

**NIRMA UNIVERSITY**

<b>Institute:</b>	Institute of Technology
<b>Name of Programme:</b>	Master of Computer Application (2-Years Programme)
<b>Course Code:</b>	3MCA303
<b>Course Title:</b>	Cloud Computing
<b>Course Type:</b>	Core
<b>Year of Introduction:</b>	2021-22

**Credit Scheme**

L	T	Practical Component				C
		LPW	PW	W	S	
3	0	2	-	-	-	4

**Course Learning Outcomes (CLO):**

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

1. interpret the issues related to cloud computing and its applications
2. identify various cloud service delivery models and platforms
3. build cloud services and applications
4. apply security aspects and configure the cloud

**Syllabus:**

**Total Teaching hours: 45**

Unit	Syllabus	Teaching hours
Unit-I	<b>Introduction:</b> Cloud computing introduction, Roots of cloud computing, Layers of clouds, desired features of cloud, Cloud infrastructure management, Cloud reference model, and types of clouds. Cloud Services, Challenges and risks	07
Unit-II	<b>Virtualization and Cloud Computing Architecture:</b> Virtual machines and characteristics of virtual environments, taxonomy, virtualization and cloud computing technology examples, virtualization of clusters and data centers, Applications of virtual machines, Implementation levels of virtualization, Virtualization structures/tools and mechanism, Virtualization of CPUs, Memory, applications and I/O devices	07
Unit-III	<b>Cloud Services:</b> Evolution of SaaS, Challenges of SaaS paradigm, SaaS integration services, SaaS integration of products and platforms, Virtual machines provisioning and manageability-introduction, Virtual machine migration services, Integration of private and public cloud, Technologies and tools for cloud computing, Aneka cloud platform, Resource provisioning Services, Related real-time case studies	15
Unit-IV	<b>Migrating into a Cloud:</b> Cloud services for individuals, Cloud services aimed at the mid-market, Enterprise class cloud offering	03
Unit-V	<b>SLA Management in Cloud Computing, Data Security in the cloud:</b> Inspiration, Traditional approaches to SLO management, policies and metrics, Types of SLA, Life cycle of SLA, SLA management in cloud, identity, digital identity and data security	07



Unit-VI **Cloud Platforms in Industry:** Amazon web Services compute services, Storage Services, Communication Services, Google AppEngine Architecture and core concepts, Application Life Cycle, cost model, Microsoft Azure core concepts, SQL Azure, Windows Azure platform appliance 06

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. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing: Foundations and applications programming, Elsevier Morgan Kaufmann.
  3. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Cloud Computing – A Practical Approach, Tata McGraw Hill Education.
  4. Munindar P. Singh, Michael N. Huhns, Service-Oriented Computing – Semantics, Processes, Agents, Wiley India Pvt. Ltd.
  5. Barrie Sosinsky, Cloud Computing Bible, Willey Publication.
  6. George Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly Publication.

Suggested List of Experiments:	Sr. No.	Title	Hours
	1	To Install and study the Simulation tool (Cloud Analyst) with various features.	02
	2	To execute the scenario for the following condition. To create number of minimum five datacentres and apply the five user base. Also generate the report using Cloud Analyst GUI tool.	02
	3	To learn the use of compute and container services on any one of the cloud platform: AWS/Google/Azure/IBM/Any other.	03
	4	To learn the use of database and storage services on any one of the cloud platform: AWS/Google/Azure/IBM/Any other.	03
	5	To configure and use Kubernetes Engine for getting hands-on with the PAAS model of the cloud platform. Any one of the cloud platform: AWS/Google/Azure/IBM/Any-other may be used to complete the experiment.	03
	6	To configure and use Google App engine for getting hands-on with the PAAS model of the cloud platform. Any one of the cloud platform: AWS/Google/Azure/IBM/Any-other may be used to complete the experiment.	03

- |    |                                                                                                                                                                                                                                     |    |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 7  | To create scaling policy and migrate VMs from one physical server to another and to migrate resources from one VM to another. Any one of the cloud platform: AWS/Google/Azure/IBM/Any-other may be used to complete the experiment. | 04 |
| 8  | To build and manage the secure applications in the cloud using DevOps and other Developer Tools. Any one of the cloud platforms: AWS/Google/Azure/IBM/Any-other may be used to complete the experiment.                             | 04 |
| 9  | To create a sample mobile application using Microsoft Azure account as a cloud service. Also provide database connectivity with implemented mobile application.                                                                     | 03 |
| 10 | To create a sample mobile application using Amazon Web Service (AWS) account as a cloud service. Also provide database connectivity with implemented mobile application                                                             | 03 |

Suggested Case List:                    -NA-