

**Nirma University**  
**Institute of Technology, School of Technology**  
**M Tech Computer Science and Engineering**  
**Semester – II**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
3	0	2	4

<b>Course Code</b>	3CS12D303
<b>Course Name</b>	Cloud Computing

**Course Learning Outcomes (CLOs):**

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

1. describe the hardware and software concepts and architecture of cloud computing
2. recognize the importance of virtualization technology in support of cloud computing
3. explore the basic ideas and principles in data center design, cloud management techniques and cloud software deployment considerations,
4. analyse the issues related to cloud computing data centres

**Syllabus:**

**Teaching Hours**

**Unit I**

**Fundamentals of cloud computing:** Cloud Computing characteristics, private, public and hybrid cloud. Cloud types, IaaS, PaaS, SaaS, Benefits and challenges of cloud computing, public vs private clouds, Performance, Security, and Energy Efficiency.

**8**

**Unit II**

**Virtual Machines and Virtualization:** Levels of virtualization and mechanisms, Virtualization of resources, virtual clusters and resource management, Full and Para virtualization

**5**

**Unit III**

**Cloud Platform Architecture over Virtualized Data Centers:** Data-Center Design and Interconnection Networks, Architectural Design, Inter-cloud Resource Management, Cloud Security and Trust Management.

**6**

**Unit IV**

Service quality metrics and SLAs (service level agreements), Service scalability and resiliency metrics, SLA Guidelines, cloud usage monitor, Case study example for SLA monitor

**8**

**Unit V**

**Advance cloud architecture:** Zero downtime, Cloud balancing architecture, resource reservation, dynamic failure detection and recovery architecture, cloud bursting architecture, Emerging technologies: Autonomic computing, Introduction to Edge and Fog Computing

**10**

## **Unit VI**

**8**

Cloud security mechanism, cloud security threats, Public key architecture, SSO, IAM, cloud based security groups, Case study example

### **Self Study:**

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

### **Laboratory Work:**

Laboratory work will be based on above syllabus with minimum 5 experiments to be incorporated.

### **Suggested Readings<sup>^</sup>:**

1. Rajkumar Buyya, James Broberg, Andrzej M Goscinski, Cloud Computing: Principles and Paradigms, Wiley Publication.
2. Thomas Erl, Z Mahmood and Ricardo Puttini, Cloud computing concepts, technology and architecture, Prentice Hall
3. Kai Hwang, Jack Dongarra and Geoffrey C. Fox, Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future Internet, Elsevier
4. Gautam Shroff, Enterprise Cloud Computing: Technology, Architecture, and Applications, Cambridge University Pres
5. Toby Velte, Anthony Velte, Cloud Computing, A Practical Approach, McGraw-Hill Osborne Media, McGraw-Hill
6. Selected Research Papers from Various Sources.

L=Lecture, T=Tutorial, P=Practical, C=Credit

---

<sup>^</sup>this is not an exhaustive list