models, Data center Design and interconnection Network, Architectural design of Computer and Storage Clouds.

MODULE-IV: CLOUD APPLICATIONS (10)

Web-Based Application, Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Software as a Service, Platform as a Service, Web Services, On Demand Computing, Discovering Cloud Services, Development Services and Tools, Amazon Ec2, Google App Engine, IBM Clouds

MODULE-V: SECURITY IN THE CLOUD (9)

Security Overview – Cloud Security Challenges – Software-as-a-Service Security– Security Governance – Risk Management – Security Monitoring –Security Architecture Design – Data Security – Application Security – Virtual Machine Security. Case studies: Cloud computing systems from Amazon, Microsoft and IBM.

V. TEXT BOOKS:

1. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley ," Cloud Computing: Principles and Paradigms", Editors:2011.
2. Ronald L. Krutz, Russell Dean Vines, Wiley," Cloud Security: A Comprehensive Guide to Secure Cloud Computing", India,2010.

VI. REFERENCE BOOKS:

1. Kai Hwang, Jack Dongarra, Geoffrey C. Fox, "Distributed and Cloud Computing", Morgan Kaufmann, 1st edition, 2013.
2. Rajkumar Buyya, Christian Vecchiola and S. Thamarai Selvi, "Mastering Cloud Computing: Foundations and Applications Programming", Morgan Kaufmann, 2013.
3. Gautam Shroff," Enterprise Cloud Computing - Technology, Architecture, Applications", Cambridge University Press, 2010.

VII. ELECTRONICS RESOURCES:

1. https://www.geeksforgeeks.org/cloud-computing/cloud-computing
2. https://www.ibm.com/think/topics/cloud-computing
3. https://aws.amazon.com

VIII. MATERIALS ONLINE:

1. Course Outline Description
2. Tutorial question bank
3. Tech talk topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes

10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)