# CLOUD COMPUTING

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# PREFACE

Cloud computing is an emerging discipline which is essential for changing corporate computing ways. It is a transformative paradigm that enables on-demand access to a shared pool of configurable computing, scalable, expedient and networking resources, for competently delivering applications and services over the internet.

It gives us pleasure to present the book "Cloud Computing" for the students of final year degree course in Computer Science and Engineering and Information Technology. This book is strictly as per the New Revised Syllabus of 2017 Regulation of Anna University.

The book is written such that all the basic concepts are explained in simplified manner. It is presented in a conceptual manner. And it is our objective to present systematic, consistent, intensive and clear through explanatory notes and figures.

The suggestions of our esteemed readers are welcomed and will be highly appreciated.

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✍ *Dr. K. Ravi Kumar*

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✍ *Dr G. Simi Margarat*

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## CS8791 CLOUD COMPUTING L T P C 3 0 0 3

**OBJECTIVES:** To understand the concept of cloud computing.

- To appreciate the evolution of cloud from the existing technologies.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

### UNIT I : INTRODUCTION 9

Introduction to Cloud Computing – Definition of Cloud – Evolution of Cloud Computing – Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – Ondemand Provisioning.

### UNIT II : CLOUD ENABLING TECHNOLOGIES 10

Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish-Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU – Memory – I/O Devices – Virtualization Support and Disaster Recovery.

### UNIT III : CLOUD ARCHITECTURE, SERVICES AND STORAGE 8

Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and

Hybrid Clouds - laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.

**UNIT IV : RESOURCE MANAGEMENT AND SECURITY IN CLOUD 10**

Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud Resources – Security Overview – Cloud Security Challenges – Softwareas-a-Service Security – Security Governance – Virtual Machine Security – IAM – Security Standards.

**UNIT V : CLOUD TECHNOLOGIES AND ADVANCEMENTS 8**

Hadoop – MapReduce – Virtual Box -- Google App Engine – Programming Environment for Google App Engine —– Open Stack – Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation.

**TOTAL: 45 PERIODS**

**OUTCOMES:** On Completion of the course, the students should be able to:

Articulate the main concepts, key technologies, strengths and limitations of cloud computing.

- Learn the key and enabling technologies that help in the development of cloud.
- Develop the ability to understand and use the architecture of compute and storage cloud, service

and delivery models.

- Explain the core issues of cloud computing such as resource management and security.
- Be able to install and use current cloud technologies.
- Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

**TEXT BOOKS:**


1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

2. Rittinghouse, John W., and James F. Ransome, ―Cloud Computing: Implementation, Management and Security‖, CRC Press, 2017.


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1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing‖, Tata Mcgraw Hill, 2013.

2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach‖, Tata Mcgraw Hill, 2009. 3. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)‖, O'Reilly, 2009.

*Dedication*

*To Our Beloved Children*

*Sharon & Sherly*