**NIRMA UNIVERSITY**

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| **Institute:** | Institute of Technology |
| **Name of Programme:** | BTech All (Other than CSE) |
| **Course Code:** | 3CS402CC24 |
| **Course Title:** | Cloud Computing |
| **Course Type:** | Interdisciplinary Minor-Elective |
| **Year of Introduction:** | 2025-26 |

| L | T | Practical Component | | | | C |
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**Course Learning Outcomes (CLO):**

At the end of the course, the students will be able to -

1. explain the importance of virtualization in support of cloud computing (BL2)
2. classify the services and deployment models of the cloud (BL4)
3. determine the issues related to cloud computing (BL5)
4. develop an application exhibiting the features of the cloud. (BL6)

| Unit | Contents | Teaching Hours (Total 45) |
|---|---|---|
| Unit-I | **Cloud Fundamentals**: Traditional computing paradigm trends, computing paradigm evolution, Introduction and understanding of cloud computing, concepts and models, types of cloud, cloud services: Benefits and challenges of cloud computing, Applications of cloud computing, Business models around Cloud, Major Players in Cloud Computing. | 10 |
| Unit-II | **Abstraction and Virtualization:** Introduction to Virtualization Technologies, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context, Virtualization of CPU, Memory, I/O Devices, Virtual Clusters, and Resource Management, Virtualization for Data Center Automation. | 10 |
| Unit-III | **Cloud Infrastructure and Resource Management:** Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, InterCloud Resource Management, Cloud Usage Monitor, Load Balancer, SLA Monitor, Failover System, Automated Scaling Cloud Management Mechanisms, Resource Management System, SLA Management System, Cloud Security Mechanisms, CASE STUDY examples. | 10 |
| Unit-IV | **Working with a cloud:** Cloud Managed services like databases, Serverless Computing, Cloud formation and deployment pipeline, and enterprise cloud solutions. | 08 |
| Unit-V | **Industrial Cloud Platforms and Applications:** Cloud platforms in the industry, such as AWS, Google App Engine, Microsoft Azure, and Best Practices in Architecting Cloud Applications. | 07 |

**Self-Study:**
The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

**Suggested Readings/ References:**


1. Rajkumar Buyya, James Broberg, Andrzej M Goscinski, Cloud Computing: Principles and Paradigms, Wiley
2. Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, Cloud Computing Concepts, Technology & Architecture, Prentice Hall
3. Toby Velte, Anthony Velte, Cloud Computing: A Practical Approach, McGraw-Hill
4. George Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly
5. John Rhoton, Cloud Computing Explained: Implementation Handbook for Enterprises, Recursive Press
6. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing Foundations and Applications Programming, McGraw Hill


**Suggested List of Experiments:**

| Sr. No. | Title | Hours |
|---|---|---|
| 1 | Configuring and installing Cloud Sim/Analyst to simulate and evaluate various cloud configuration parameters. | 04 |
| 2 | Configuring Identity and Access Management services for resource management in the cloud. | 04 |
| 3 | Creating a virtual instance and hosting a website on the cloud. | 02 |
| 4 | Implementing a load balancer for websites on the cloud. | 02 |
| 5 | Developing an application using the Google App engine. | 04 |
| 6 | Developing an application using serverless computing service. | 06 |
| 7 | Developing an application based on database service on the cloud. | 06 |