

NIRMA UNIVERSITY
Institute of Technology
B. Tech. Computer Science and Engineering
Semester – VI
Department Elective –II

L	T	P	C
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Course Code	2CSDE67
Course Title	Cloud Computing

Course Outcomes:

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

1. explain core concepts of cloud computing, its services and models
2. discuss systems, hardware and application virtualization and outline their role in enabling cloud services
3. explore the issues related to cloud computing and its application
4. apply fundamental concepts in cloud infrastructures to build and deploy cloud applications.

Syllabus

**Teaching
Hours: 45**

Unit I

Cloud Fundamentals and Virtualization: Introduction and understanding of cloud computing, concepts and models, Cloud enabling technologies and fundamental cloud security and requirements, virtual machines and virtualization of clusters and data centres, Applications of Virtual Machines, Implementation levels of virtualization, Virtualization structures/Tools and Mechanism, Virtualization of CPUs, Memory and I/O devices.

08

Unit II

Cloud delivery model: IaaS, PaaS and SaaS, Cloud delivery model with the perspective of cloud provider and the cloud consumer.

03

Unit III

Cloud Computing Mechanisms: Cloud Infrastructure, Logical Network Perimeter, Virtual Server, Cloud Storage Device, Cloud Usage Monitor, Specialized Cloud Mechanisms, Load Balancer, SLA Monitor, Failover System, Hypervisor, Automated Scaling Cloud Management Mechanisms, Resource Management System, SLA Management System, CASE STUDY examples.

07

Unit IV	08
Cloud Computing Architecture: Fundamental cloud architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, advanced cloud architecture, Zero Downtime Architecture, Resource Reservation Architecture, Dynamic Failure Detection and Recovery Architecture, Storage Workload Management Architecture.	
Unit V	
Working with the cloud: Cost metrics and pricing models, , Cloud usages cost metrics and SLAs, service quality metrics, CASE STUDY examples	08
Unit VI	
Security: Introduction, Cloud Storage: from LANs to WANs, Technologies for Data Security in Cloud Computing, Security Concerns, Legal issues and Aspects, Securing the Private and Public Cloud Architecture.	06
Unit VII	
Achieving production readiness for cloud services: Industry Standards Organizations, Mapping Mechanisms to Characteristics, Cloud-Adapted Risk Management Framework, Cloud Business Case Template	05

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 the above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings[^]:

1. Rajkumar Buyya, James Broberg, Andrzej M Goscinski, Cloud Computing: Principles and Paradigms, Wiley publication
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 Osborne Media
4. George Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly Publication
5. John Rhoton, Cloud Computing Explained: Implementation Handbook for Enterprises, Recursive Press
6. RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing Foundations and Applications Programming, McGraw Hill

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

[^]this is not an exhaustive list