

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0805
Course Title:	Cloud Computing
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLO):

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:

Total Teaching hours: 30

Unit	Syllabus	Teaching hours
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 centers, Applications of Virtual Machines.	05
Unit-II	Cloud delivery model: IaaS, PaaS, and SaaS, Cloud delivery model with the perspective of the 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	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.	08

Unit-V **Working with the cloud metrics, security issues, and production readiness:** Cost metrics and pricing models, Cloud usages cost metrics and SLAs, service quality metrics, Technologies for Data Security in Cloud Computing, Security Concerns, Legal issues, and Aspects, Securing the Private and Public Cloud Architecture. Industry Standards Organizations, Mapping Mechanisms to Characteristics, Cloud-Adapted Risk Management Framework, Cloud Business Case Template. 07

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

- Suggested Readings/References:
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. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing Foundations and Applications Programming, McGraw Hill

Suggested List of Experiments:	Sr. No.	Title	Hours
	1	To Install and study the simulation tool (Cloud Analyst) with various features. Also, explore the utilities/usages of the Brokers and Load balancers in the simulations.	02
	2	To execute the scenario for the following condition: to create the number of a minimum of five datacenters and apply the five-user base. Also, generate the report using the Cloud Analyst GUI tool.	02
	3	To learn the use of computing and container services on any one of the cloud platforms: AWS/Google/Azure/IBM/Any other.	02
	4	To host a website (both static and dynamic environment) in the AWS public cloud and analyzing the utility of its resources.	02
	5	To understand the mechanism of the load balancing in Cloud Computing and implementing the same in the AWS public cloud using a Classical Load Balancer.	02
	6	To understand the mechanism of the Auto-scaling and elastic nature of the AWS public cloud and implement the same by using a maximum of three EC2 instances in the AWS.	02
	7	Using the AWS S3 (Simple Storage Service), implement the configuration management technique and validate the access rights as public and private.	02

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| 8 | To understand the PAAS model of the IBM Cloud and run a web application onto the already available readymade environment (with all the necessary available platforms). | 02 |
| 9 | To work with the IAM (Identity Access Management) of the AWS (Amazon Web Services) Cloud and to enables the access management mechanism in AWS for Cloud security. Also, create and manage AWS users and groups, and use permissions to allow and deny their access to AWS resources. | 02 |
| 10 | Understanding the architecture and workflow of the cloud sim and workflow sim. Analyze its results to understand load balancing, scheduling, and failure handling techniques. | 02 |

Suggested Case List: -NA-