Course Title : **Cloud Computing**
Course Code : COM XXX.3
Credit : 3
Class Load : 3 hours
Evaluation :

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	100	-	100

Course Objective:
The main objective of this course covering the concept of three main domains of Cloud Systems: Cloud Systems, Cloud applications and paradigms, and challenge in cloud.

1. **Introduction (6 Hrs)**
   Defining the Cloud, The Emergence of Cloud Computing, Grid Computing or Cloud Computing, Types of Cloud, Cloud Computing Paradigms and Services, Components of Cloud Computing, Ethical issues in Cloud Computing, Cloud Vulnerabilities, and Characteristic of Cloud Computing.

2. **Networks in Cloud Computing (6 Hrs)**
   Parallel Computing, Distributed Systems, Network Architecture for Cloud: Data Center Network, Data Center Interconnect Network and Internet, Foundations of Cloud Computing Infrastructures: Virtualization Technology, Automation in Cloud Computing, Network Architecture for Hybrid Deployment, Concept of Autonomic Computing, Open Source Software in Data Centers.

3. **Roles of Grid Computing and Autonomic Computing in Cloud Computing (6 Hrs)**
   Grid Computing, Interaction of Models of Grid and Cloud Computing, Distributed Computing in Grid and Cloud, Layered Models and Usages Patterns in Grid and Cloud, Interoperability in Grids and Clouds, Autonomic Computing, System Models of Autonomic Computing, Roles and Importance of Autonomic Computing in Cloud, Autonomic Cloud Computing.

4. **VT in Cloud Computing (3 Hrs)**
   Introduction to Virtualization Technology, Hypervisors (ESXi), Hypervisor Networks, Virtual Machines, VM management and configurations, Cloud Data stores, Cloud Computing and Virtualization, Academic Environment and Virtualization.

5. **Cloud Service Models and Cloud Infrastructure (6 Hrs)**
   Jericho Cloud Cube Model, Infrastructure-as-a-Service, Platform-as-a-Service, Software-as-a-Service, Communication-as-a-Service, Database-as-a-Service, Cloud Computing at Amazon, Amazon Web Services, Cloud Computing from the Google Perspective, Window Azure and Online Services, Open Source Software Platforms for Private Clouds.

6. **Service Oriented Architecture in Cloud Computing (6 Hrs)**
   Existing Cloud Application: Processing Pipelines, Batch Processing Systems, Parallel and Distributed Processing in Cloud Web Applications, Architecture Style for Cloud Applications, Workflow in Cloud Applications, Coordination Models, Hadoop System, Hadoop Distributed File System, Thread Programming, Task Programming and Map-Reduce Programming, Social Computing and Cloud Computing. Service Oriented Architecture (SOA), Characteristic of SOA.

7. **Security in Cloud Computing (6 Hrs)**
   Cloud Security Challenges, Dimensions of Cloud Security: Security and Privacy, Compliance, and Legal or Contractual Issues, Risk Management, Security Monitoring, Incident Response Planning, Security Architecture Design, Vulnerability Assessment, Data and Application Security, Virtual Machine Security, Handling Disasters management in Cloud.

8. **Case Studies: Cloud platforms and Applications (6 Hrs)**
   The Amazon Elastic Compute Cloud and IBMs Blue Cloud, Data Centre Networking Use Case Studies and Enabling Technologies and Protocols in Modern Data Centre, Case studies: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).

Practical:
There shall be application lab exercises covering all features of Cloud System

References:

1. Cloud Computing: Principle and Paradigms, Rajkumar Buyya and Willliam Voorsluys, James Broberg, Wiley Publication Inc.
2. Cloud Computing: Theory and Practice, Dan C. Marinescu, MK Publications.
3. Cloud Application Architeture, George Reese, O'Reilly Media Inc.
4. Cloud Computing for Dummies, Judith Hurwitz, Robin Bloor, Marcia Kufman, Wiley Publication Inc.
5. Handbook of Cloud Computing, Borko Furht, Armando Escalante, Springer, 2010.
6. Cloud Computing and SOA Convergence in Your Enterprise, a Step by Step Guide, David S. Linthcum, Addison Wesley Publication.